REMEDIAL ACTION WORK PLAN

for

1487 1st Avenue Redevelopment Site
New York, New York
NYSDEC BCP Site No. C231152

Prepared For:

CP VII 78th Street Owner, LLC
805 Third Avenue, 20th Floor
New York, New York 10022

Prepared By:

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
300 Kimball Drive
Parsippany, New Jersey 07054

5 April 2023

Langan Project No. 100963701

LANGAN

CERTIFICATION

I, Stewart Abrams, P.E., certify that I am currently a Professional Engineer as defined in 6 NYCRR Part 375 and that this Remedial Action Work Plan (RAWP) was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the Division of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10).

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

NYS Professional Engineer	April 5, 2023 Date	Signature

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

LANGAN

TABLES

FIGURES

APPENDICES

LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
AST	Aboveground Storage Tank
AWQS	Ambient Water Quality Standards
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
bgs	Below Ground Surface
BOA	Brownfield Opportunity Area
BTEX	Benzene, Toluene, Ethylbenzene, and Total Xylene
C/D	Construction/Demolition
CAMP	Community Air Monitoring Program
CCR	Construction Completion Report
CFR	Code of Federal Regulations
CHASP	Construction Health and Safety Plan
CQAP	Construction Quality Assurance Plan
COC	Contaminants of Concern
COD	Chemical Oxygen Demand
CPP	Citizen Participation Plan
CSM	Conceptual Site Model
CVOC	Chlorinated Volatile Organic Compound
DER	Division of Environmental Remediation
DMM	Division of Materials Management
DO	Dissolved Oxygen
DOT	Department of Transportation
EC	Engineering Control
el	Elevation
ELAP	Environmental Laboratory Approval Program
EPA	United States Environmental Protection Agency
EPH	Extractable Petroleum Hydrocarbons
ESA	Environmental Site Assessment
ESI	Environmental Site Investigation
eV	Electron Volt
FEMA	Federal Emergency Management Agency
FER	Final Engineering Report
FWRIA	Fish and Wildlife Resources Impact Analysis

Acronym	Definition
GPR	Ground Penetrating Radar
IC	Institutional Control
IRMWP	Interim Remedial Measures Work Plan
ISCO	In-Situ Chemical Oxidation
µg/L	Microgram Per Liter
µg/m^3	Microgram Per Cubic Meter
mg/kg	Milligram Per Kilogram
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MTBE	Methyl tert Butyl Ether
NAVD88	North American Vertical Datum of 1988
NYCRR	New York Codes, Rules and Regulations
NYCDEP	New York City Department of Environmental Protection
NYCDOB	New York City Department of Buildings
NYCOER	New York City Office of Environmental Remediation
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
ORP	Oxidation-Reduction Potential
OSHA	United States Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbon
PBS	Petroleum Bulk Storage
PCB	Polychlorinated Biphenyls
PCE	Tetrachloroethene
PG	Protection of Groundwater
PID	Photoionization Detector
PPE	Personal Protective Equipment
ppm	Parts per million
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QEP	Qualified Environmental Professional
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCA	Recycled Concrete Aggregate
RCRA	Resource Conservation and Recovery Act
RE	Remediation Engineer
REC	Recognized Environmental Condition

Acronym	Definition
RI	Remedial Investigation
RIR	Remedial Investigation Report
RURR	Restricted Use – Restricted Residential
SCG	Standards, Criteria, and Guidance
SCO	Soil Cleanup Objective
SMDS	Sub-Membrane Depressurization System
SMMP	Soil/Materials Management Plan
SMP	Site Management Plan
STARS	Spills Technology and Remediation Series
SVOC	Semivolatile Organic Compound
TAL	Target Analyte List
TCE	Trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Total Organic Carbon
TOGS	Technical and Operational Guidance Series
UST	Underground Storage Tank
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

This Remedial Action Work Plan (RAWP) was prepared on behalf of CP VII 78th Street Owner, LLC (Volunteer), for the ±10,050-square foot property located at 1487 First Avenue (Block 1452, Lot 27 [formerly consisting of Lots 27, 28, 29, and 30] (Figure 1) in the Upper East Side neighborhood of Manhattan, New York (hereinafter the "Site"). The Volunteer has enrolled in the New York State Brownfield Cleanup Program (BCP) as a Volunteer and will implement this RAWP pursuant to the Brownfield Cleanup Agreement (BCA) executed on 27 July 2022 with the New York State Department of Environmental Conservation (NYSDEC).

This RAWP summarizes the nature and extent of contamination as determined from data gathered during the Remedial Investigation (RI) work completed by Langan, provides evaluations of Track 1 and Track 2 remedies and associated costs, and recommends the preferred remedy. The remedy was selected consistent with the procedures defined in DER-10 and complies with applicable standards, criteria, and guidance, as well as with applicable federal, state and local laws, regulations and requirements.

Site Description/Physical Setting/Site History

The Site is located in the Upper East Side neighborhood of Manhattan, New York and is identified as Block 1452, Lot 27 [formerly consisting of Lots 27, 28, 29, and 30]. The Site is an approximately 10,050-square foot parcel bordered by the four-story 354 East 78th Street building to the west, East 78th Street to the north, 1st Avenue to the east, and the nine-story 1485 1st Avenue building to the south.

The Site was most recently occupied by two four-story vacant buildings in the southern and northwestern portions of the site that have been demolished. The remaining portions of the site consist of vacant land where former building basements were previously partially backfilled with remnant demolition debris from sidewalk level to the assumed depth of the former basement slabs at approximately 8 to 10 feet below sidewalk level (bsl) by the previous owner. The vacant portion of the site was heavily vegetated with uneven topography; however, vegetation was cleared and the remnant demolition debris was graded to a more even surface ranging from 4 to 8 feet bsl. Stone was imported in January 2022 from Clinton Quarry, located in Union Township, New Jersey, in order to grade the Site. Additional clean fill was imported in October and November 2022 from Allocco Recycling Corp. in accordance with the 25 October 2022 NYSDEC approval to level the Site in preparation for the demolition of the Site buildings. A site plan is provided as Figure 2.

According to a survey prepared by True North Surveyors, Inc. dated 29 April 2022, the sidewalk elevation slopes from the northwest corner (elevation 38.28) to the southeast corner (elevation 36.58). All elevations are North American Vertical Datum of 1988 (NAVD 88). Onsite elevations have not been surveyed; however, the surface of the graded demolition debris is between approximately 4 and 8 feet bsl.

According to the Phase I Environmental Site Assessment completed by Langan in January 2022, historical operations on the subject site included dyeing and cleaning operations between 1920 and 2005 on former Lot 28 and former Lot 30. A solvent tank was identified on the Sanborn Maps from 1951 to 2005 on former Lot 30.

The Site was identified in the NY Spills database for a release reported to the NYSDEC on 4 November 2009 and assigned Spill No. 0908776. According to the case narrative, a supply line for two 275-gallon fuel oil aboveground storage tanks (ASTs) was suspected to have leaked. The supply line was replaced and the spill was administratively closed on 2 December 2009.

Two fuel oil aboveground storage tanks (ASTs) have been documented at the Site: one is located in the basement of the vacant building in the northwestern corner of the Site and another was found buried in the debris of the building demolished by the previous owners. A release was observed when the second AST was discovered and reported to NYSDEC on 25 January 2022 and assigned Spill No. 2109276.

Summary of the Remedial Investigation Findings

The Remedial Investigation (RI) was completed in accordance with the Remedial Investigation Work Plan (RIWP) submitted with the BCP Application on 18 April 2022 and the revised RIWP submitted on 26 July 2022 in response to the 21 July 2022 RIWP Comment letter issued by the NYSDEC, and included the following scope of work:

- Advancement of 12 soil borings (LSB-16 through LSB-23, LSB-26, LSB-27, LSB-29, and LSB-30) and collection of thirty soil samples (including three duplicate samples);
    - Eight of the soil borings were completed for the purpose of Site-wide characterization and to supplement the 2022 Phase II Environmental Investigation
    - Four of the soil borings were completed for the purpose of delineating PCE impacts in the northern part of the Site
- Installation of five permanent groundwater monitoring wells (LMW-6 through LMW-10) and collection of five groundwater samples (including one duplicate sample);

- Installation of eight shallow bedrock monitoring wells (LMW-6R-S through LMW-13R-S) and eight deep bedrock wells (LMW-6R-D through LMW-13R-D);
- Downhole geophysical evaluation of the bedrock wells, hydraulic conductivity testing of specific fracture zones by packer testing, and additional groundwater sample collection and analysis for the completion of a treatability study;
- Initial bedrock groundwater sample collection via passive diffusion bag samplers.
- Survey and gauging of monitoring wells to evaluate groundwater elevation and flow direction; and,
- Installation of three exterior soil vapor sampling points (LSV-8 through LSV-10) and three interior soil vapor sampling points (LSV-11 through LSV-13) and collection of five soil vapor samples (including one duplicate sample) and two ambient air samples. And indoor air quality assessment was not completed.

The following remedial investigation scope of work was completed in December 2022:

- Hydraulic conductivity testing of specific fracture zones by packer testing.
- Collection of groundwater samples from the bedrock wells for laboratory analysis.

The following supplemental soil vapor investigation scope of work was completed in January 2023:

- Installation of three exterior soil vapor sampling points (LSV-14 through LSV-16) and collection of three soil vapor samples and one ambient air sample.

Findings and conclusions from the RI are as follows:

1. Stratigraphy: Up to four feet of fill material was identified below an approximately 0.5- to 5-foot thick layer of remnant demolition debris surface cover, to a maximum depth of 12 feet bsl throughout the Site footprint. The fill predominately consists of fine- to coarse-grained sand with varying amounts of gravel, silt, brick, clay, organics, miscellaneous debris, and concrete. The fill is underlain by a layer of silty sand. Drilling refusal on presumed bedrock was encountered between approximately 17 and 22 feet bsl during the August 2022 RI and between 22 and 27 feet bsl during the geotechnical investigations.
2. Hydrogeology: Depth to perched groundwater ranges from approximately 11.8 and 14.2 feet bsl, corresponding to elevations between 22.79 and 25.21 NAVD88. Groundwater was encountered at depths ranging from approximately 11.7 and 13.2 feet bsl corresponding to elevations between 23.80 and 25.33 NAVD88 in the shallow bedrock monitoring wells and at depths ranging from approximately 12.3 and 13.2 feet bsl

corresponding to elevations between 23.76 and 24.69 NAVD88 in the deep bedrock monitoring wells. Based on the groundwater elevations recorded during the August 2022 RI, perched groundwater flows to the northeast and bedrock groundwater flows to the southeast.

Borehole geophysical logging was conducted in the 16 bedrock wells installed across an approximately 40-foot by 70-foot area on the eastern portion of the Site. Fractures, foliation, and veins were found to dip to the southeast. Potential water bearing zones were identified primarily using the heat-pulse flow meter (HPFM) results supported by caliper data, acoustic/optical televiewer data, and borehole fluid property trends. The results of the borehole geophysics analysis revealed that bedrock at the Site contains few major fractures and is characterized by generally low transmissivity.

3. <u>Contaminated Fill Quality:</u> Up to four feet of fill material was identified below an approximately 0.5- to 5-foot thick layer of remnant demolition debris surface cover. Contaminants related to the fill material include pesticides and metals, which were detected at concentrations above Unrestricted Use Soil Cleanup Objectives (SCOs), Restricted Residential RUSCOs, and/or Protection of Groundwater SCOs within this layer. Perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) were detected above the Unrestricted Use and/or Protection of Groundwater guidance values for per- and polyfluoroalkyl substances (PFAS) in two samples from 8 to 10 feet bsl (NYSDEC, *Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances*, November 2022; hereinafter PFAS Guidance Values). The source of pesticides and metals in attributed to the quality of the fill material. The sources of PFAS contamination may be related to the condition of the contaminated fill, undocumented releases from the historical dyeing and cleaning operations, or an unidentified off-Site source.

4. <u>Native Sand Quality:</u> Acetone and pesticides were detected above the Unrestricted Use SCOs and/or Protection of Groundwater SCOs between 8 and 19 feet bsl in five soil samples collected. Elevated concentrations of metals above Unrestricted Use SCOs were detected between 8 and 19 feet bsl in eleven soil samples collected from the sand layer; exceedances of the Restricted Residential RUSCOs and/or Protection of Groundwater SCOs were detected between 8 and 18.5 feet bsl in two of the soil samples. PFOS and PFOA were detected above the Unrestricted Use PFAS Guidance Value in three samples from 8 to 10 feet bsl. The source of pesticides and acetone is attributed to the quality of the overlying fill material or an unknown on- or off-Site source. The sources of PFAS contamination may be related to the condition of the overlying fill, undocumented

releases from the historical dyeing and cleaning operations, or an unidentified off-Site source.

5. Groundwater Quality: Groundwater analytical results exceeding the standards and guidance values (SGVs) for volatile organic compounds (VOCs) and metals were detected throughout the site and semivolatile organic compound (SVOC) exceedances were detected at select well locations. The chlorinated VOC (CVOC) exceedances in groundwater are attributed to the former solvent tank located in the northern portion of the Site. Acetone was detected in one perched water well and was also detected in one bedrock well set during the passive diffusion bag (PDB) sampling. Acetone in groundwater is attributed to an unknown on- or off-Site source. As SVOCs were not detected in exceedance of the Protection of Groundwater SCOs throughout the Site footprint, detections in groundwater are attributed to an off-Site source. Detections of total metals are generally attributed to sediment entrainment in the samples; in particular, total beryllium, copper, and lead were detected in the groundwater samples, but were not detected in the dissolved phase. Detections of dissolved metals are likely attributable to naturally occurring background concentrations or an unknown off-Site source. The sources of PFAS contamination may be related to the condition of the overlying fill, undocumented releases from the historical dyeing and cleaning operations, or an unidentified off-Site source.

   Initial bedrock groundwater sampling was completed at 53 sampling intervals via PDBs as a screening tool to evaluate vertical and horizontal contaminant distribution and refine the packer testing intervals. Analytical results from the PDB sampling revealed exceedances of the NYSDEC SGVs for VOCs in 49 of the 53 groundwater samples collected, including the presence of PCE (9.4 µg/L – 640 µg/L) and TCE (5.4 µg/L – 390 µg/L) above the SGVs in six of the eight shallow bedrock wells and in one of the eight deep bedrock wells. The highest concentrations of PCE and TCE were detected in the northern portion of the Site in the vicinity of the former solvent tank.

   Bedrock groundwater sampling was completed in December 2022. Analytical results revealed exceedances of the NYSDEC SGVs for VOCs, metals, and general chemistry parameters in all of the groundwater samples collected during the investigation. PCE (7.2 µg/L – 900 µg/L), TCE (6.3 µg/L – 360 µg/L), and/or VC (4.4 µg/L – 6.4 µg/L) were detected in 8 of the 10 wells sampled. The highest concentrations of PCE and TCE were detected in the northern portion of the Site in the vicinity of the former solvent tank.

A full discussion of the analytical results for the PDB screening samples was reported in the 6 March 2023 full-scale design.

6. Soil Vapor Quality: Soil vapor samples collected during the August 2022 RI and previous investigations revealed the chlorinated VOCs cis-1,2-DCE, TCE, 1,1-DCE, and PCE at concentrations above the respective minimum matrix guidance values requiring monitoring and/or mitigation threshold in four samples in the northeastern portion of the Site (NYSDOH, *Guidance for Evaluating Soil Vapor Intrusion in the State of New York*, October 2006 and revised in May 2017; hereinafter NYSDOH Soil Vapor Guidance). An indoor air quality assessment was not completed. The presence of elevated concentrations of CVOCs is attributed to releases associated with the former solvent tank. Soil vapor sample analytical results also identified elevated concentrations of petroleum-related VOCs including BTEX, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene throughout the Site footprint. As the presence of petroleum-related VOCs were not detected at elevated concentrations in soil or groundwater at the Site and no historical source of these impacts has been identified, the presence of these compounds in soil vapor is likely attributed to an off-Site source.

Sufficient analytical data were gathered during the RI and previous studies to establish appropriate soil cleanup levels and to develop a remedy for the Site. Source treatment of the CVOC impacts in soil and groundwater is being addressed by the IRM via source material excavation and in-situ treatment via injections to address impacts in bedrock. Langan conducted a bench-scale treatability study, which was used to finalize the 6 March 2023 EZVI Injection Design (e.g., injection requirements in specific fractures such as selected reagent, dosages, monitoring requirements, injection spacing interval, pressure, and radius of influence) that was approved by NYSDEC .

Qualitative Human Health Exposure Assessment

Based upon the conceptual site model (CSM) and the review of environmental data, incomplete exposure pathways appear to be present under current conditions at the Site. Institutional and/or engineering controls will be implemented to prevent complete on-Site exposure pathways in construction/remediation and future conditions.

In addition to the qualitative human health exposure assessment, NYSDEC DER-10 requires an on-Site and off-Site Fish and Wildlife Resources Impact Analysis (FWRIA) if certain criteria are met. Based on the requirements stipulated in Section 3.10 and Appendix 3C of DER-10, a FWRIA for the Site is not required.

1. Under current conditions, there is a low risk for exposure if the integrity of the demolition debris and imported clean fill cover and foundation slabs are compromised or during remedial injection. Potential exposure to groundwater is limited to those completing remedial injection activities. The exposure risks can be avoided or minimized by limiting Site access and implementing the appropriate health and safety and vapor and dust suppression measures outlined in a Site-specific HASP and CAMP during ground-intrusive activities.
2. Post-demolition and in the absence of protective measures, there is a moderate risk of exposure during the construction and remediation activities. The primary exposure pathways are:
   a. Dermal contact, ingestion and inhalation of contaminated soil, groundwater, or soil vapor by Site visitors and construction and remediation workers.
   b. Dermal contact, ingestion and inhalation of soil (dust) and inhalation of soil vapor by the community in the vicinity of the Site.

   These exposure pathways can be avoided or minimized by performing the community air monitoring plan (CAMP) and by following the appropriate health and safety plans, implementing vapor and dust suppression techniques, and using Site security to control access.
3. The existence of a complete exposure pathway for Site contaminants to human receptors during proposed future conditions is unlikely, as the majority of on-Site sources of contamination will be treated in-situ in accordance with the IRMWP discussed in Section 4.0 or will be excavated and transported for off-Site disposal. Regional groundwater is not used as a potable water source in this part of New York City. Excavation will be completed to bedrock across much of the Site. Following completion of the Site excavation combined with the groundwater treatment proposed in the IRMWP, the presence of soil vapor requiring monitoring or mitigation per the NYSDOH Soil Vapor Guidance is not anticipated due to the construction of the new building foundation into bedrock and the groundwater table combined with the groundwater treatment proposed in the IRMWP currently being implemented.

Summary of the Remedy

Alternative I, a Track 1 Unrestricted Use cleanup utilizing the NYSDEC Unrestricted Use SCOs, will include the following tasks:

- Development and implementation of a Construction Health and Safety Plan (CHASP) and Community Air Monitoring Plan (CAMP) for the protection of on-Site workers, community/residents, and the environment during remediation and construction activities.
- Removal of soil imported to facilitate the demolition of the on-Site buildings.
- Bedrock well decommissioning in accordance with NYSDEC policy CP-43 Groundwater Monitoring Well Decommissioning Policy.
- Bedrock well re-installation in immediate proximity to the original well locations. Downhole geophysical evaluation of the bedrock wells to verify fracture depths, and performance monitoring well sampling 6 months following the completion of treatment injections in accordance with the Emulsified Zero-Valent Iron (EZVI) Injection Remedial Design.
- Design and construction of the support of excavation (SOE) system around the Site boundary to facilitate the remedial excavation up to a depth of 19 feet bsl (with development excavation being to 23 feet bsl and deeper excavations to between 31 and 42 feet bsl for deeper foundation elements).
- Dewatering in compliance with city, state, and federal laws and regulations. Extracted groundwater will be treated under a permit from NYCDEP/NYSDEC that will be required to meet effluent limitations prior to discharge to the sewer system.
- Implementation of soil erosion, pollution and sediment control measures in compliance with applicable laws and regulations.
- Screening for indications of contamination (by visual means, odor, and monitoring with PIDs) of excavated material during intrusive Site work.
- Excavation, stockpiling, off-Site transport, and disposal of soil that exceeds Unrestricted Use SCOs as defined by 6 NYCRR Part 375-6.8 from ground surface to a minimum depth of between 12 and 19 feet bsl at various locations throughout the Site footprint to remove known elevated concentrations of VOCs, pesticides, and metals exceeding the Unrestricted Use SCOs at various locations throughout the Site footprint. The remediation

depth may extend deeper if endpoint samples reveal elevated concentrations of compounds above the Unrestricted Use SCOs and over-excavation is required to achieve an Unrestricted Use Track 1 cleanup.

- Appropriate off-Site disposal of material removed from the Site in accordance with federal, state and local rules and regulations for handling, transport, and disposal.
- Removal and decommissioning of any encountered underground storage tanks (USTs) and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) and disposal off-Site during Site redevelopment in accordance with DER-10, 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements.
- Collection and analysis of confirmation soil samples from the remedial excavation base, in accordance with DER-10 to confirm Track 1 Unrestricted Use SCOs were achieved.
- Importation and backfilling of remediated areas, as necessary for development, with certified-clean material (meeting Track 1 Unrestricted Use SCOs), recycled concrete aggregate (RCA), or virgin, native crushed stone to backfill areas excavated deeper than the development depth.
- Reuse of Site soil meeting the Track 1 Unrestricted Use SCOs, if necessary.
- Installation of a vapor barrier membrane below the slab of the proposed building and along sidewalls of any subgrade foundation elements beneath occupied spaces as a green remediation component.
- As directed by the NYSDEC and New York State Department of Health (NYSDOH), an appropriate vapor intrusion evaluation will be completed.
- All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State and local rules and regulations.

1.0 INTRODUCTION

This Remedial Action Work Plan (RAWP) was prepared on behalf of CP VII 78th Street Owner, LLC (the Volunteer) for the ±10,050-square property located at 1487 First Avenue (Block 1452, Lot 27 [formerly consisting of Lots 27, 28, 29, and 30] (Figure 1) in the Upper East Side neighborhood of Manhattan, New York (herein after the "Site"). The Volunteer is participating in the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) as a Volunteer as defined in ECL 27-1405 (1)(b) and as identified in the executed Brownfield Cleanup Agreement (BCA) Index No. C231152-06-22 dated 27 July 2022. The Site is identified in the BCA as Site No. C231152.

This RAWP summarizes the nature and extent of contamination as determined from data gathered during the Phase II Environmental Investigation in November 2021 and January/February 2022 and the Remedial Investigation in August 2022 documented in a November 2022 Draft Remedial Investigation Report, which was revised for final submission in March 2023 in response to NYSDEC comments (2023 RIR). The selected remedy is consistent with the procedures defined in DER-10/Technical Guidance for Site Investigation and Remediation and complies with applicable standards, criteria, and guidance, and with applicable federal, state and local laws, regulations and requirements.

Groundwater treatment and source removal remediation is currently being implemented in accordance with the 4 January 2023 Interim Remedial Measures Work Plan (IRMWP) and the 6 March 2023 Emulsified Zero-Valent Iron Injection Remedial Design. Implementation of the IRM began in March 2023.

1.1 Site Location and Description

The Site is located in the Upper East Side neighborhood of Manhattan, New York and is identified as Block 1452, Lot 27 [formerly consisting of Lots 27, 28, 29, and 30]. A Site Location Plan is provided as Figure 1. The Site is an approximately 10,050-square foot parcel bordered by the four-story 354 East 78th Street building to the west, East 78th Street to the north, First Avenue to the east, and the nine-story 1485 First Avenue building to the south.

The Site was most recently occupied by two four-story vacant buildings in the southern and northwestern portions of the site, which have been demolished. The remaining portions of the site consist of vacant land where former building basements were previously partially backfilled with remnant demolition debris from sidewalk level to the assumed depth of the former basement slabs at approximately 8 to 10 feet below sidewalk level (bsl) by the previous owner. The vacant portion of the site was heavily vegetated with uneven topography; however, vegetation was cleared and the remnant demolition debris was graded to a more even surface ranging from 4 to 8 feet bsl. Stone was imported in January 2022 from Clinton Quarry, located in Union Township, New Jersey, in order to grade the Site. Additional clean fill was imported in October and November 2022 from Allocco Recycling Corp. in accordance with the 25 October 2022 NYSDEC approval to level the Site in preparation for the demolition of the Site buildings. A site plan is provided as Figure 2.

According to a survey prepared by True North Surveyors, Inc. dated 29 April 2022, the sidewalk elevation slopes from the northwest corner (elevation el 38.28 to the southeast corner (elevation el 36.58). All elevations are North American Vertical Datum of 1988 (NAVD88). Onsite elevations have not been surveyed; however, the surface of the graded demolition debris is estimated to be between approximately 4 and 8 feet bsl. The site survey is provided as Appendix A.

1.2 Redevelopment Plan

In conjunction with the implementation of this RAWP, the proposed redevelopment plan for the Site will consist of Site preparation activities including the demolition of the two vacant 4-story on-Site buildings and associated cellar spaces, the removal of all existing construction debris, followed by the construction of a new 35-story mixed-use residential and commercial building that will occupy the entirety of the Site footprint. The current zoning designation is commercial (C2-8). The proposed use is consistent with existing zoning for the property. General excavation will be completed across the majority of the Site footprint to approximately 23 feet bsl with excavation for deeper foundation elements advancing to between 31 and 42 feet bsl.

An initial foundation element was installed in April 2022 in the northeastern portion of the Site for the planned 421(a) affordable housing component of the project. No material was generated for disposal as part of the early foundation element installation. Installation of the early foundation element was completed in accordance with the Change of Use Form and associated Soil Management Plan/Excavation Work Plan and a Community Air Monitoring Plan (CAMP) submitted with the BCP Application on 28 March 2022 (discussed in Section 1.4.2).

A Change of Use Form was submitted on 21 October 2022 for the demolition of the on-Site buildings; building demolition began in October 2022 and has been completed.

1.3 Description of Surrounding Properties

According to records maintained online by New York City Open Accessible Space Information System (NYCOASIS) and aerial/street-view observations provided by Google Maps, surrounding properties include multi-story mixed-use residential/commercial buildings, public institutional buildings, and transportation/utilities properties associated with the nearby Lincoln Tunnel entrance. The following is a summary of adjacent property usage:

Direction	Adjacent Properties		
	Block No.	Lot No.	Description
North	1453	23	East 78th Street followed by a 5-story mixed-use commercial/ residential building
East	1472	47, 48, 49, and 50	First Avenue followed by three 4-story and one 5-story mixed-use commercial/residential buildings
South	1452	26	A 9-story mixed-use commercial/residential building
West	1452	31	A 4-story mixed-use commercial/residential building

Public infrastructure (storm drains, sewers, and underground utility lines) exists within the streets surrounding the Site. Sensitive receptors, as defined in DER-10, located within a half-mile of the Site, include those listed below:

Number	Name (Approximate distance from site)	Address
1	Eleanor Roosevelt High School (approximately 450 feet southeast of the site)	411 East 76th Street New York, NY 10021
2	Yorkville East Middle School (approximately 820 feet southeast of the site)	1458 York Avenue New York, NY 10021
3	JHS 167 Robert F. Wagner (approximately 1,085 feet west of the site)	220 East 76th Street New York, NY 10021
4	PS 290 Manhattan New School (approximately 1,125 feet north of the site)	311 East 82nd Street New York, NY 10028
5	PS 158 Bayard Taylor (approximately 820 feet southeast of the site)	1458 York Avenue New York, NY 10075

Number	Name (Approximate distance from site)	Address
6	Lenox Hill Neighborhood House and Day Care (approximately 2,020 feet southwest of the site)	331 East 70th Street New York, NY 10021
7	Cassidy's Place (approximately 2,380 feet northeast of the site)	419 East 86th Street New York, NY 10028
8	Marymount Manhattan College (approximately 1,950 feet southwest of the site)	221 East 71st Street New York, NY 10021
9	Hunter College School Social Work CUNY (approximately 2,060 feet northwest of the site)	129 East 79th Street New York, NY 10021
10	Cornell University / Weill Graduate School of Medical Sciences of Cornell University (approximately 2,600 feet southwest of the site)	445 East 69th Street New York, NY 10021
11	Cornell University / Weill Medical College of Cornell University (approximately 2,420 feet southwest of the site)	1300 York Avenue New York, NY 10021
12	NYPL, Webster Branch (approximately 745 feet southeast of the site)	1465 York Avenue New York, NY 10021
13	NYPL, Yorkville Branch (approximately 1,040 feet northwest of the site)	222 East 79th Street New York, NY 10021
14	OST - Lenox Hill Neighborhood House (approximately 1,170 feet west of the site)	220 East 76th Street New York, NY 10021
15	Chabad Lobavitch of the Upper East Side (approximately 360 feet southeast of the site)	419 East 77th Street New York, NY 10075
16	The Caedmon School (approximately 740 feet northeast of the site)	416 East 80th Street New York, NY 10075
17	Temple Shaaray Tefila Nursery School (approximately 815 feet northwest of the site)	250 East 79th Street New York, NY 10075
18	The Cathedral School (approximately 900 feet southwest of the site)	319 East 74th Street New York, NY 10021
19	The Church of the Epiphany (approximately 1,115 feet southeast of the site)	1393 York Avenue New York, NY 10021
20	Lycee Francais de New York (approximately 1,140 feet southeast of the site)	505 East 75th Street New York, NY 10021
21	York Avenue Preschool (approximately 1,230 feet northeast of the site)	1520 York Avenue New York, NY 10028
22	Manhattan School House LLC (approximately 1,640 feet northeast of the site)	1616 First Avenue New York, NY 10028
23	Manhattan School House LLC (approximately 495 feet south of the site)	1456 First Avenue New York, NY 10028
24	All Souls School (approximately 1,875 feet northwest of the site)	1157 Lexington Avenue New York, NY 10075

Number	Name (Approximate distance from site)	Address
25	Church of St. Ignatius Layola (approximately 1,730 feet north of the site)	240 East 84th Street New York, NY 10028
26	Bright Horizons Children’s Center Inc. (approximately 2,080 feet southwest of the site)	435 East 70th Street New York, NY 10021
27	Clarke School for the Deaf (approximately 2,120 feet northeast of the site)	80 East End Avenue New York, NY 10028
28	The Chapin School (approximately 2,300 feet northeast of the site)	100 East End Avenue New York, NY 10028
29	Resurrection Episcopal Day School (approximately 2,290 feet west of the site)	119 East 74th Street New York, NY 10021
30	Temple Israel of the City of New York (approximately 2,270 feet northwest of the site)	112 East 75th Street New York, NY 10021
31	St. Catherine of Sienna (approximately 2,420 feet southwest of the site)	420 East 69th Street New York, NY 10021
32	The William Woodward, Jr. Nursery School (approximately 2,490 feet south of the site)	436 East 69th Street New York, NY 10021
33	Association to Benefit Children, Inc. (approximately 2,550 feet northeast of the site)	420 East 87th Street New York, NY 10028
34	Hopscotch Montessori, Inc. (approximately 724 feet east of the site)	435 East 79th Street New York, NY 10075
35	Saint Stephen of Hungary School (approximately 840 feet northeast of the site)	408 East 82nd Street New York, NY 10028
36	The Birch Wathen Lenox School (approximately 1,120 feet northwest of the site)	210 East 77th Street New York, NY 10075
37	The Buckley Preschool/School (approximately 2,450 feet southwest of the site)	113 East 73rd Street New York, NY 10021
38	St. Jean Baptiste High School (approximately 1,700 feet east of the site)	173 East 75th Street New York, NY 10021
39	The Town School (approximately 1,500 feet southeast of the site)	540 East 76th Street New York, NY 10021
40	The Brearly Kindergarten/School (approximately 2,225 feet northeast of the site)	610 East 83rd Street New York, NY 10028
41	Manhattan School House LLC (approximately 1,960 feet northeast of the site)	1624 First Avenue New York, NY 10028
42	International Preschools, Inc. (approximately 2,400 feet northeast of the site)	345 East 86th Street New York, NY 10028
43	The Children's Academy (approximately 1,165 feet northeast of the site)	350 East 82nd Street New York, NY 10028
44	The Allen Stevenson School (approximately 2,045 feet northwest of the site)	132 East 78th Street New York, NY 10075

1.4 Site History

1.4.1 Past Uses and Ownership

According to the Phase I ESA completed by Langan in January 2022, historical operations on the subject site included dyeing and cleaning operations between 1920 and 2005 on former Lot 28 and former Lot 30. A solvent tank was identified on the Sanborn Maps from 1951 to 2005 on former Lot 30.

The Site was identified in the NY Spills database for a release reported to the NYSDEC on 4 November 2009 and assigned Spill No. 0908776. According to the case narrative, a supply line for two 275-gallon fuel oil aboveground storage tanks (ASTs) was suspected to have leaked. The supply line was replaced and the spill was administratively closed on 2 December 2009.

Two fuel oil aboveground storage tanks (ASTs) have been documented at the Site; one is located in the basement of the vacant building in the northwestern corner of the site, and another was found buried in the debris of the building demolished by the previous owners. A release was observed when the second AST was discovered and reported to NYSDEC on 25 January 2022 and assigned Spill No. 2109276.

1.4.2 Previous Environmental Reports

The following environmental assessment and investigation reports have been prepared for the Site.

- Phase II Environmental Site Assessment (ESA) prepared by Cider Environmental (Cider), dated 23 February 2016.
- Phase I ESA prepared by Langan, dated 5 January 2021.
- Phase II Environmental Site Investigation (ESI) Report prepared by Langan, dated 3 March 2022.
- 60-Day Advance Notice of Site Change of Use prepared by Langan, dated 25 March 2022.
- Remedial Investigation Work Plan prepared by Langan, dated 16 March 2022 and last revised 26 July 2022.
- Interim Remedial Measures Work Plan prepared by Langan, dated 16 March 2022 and last revised 4 January 2023.
- 60-Day Advance Notice of Site Change of Use prepared by Langan, dated 21 October 2022.
- Remedial Investigation Report prepared by Langan, dated 30 March 2023.

Previous environmental reports are provided in Appendix B. Summaries of environmental findings of these reports are provided below.

February 2016 Phase II Environmental Site Assessment, prepared by Cider

The 23 February 2016 Phase II ESA completed by Cider documented the findings of a 21 January 2016 Phase I ESA also prepared by Cider. The Phase I ESA identified the following recognized environmental conditions (RECs):

- REC-1: Historic dyeing and cleaning operations documented between 1920 and 2005 on former Lot 28 and former Lot 30 and a solvent tank identified on former Lot 30 on the Sanborn Fire Insurance Maps from 1951 to 2005; and,

- REC-2: Potential presence of abandoned fuel oil underground storage tanks (USTs) due to historical fuel oil burner application records.

The Phase I ESA also identified the observation of urban fill material at the site.

The Cider Phase II ESA was completed to investigate the RECs and included the completion of a geophysical survey in accessible portions of the site, installation of three soil borings and collection of three discrete soil samples and one composite soil sample, and installation of three soil vapor points and collection of three soil vapor samples. Soil borings were advanced with a hand auger to approximately five feet below the former basement slabs in former Lots 28 and 29 (corresponding to approximately 15 feet bsl). Soil borings and three soil vapor points were advanced in the vicinity of former dry cleaning operations. The geophysical survey identified the presence of one suspected 275-gallon UST of unknown contents in former Lot 29, and one of the soil borings and one of the soil vapor points were also installed in the vicinity of the suspected UST. Discrete soil samples were collected for analysis of volatile organic compounds (VOCs) and petroleum-related semi-volatile organic compounds (SVOCs), and soil vapor points were sampled from either 2 or 4 feet below the former basement slabs for VOC analysis. One five-point composite soil sample was also collected to characterize impacts in fill at the site for analysis of metals, polychlorinated biphenyls (PCBs), VOCs, SVOCs, and herbicides. Groundwater was not encountered in any of the soil borings.

The Phase II ESA soil analytical results revealed no detections of VOCs or petroleum-related SVOCs. The composite soil sample analytical results revealed the presence of lead marginally above the NYSDEC Unrestricted Use Soil Cleanup Objective (SCO). Soil vapor analytical results revealed the presence of tetrachloroethylene (PCE) at concentrations below New York State

Department of Health (NYSDOH) minimum matrix guidance values requiring monitoring or mitigation; an indoor air quality assessment was not completed.

January 2022 Phase I Environmental Site Assessment, prepared by Langan

The Phase I ESA identified the following recognized environmental conditions (RECs), historical RECs (HRECs), and business environmental risks (BERs):

- REC-1: Historical Site Operations. Dyeing and cleaning operations are documented between 1920 and 2005 on former Lot 28 and former Lot 30 and a solvent tank was identified on former Lot 30 on the Sanborn Fire Insurance Maps from 1951 to 2005. Subsequent testing of on-Site soil, groundwater, and soil vapor as documented in the Langan Phase II ESI Report revealed impacts to soil, groundwater, and soil vapor from historical site use at concentrations exceeding NYSDEC and NYSDOH standards. The concentrations of PCE and associated breakdown compounds detected in soil, groundwater, and soil vapor are indicative of a release from the former solvent tank.

- REC-2: Presence of Contaminated Fill Material. The Langan Phase II ESI revealed the presence of fill impacted with elevated concentrations of metals above the NYSDEC Soil Cleanup Objectives beneath the former basement slabs.

- HREC-1: Closed Spill 0908776. The spill was reported to NYSDEC on 4 November 2009 when supply line for two 275-gallon fuel oil ASTs was suspected to have leaked. The initial spill report identified that the supply line was located underground, but additional narrative by NYSDEC documented that the supply line was aboveground. The supply line was replaced and the spill was administratively closed on 2 December 2009.

- BER-1: Potential Presence of Undocumented USTs. No evidence of USTs was observed during the Site inspection; however, the buildings at the Site were historically operated for commercial and residential purposes and have historically received approvals for fuel oil use. In addition, a UST is suspected to be present on former Lot 29 based on historical geophysical survey results during the Cider Phase II ESA.

- BER-2: Potential Impacts from Current and Historical Operations at Adjacent and Nearby Properties. Potential impacts from current and historical operations conducted at adjacent and nearby properties involving drycleaners and spills and the generation and disposal of hazardous waste have potential for offsite migration of contaminants to impact sub-slab soil, soil vapor, and/or groundwater below the site.

March 2022 Phase II Environmental Site Investigation Report, prepared by Langan

Langan's Phase II ESI Report was prepared for the Volunteer. The data are presented in Tables 1 through 3 of the Phase II ESI Report, which are included in Appendix B. The results are also presented in Tables 1 through 3 and summarized on Figures 4 through 6 of this RAWP.

The Phase II Investigation was completed in November 2021 and January/February 2022 and consisted of the following:

- Excavation of three test pits in the northern portion of the site (former Lot 30) to assess the potential presence of the former solvent tank;
- Installation of thirteen soil borings (LB-01 through LB-08, LSB-9 through LSB-11, LSB-14, and LSB-15) to between 18 to 23 feet bsl, completion of two soil borings/rock cores (LSB-12 and LSB-13) to 50 feet bsl, and collection of 28 soil samples (including three duplicate samples);
- Installation of five groundwater monitoring wells and collection of seven groundwater samples (including two duplicate samples);
- Installation of two bedrock monitoring wells and collection of five groundwater samples (including one duplicate sample);
- Installation of seven soil vapor sampling points and collection of nine soil vapor samples (including two duplicate samples)

Two test pits (TP-1 and TP-2) were excavated to a depth of approximately 3.5 feet below the former basement slab (corresponding to approximately 12 feet bsl) and one test pit (TP-3) was excavated to the top of bedrock at approximately 9 feet below the former basement slab (corresponding to approximately 17.5 feet bsl). No evidence of a former solvent tank or odors were observed in TP 1 and TP-2. Odors and elevated PID readings between 14 and 23 parts-per-million (ppm) were observed in soil immediately above bedrock in TP-3. The test pits were backfilled with the material inform the same depth from which the material was excavated.

Six soil boings were advanced in the vicinity of the historical solvent tank, in the vicinity of former historical drycleaning operations, and in the vicinity of the suspected 275-gallon AST reported in the Cider Phase II ESA to assess for subsurface impacts from historical Site operations. Seven soil borings were completed to assess general subsurface conditions throughout the Site footprint.

Elevated PID readings up to 21.6 ppm were detected in two soil borings between approximately 15 and 17 feet bsl. Odors and globules potentially associated with the AST that had previously been discovered nearby were also observed at one soil boring location.

Twenty-eight soil samples were collected for chemical analysis during the Phase II ESI. Five soil borings were completed as groundwater monitoring wells to between 18 and 23.5 feet bsl in perched water immediately above bedrock. One well (MW-02) was installed in the vicinity of the former solvent tank, two wells were installed in the vicinity of historical dyeing and dry cleaning operations, and two wells were installed to assess general site conditions and to assess for impacts from historical dyeing and drycleaning operations. No evidence of sheen, odors, or free product were observed during purging or sampling activities in any of the wells.

Two soil borings were advanced into bedrock to 50 feet bsl and completed as open-hole groundwater monitoring wells to assess for impacts within bedrock from historical dyeing and dry cleaning operations. Two groundwater samples were collected from each well from between 20 and 45 feet bsl for VOC analysis.

Seven soil vapor points were installed and sampled to assess general site conditions and to assess for impacts from historical dyeing and dry cleaning operations and in the vicinity of the former solvent tank. All soil vapor points were installed to approximately 2-feet above the observed groundwater interface as measured in the installed monitoring wells and were sampled for VOC analysis.

Laboratory analytical results for soil samples were compared to the 6 NYCRR Subpart 375-6.8(a-b) Remedial Program Soil Cleanup Objectives for Unrestricted Use, Restricted Residential Use, and Protection of Groundwater. Groundwater analytical results were compared to NYSDEC Ambient Water Quality Standards and Guidance Value (SGVs). Soil vapor was compared to the minimum values of the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion Matrices A through C dated October 2006 and revised in May 2017; an indoor air quality assessment was not completed. Laboratory analytical results identified subsurface chlorinated VOC impacts in the vicinity of the solvent tank formerly located in the approximately center of former Lot 30. PCE was detected in soil from between approximately 14.5 and 16.5 feet bsl at this location (LB-02) in exceedance of the Unrestricted Use SCOs and Protection of Groundwater SCOs. Perched groundwater analytical results at this location (MW-02) revealed cis-1,2-

dichloroethene (cis-1,2-DCE), PCE, and trichloroethylene (TCE) in exceedance of the NYSDEC SGVs. Chlorinated VOCs detected in soil vapor at this location that are included in the NYSDOH Soil Vapor/Indoor Air Decision Matrices A through C include cis-1,2-DCE, TCE, and PCE, all of which were detected at concentrations above the minimum matrix guidance values that require mitigation according to the NYSDOH Final Guidance on Soil Vapor Intrusion, October 2006 and Revised May 2017. An indoor air quality assessment was not completed.

Laboratory analytical results also identified subsurface chlorinated VOC impacts in perched groundwater and bedrock wells in exceedance of the NYSDEC SGVs within the eastern portion of the site to the south of the former solvent tank. Chlorinated VOCs were detected in soil vapors throughout the Site footprint, but at concentrations below requiring further action according to the NYSDOH Soil Vapor Guidance.

Metals including barium, copper, trivalent chromium, lead, nickel, silver, and zinc were detected at concentrations exceeding the Unrestricted Use SCOs in the fill and native soil in all but two soil borings. Lead and barium were also detected at concentrations above the Protection of Groundwater and/or Restricted Residential RUSCOs. Metals including total chromium, iron, lead, magnesium, manganese, nickel, selenium, and/or sodium were detected in exceedance of the NYSDEC SGVs at all perched monitoring well locations. Detections of total metals in groundwater are likely attributable to sediment entrainment in the samples or naturally occurring background conditions.

Based on the results of the Phase II ESI, the presence of contaminated fill and subsurface impacts to soil, groundwater, and soil vapor from historical site use were identified.

March 2022 60-Day Advance Notice of Site Change of Use, prepared by Langan

A NYSDEC 60-Day Advanced Notification of Site Change of Use Form was prepared for the initial foundation element installation and submitted with the BCP Application on 28 March 2022. The Site Change of Use submission included the foundation drawings as well as a Soil Management Plan/Excavation Work Plan which included a Community Air Monitoring Plan (CAMP). The caisson installation work commenced in April 2022, prior to the execution of the Brownfield Cleanup Agreement.

July 2022 Remedial Investigation Work Plan, prepared by Langan

A Remedial Investigation Work Plan (RIWP) dated 16 March 2022 and last revised 26 July 2022 for final submission was prepared by Langan for CP VII 78th Street Owner, LLC and submitted to the NYSDEC. The RIWP was prepared to investigate and characterize "the nature and extent of the contamination at and/or emanating from the brownfield site," per ECL Article 27, Title 14 (Brownfield Cleanup Program). The scope of work provided supplemented the investigation activities and results documented in the January 2022 Phase II ESI Report.

The scope of work for the remedial investigation presented in the RIWP consisted of:

- Advancement of fifteen soil borings (LSB-16 through LSB-30) and collection of up to 31 soil samples for laboratory analysis.
- Installation of groundwater monitoring wells across the central and eastern side of the Site to evaluate the extents of impacts and potential remedial options based on subsurface conditions.
- Installation of five permanent groundwater monitoring wells (LMW-6 through LMW-10) in the perched groundwater layer above bedrock and collection of five groundwater samples for laboratory analysis.
- Installation of six permanent bedrock monitoring wells (LMW-8R-S through LMW-13R-S) to 50 feet bsl. Two existing wells (LMW-6R-S [formerly referred to as MW-6] and LMW-7R-S [formerly referred to MW-7]) would also be reinstalled if the wells were determined to be damaged prior to mobilization for the RI.
- Installation of eight permanent bedrock monitoring wells (LMW-6R-D through LMW-13R-D) to 85 feet bsl.
- Downhole geophysical evaluation of the bedrock wells, hydraulic conductivity testing of specific fracture zones by packer testing, and additional groundwater sample collection and analysis for the completion of a treatability study.
- Collection of up to two samples from each of the 16 bedrock wells for a total of up to 32 groundwater samples for laboratory analysis. The number of samples collected would depend on the results of the geophysical evaluation and hydraulic conductivity testing.
- Installation of six soil vapor sampling points (LSV-8 through LSV-13) and collection of six soil vapor samples.

January 2023 Interim Remedial Measures Work Plan, prepared by Langan

An Interim Remedial Measures (IRM) Work Plan was prepared by Langan for the Volunteer and submitted to NYSDEC with the BCP Application on 28 March 2022 and was revised for final submission on 4 January 2023 in response to NYSDEC comments. The IRM Work Plan scope of work includes excavation for the removal of chlorinated VOC-impacted source material in saturated soil within the perched groundwater and implementation of an in-situ groundwater treatment technology to reduce chlorinated VOCs in groundwater. PCE was detected in soil between approximately 14.5 and 16.5 feet bsl and in the vicinity of the former solvent tank area at concentrations exceeding the Unrestricted Use SCOs and Protection of Groundwater SCOs during the previous investigations. Soil borings were advanced as part of the August 2022 RI to delineate to the north, east, and west of PCE impacts detected in LB-02 and MW-02 during the previous investigations. A minimum approximately 30-foot by 20-foot area will be excavated from the current ground surface (approximately 9 feet bsl) to the top of bedrock (approximately 18.5 feet bsl) for the removal of chlorinated VOCs in saturated soil within the perched groundwater in this contamination source area and in the location of the former solvent tank.

Sixteen permanent bedrock monitoring wells were installed as part of the August 2022 RI. A bench-scale treatability study to demonstrate the effectiveness of various remedial treatments to address chlorinated VOCs in Site groundwater, as well as confirm dosages of the potential additives is in progress. The results of the bench-scale treatability study, in conjunction with the additional data on bedrock fracture conditions determined during the August 2022 RI, was used to finalize the full-scale design (e.g., injection requirements in specific fractures such as selected reagent, dosages, monitoring requirements, injection spacing interval, pressure, and radius of influence), which was submitted for NYSDEC review under separate cover.

October 2022 60-Day Advance Notice of Site Change of Use (Langan)

A NYSDEC 60-Day Advanced Notification of Site Change of Use Form was prepared for the demolition of the on-Site buildings and submitted on 21 October 2022. The demolition of the on-Site buildings began in October 2022 and will accommodate the implementation of this RAWP in conjunction with site redevelopment.

March 2023 Remedial Investigation Report (Langan)

A Remedial Investigation Report was prepared by Langan for the Volunteer to document the Remedial Investigation completed in accordance with the RIWP. The draft report was transmitted to NYSDEC for review and comment on 8 November 2022 and revised for final submission on 30 March 2023 in response to NYSDEC comments. The results of the 2022 RI are included in the discussion of the RI activities and results in Section 2.0.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION AND FINDINGS

The RI was completed in accordance with the Remedial Investigation Work Plan (RIWP) submitted with the BCP Application on 18 April 2022 and the revised RIWP submitted on 26 July 2022 in response to the 21 July 2022 RIWP Comment letter issued by the NYSDEC and Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 375-1, 3.8, 6.8, NYSDEC Division of Environmental Remediation (DER) Program Policy: Technical Guidance for Site Investigation and Remediation (DER-10), and the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006, with updates. The RI field work was completed to determine the nature and extent of contamination at and/or emanating from the Site, to supplement the findings and address data gaps in the 2022 Phase II Environmental Investigation, and to complete a remedial treatability study and develop a remedial design. The RIR summarizes the RI work completed to characterize the nature and extent of contamination at the Site.

The findings of the investigation completed in November 2021 and January/February 2022 and documented in the March 2022 ESI Report and the August 2022 RI as documented in the 2023 RIR are summarized in the following sections.

2.1 Field Investigation

The investigation completed during the August 2022 RI was completed in accordance with the revised RIWP submitted on 26 July 2022, and included the following scope of work:

- Advancement of 12 soil borings (LSB-16 through LSB-23, LSB-26, LSB-27, LSB-29, and LSB-30) and collection of thirty soil samples (including three duplicate samples);
    - Eight of the soil borings were completed for the purpose of Site-wide characterization and to supplement the 2022 Phase II Environmental Investigation
    - Four of the soil borings were completed for the purpose of delineating PCE impacts in the northern part of the Site
- Installation of five permanent groundwater monitoring wells (LMW-6 through LMW-10) and collection of five groundwater samples (including one duplicate sample);

- Installation of eight shallow bedrock monitoring wells (LMW-6R-S through LMW-13R-S) and eight deep bedrock wells (LMW-6R-D through LMW-13R-D);
- Downhole geophysical evaluation of the bedrock wells, hydraulic conductivity testing of specific fracture zones by packer testing, and additional groundwater sample collection and analysis for the completion of a treatability study;
- Initial bedrock groundwater sample collection via passive diffusion bag samplers.
- Survey and gauging of monitoring wells to evaluate groundwater elevation and flow direction; and,
- Installation of three exterior soil vapor sampling points (LSV-8 through LSV-10) and three interior soil vapor sampling points (LSV-11 through LSV-13) and collection of five soil vapor samples (including one duplicate sample) and two ambient air samples. An indoor air quality assessment was not completed.

The following remedial investigation scope of work was completed in December 2022:

- Hydraulic conductivity testing of specific fracture zones by packer testing.
- Collection of groundwater samples from the bedrock wells for laboratory analysis.

The following supplemental soil vapor investigation scope of work was completed in January 2023:

- Installation of three exterior soil vapor sampling points (LSV-14 through LSV-16) and collection of three soil vapor samples and one ambient air samples.

2.1.1 Summary of Remedial Investigation Findings

The findings summarized herein are based on field observations and instrumental readings and laboratory analytical results of soil, groundwater, and soil vapor samples collected during the August 2022 RI. Cross-sectional diagrams showing the inferred soil profile is included as Figures 3A and 3B. Soil sample results are summarized on Figure 4, groundwater sample results are summarized on Figure 5, and soil vapor results are summarized on Figure 6. Findings and conclusions are as follows:

1. Stratigraphy: Up to four feet of fill material was identified below an approximately 0.5- to 5-foot thick layer of remnant demolition debris surface cover, to a maximum depth of 12 feet bsl throughout the Site footprint. The fill predominately consists of fine- to coarse-grained sand with varying amounts of gravel, silt, brick, clay, organics, miscellaneous debris, and concrete. The fill is underlain by a layer of silty sand. Drilling refusal on

presumed bedrock was encountered between approximately 17 and 22 feet bsl during the August 2022 RI and between 22 and 27 feet bsl during the geotechnical investigations.

2. Hydrogeology: Depth to perched groundwater ranges from approximately 11.8 and 14.2 feet bsl, corresponding to elevations between 22.79 and 25.21 NAVD88. Groundwater was encountered at depths ranging from approximately 11.7 and 13.2 feet bsl corresponding to elevations between 23.80 and 25.33 NAVD88 in the shallow bedrock monitoring wells and at depths ranging from approximately 12.3 and 13.2 feet bsl corresponding to elevations between 23.76 and 24.69 NAVD88 in the deep bedrock monitoring wells. Based on the groundwater elevations recorded during the August 2022 RI, perched groundwater flows to the northeast and bedrock groundwater flows to the southeast.

   Borehole geophysical logging was conducted in the 16 bedrock wells installed across an approximately 40-foot by 70-foot area on the eastern portion of the Site. Fractures, foliation, and veins were found to dip to the southeast. Potential water bearing zones were identified primarily using the heat-pulse flow meter (HPFM) results supported by caliper data, acoustic/optical televiewer data, and borehole fluid property trends. The results of the borehole geophysics analysis revealed that bedrock at the Site contains few major fractures and is characterized by generally low transmissivity.

3. Contaminated Fill Quality: Up to four feet of fill material was identified below an approximately 0.5- to 5-foot-thick layer of remnant demolition debris surface cover. Contaminants related to the fill material include pesticides and metals, which were detected at concentrations above Unrestricted Use Soil Cleanup Objectives (SCOs), Restricted Residential SCOs, and/or Protection of Groundwater SCOs within this layer. Perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) were detected above the Unrestricted Use and/or Protection of Groundwater guidance values for per- and polyfluoroalkyl substances (PFAS) in two samples from 8 to 10 feet bsl (NYSDEC, *Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances*, November 2022; hereinafter PFAS Guidance Values). The source of pesticides and metals in soil was attributed to the quality of the fill material. The sources of PFAS contamination may be related to the condition of the contaminated fill, undocumented releases from the historical dyeing and cleaning operations, or an unidentified off-Site source.

4. Native Sand Quality: Acetone and pesticides were detected above the Unrestricted Use SCOs and/or Protection of Groundwater SCOs between 8 and 19 feet bsl in five soil samples collected. Elevated concentrations of metals above Unrestricted Use SCOs were

detected between 8 and 19 feet bsl in eleven soil samples collected from the sand layer; exceedances of the Restricted Residential RUSCOs and/or Protection of Groundwater SCOs were detected between 8 and 18.5 feet bsl in two of the soil samples. PFOS and PFOA were detected above the Unrestricted Use PFAS Guidance Values in three samples from 8 to 10 feet bsl. The source of pesticides and acetone is attributed to the quality of the overlying fill material or an unknown on- or off-Site source. The sources of PFAS contamination may be related to the condition of the overlying fill, undocumented releases from the historical dyeing and cleaning operations, or an unidentified off-Site source.

5. Groundwater Quality: Groundwater analytical results exceeding the SGVs for VOCs and metals were detected throughout the site and SVOC exceedances were detected at select well locations. The CVOC exceedances in groundwater are attributed to the former solvent tank located in the northern portion of the Site. Acetone was detected in one perched water well and was also detected in one bedrock well set during the PDB sampling. Acetone in groundwater is attributed to an unknown on- or off-Site source. As SVOCs were not detected in exceedance of the Protection of Groundwater SCOs throughout the Site footprint, detections in groundwater are attributed to an off-Site source. Detections of total metals are generally attributed to sediment entrainment in the samples; in particular, total beryllium, copper, and lead were detected in the groundwater samples, but were not detected in the dissolved phase. Detections of dissolved metals are likely attributable to naturally occurring background concentrations or an unknown off-Site source. The sources of PFAS contamination may be related to the condition of the overlying fill, undocumented releases from the historical dyeing and cleaning operations, or an unidentified off-Site source.

   Initial bedrock groundwater sampling was completed at 53 sampling intervals via PDBs as a screening tool to evaluate vertical and horizontal contaminant distribution and refine the packer testing intervals. Analytical results from the PDB sampling revealed exceedances of the NYSDEC SGVs for VOCs in 49 of the 53 groundwater samples collected, including the presence of PCE (9.4 μg/L – 640 μg/L) and TCE (5.4 μg/L – 390 μg/L) above the SGVs in six of the eight shallow bedrock wells and in one of the eight deep bedrock wells. The highest concentrations of PCE and TCE were detected in the northern portion of the Site in the vicinity of the former solvent tank.

   Bedrock groundwater sampling was completed in December 2022. Analytical results revealed exceedances of the NYSDEC SGVs for VOCs, metals, and general chemistry parameters in all of the groundwater samples collected during the investigation. PCE

(7.2 µg/L – 900 µg/L), TCE (6.3 µg/L – 360 µg/L), and/or VC (4.4 µg/L – 6.4 µg/L) were detected in 8 of the 10 wells sampled. The highest concentrations of PCE and TCE were detected in the northern portion of the Site in the vicinity of the former solvent tank.

A full discussion of the analytical results for the PDB screening samples was reported in the 6 March 2023 full-scale design.

6. Soil Vapor Quality: Soil vapor samples collected during the August 2022 RI and previous investigations revealed the chlorinated VOCs cis-1,2-DCE, TCE, 1,1-DCE, and PCE at concentrations above the respective minimum matrix guidance values requiring monitoring and/or mitigation threshold in four samples in the northeastern portion of the Site. An indoor air quality assessment was not completed. The presence of elevated concentrations of CVOCs in the northern portion of the Site is attributed to releases associated with the former solvent tank. Soil vapor sample analytical results also identified elevated concentrations of petroleum-related VOCs including BTEX, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene throughout the Site footprint. As the presence of petroleum-related VOCs were not detected at elevated concentrations in soil or groundwater at the Site and no historical source of these impacts has been identified, the presence of these compounds in soil vapor is likely attributed to an off-Site source.

Sufficient analytical data were gathered during the RI and previous studies to establish appropriate soil cleanup levels and to develop a remedy for the Site. Source treatment of the chlorinated VOC impacts in soil and groundwater is being addressed by the IRM via source material excavation and in-situ treatment via injections to address impacts in bedrock. Langan conducted a bench-scale treatability study, which was used to finalize the full-scale design (e.g., injection requirements in specific fractures such as selected reagent, dosages, monitoring requirements, injection spacing interval, pressure, and radius of influence) that was submitted for NYSDEC review under separate cover.

2.2 Interim Remedial Measure

The IRM will include excavation for the removal of chlorinated VOC-impacted source material in the saturated soil within the perched groundwater and implementation of an in-situ groundwater treatment technology to reduce chlorinated VOCs in groundwater.

PCE was detected in soil between approximately 14.5 and 16.5 feet bsl and in the vicinity of the former solvent tank area at concentrations exceeding the Unrestricted Use SCOs and Protection of Groundwater SCOs during the previous investigations. A minimum approximately 30-foot by 20-foot area will be excavated from the current ground surface (approximately 9 feet bsl) to the top of bedrock (approximately 18.5 feet bsl) for the removal of chlorinated VOCs in saturated soil within perched groundwater in this contamination source area and in the location of the former solvent tank.

Sixteen permanent bedrock monitoring wells were installed as part of the Remedial Investigation. Langan conducted a bench-scale treatability study to demonstrate the effectiveness of various remedial treatments to address chlorinated VOCs in Site groundwater, as well as confirm dosages of the potential additives. The findings of the treatability study were used to finalize the approved full-scale design dated 6 March 2023 prior to implementation of the IRMWP.

Implementation of the EZVI Injection Remedial Design and IRMWP began in March 2023 and is expected to be completed in April 2023.

2.3 Geological Conditions

Provided below is a description of the geologic and hydrogeologic observations made during the previous November 2021 and January/February 2022 Phase II ESI and August 2022 RI. Subsurface profiles are included as Figures 3A and 3B. Soil boring logs, a groundwater contour map, and groundwater monitoring well construction logs were included in the March 2023 RIR.

2.3.1 Contaminated Historic Fill Material

Based on borings completed during the November 2021 and January/February 2022 Phase II Environmental Site Investigation (ESI) and the August 2022 RI, stratigraphy throughout the exterior areas of the Site (northern and central portions) consists of an approximately 0.5- to 5-foot-thick layer of remnant demolition debris followed by a 1- to 4-foot-thick layer of fill. The fill layer consists of grayish brown to brown, fine- to coarse-grained sand with varying amounts of gravel, silt, brick, clay, organics, miscellaneous debris, and concrete extending from surface grade (or immediately below remnant demolition debris) to between approximately 5 and 12 feet bsl across the Site footprint. Fill was not observed in soil borings LSB-10 and LSB-22, which were completed beneath the southern building slab.

2.3.2 Sand Layer

The fill is underlain by 3 to 14 feet of native sand and clayey sand, which was encountered in all soil borings completed. Drilling refusal on presumed bedrock was encountered between approximately 17 and 22 feet bsl during the 2022 RI. A geotechnical investigation completed by Langan in November 2021 and March 2022 documented an approximately 14 foot layer of sand and clay underlain by weathered mica schist rock. The top of competent rock was encountered at approximately 22 and 27 feet bsl. Two rock cores completed at LSB-12 and LSB-13 during the January 2022 Phase II EI identified weathered rock from approximately 22 to 27 feet bsl at LSB-12 and from approximately 16.5 to 17 feet bsl at LSB-13. The top of competent rock was encountered at 27 feet bsl at LSB-12 and 17 feet bsl at LSB-13.

2.3.3 Hydrogeology

Monitoring wells installed and surveyed as part of the August 2022 RI revealed perched groundwater between 11.8 and 14.2 feet bsl, corresponding to elevations between 22.79 and 25.21 NAVD88 in LMW-6 through LMW-10. Groundwater was encountered at depths ranging from approximately 11.7 and 13.2 feet bsl corresponding to elevations between 23.80 and 25.33 NAVD88 in the shallow bedrock monitoring wells and at depths ranging from approximately 12.3 and 13.2 feet bsl corresponding to elevations between 23.76 and 24.69 NAVD88 in the deep bedrock monitoring wells. Based on the groundwater elevations recorded during the August 2022 RI, perched groundwater flows to the northwest and bedrock groundwater flows to the southeast.

Langan reviewed United States Fish and Wildlife National Wetland Inventory (NWI) and New York State Freshwater Wetlands maps. Based on these documents no mapped wetlands are listed on the Site, although the East River is approximately 1/3-mile east of the Site.

2.4 Contaminant Conditions

2.4.1 Conceptual Site Model

A conceptual Site model (CSM) was developed based on the findings of the RI and previous investigations to produce a simplified framework for understanding the distribution of impacted materials, potential migration pathways, and potentially complete exposure pathways.

2.4.1.1 Potential Sources of Contamination

Potential sources of contamination have been identified and include past uses of the Site, contaminated fill material, and regional groundwater and soil vapor conditions. Historical on-Site use as a dyeing and cleaning facility and the presence of a former solvent tank on-Site are potential sources of CVOCs detected in the sand layer above the Protection of Groundwater SCOs, in groundwater, and in soil vapor. The Site-wide presence of fill contaminated with pesticides and metals has been established.

Detections of total metals in groundwater are attributed to sediment entrainment in the samples; detections of dissolved metals are likely attributable to naturally occurring background concentrations. Acetone in groundwater is attributed to an unknown on- or off-Site source. As SVOCs were not detected in exceedance of the Protection of Groundwater SCOs in soil samples throughout the Site footprint, detections in groundwater may be attributable to an off-Site source. The sources of PFAS contamination may be related to the condition of the contaminated fill, undocumented releases from the historical dyeing and cleaning operations, or an unidentified off-site source. The presence of elevated concentrations of CVOCs in soil vapor is attributed to releases associated with the former solvent tank. Petroleum-related VOCs were detected in all soil vapor samples collected and may be attributed to the presence of petroleum storage at the Site. However, as the presence of petroleum-related VOCs were not detected at elevated concentrations in soil or groundwater at the Site and no other potential on-Site source of these impacts has been identified, the presence of these compounds in soil vapor may also be attributed to an off-Site source.

2.4.1.2 Exposure Media

Impacted media include soil, groundwater, and soil vapor. Analytical data indicates that contaminated fill material and underlying sand contains VOCs, pesticides, metals, and PFAS at concentrations greater than the Unrestricted Use SCOs, Restricted Residential RUSCOs, and/or the Protection of Groundwater SCOs. PFAS is present in soil and groundwater at concentrations exceeding NYSDEC guidance thresholds. Soil vapor at the Site is impacted with petroleum-related VOCs (BTEX) and the chlorinated VOCs cis-1,2-DCE, 1,1-DCE, TCE, and PCE, each of which were detected at concentrations above the minimum NYSDOH soil vapor intrusion matrix guidance levels that would require monitoring or mitigation. An indoor air quality assessment was not completed.

2.4.1.3 Receptor Populations

The Site was most recently occupied by two four-story vacant buildings in the southern and northwestern portions of the site that have been demolished. The remaining portions of the site consist of vacant land, where former building basements were previously partially backfilled by the previous owner with remnant demolition debris from sidewalk level to the assumed depth of the former basement slabs at approximately 8 to 10 feet bsl. The Site is enclosed by fencing, and access is restricted to remediation workers and other authorized personnel. During Site development and remediation, on-Site human receptors will be limited to construction and remediation workers, authorized personnel, and design team members visiting the Site. Under future conditions, on-Site receptors will include the new building occupants, visitors to the building, and building management/maintenance employees.

2.4.2 Description of Areas of Concern

Laboratory analytical results for soil samples were compared to the 6 NYCRR Subpart 375-6.8(a-b) Remedial Program Soil Cleanup Objectives for Unrestricted Use, Restricted Residential Use, and Protection of Groundwater. Groundwater analytical results were compared to SGVs. Soil vapor was compared to the minimum values of the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion Matrices A through C dated October 2006 and revised in May 2017; an indoor air quality assessment was not completed. Soil, groundwater, and soil vapor laboratory analytical results are summarized in Tables 1 through 3, and Figures 4 through 6.

This section discusses the results of the previous investigations completed in November 2021 and January/February 2022 and the 2022 RI with respect to the Areas of Concern (AOCs) identified.

2.4.2.1 AOC-1: Chlorinated Solvent Impacts from the Former Solvent Tank

Based on the review of Sanborn Fire Insurance maps, a solvent tank was identified on former Lot 30 from 1951 to 2005. Historical soil sample analytical results identified chlorinated solvent impacts in soil, groundwater, and soil vapor in the vicinity of the former solvent tank location.

On 24 January 2022, three test pits were excavated in the northern portion of the site (former Lot 30) to look for evidence of the former solvent tank. Two test pits (TP-1 and TP-2) were excavated to a depth of approximately 3.5 feet below former basement slab (corresponding to approximately 12 feet bsl) and one test pit (TP-3) was excavated to the top of bedrock at approximately 9 feet below former basement slab (corresponding to approximately 17.5 feet bsl). Odors and elevated PID readings between 14 and 23 ppm were observed in soil immediately above bedrock in TP-3; however, the presence of the tank was not identified in any of the test pits completed.

Five soil borings (LB-02, LSB-26, LSB-27, LSB-29, and LSB-30), two overburden monitoring wells (LMW-2 and LMW-9), two shallow bedrock monitoring wells (LMW-6 and LMW-7) and two soil vapor points (SV-02 and LSV-8) were installed in the vicinity of the former solvent tank area.

AOC-1 Findings Summary

Soil

Six discrete soil samples were collected from five soil borings (LB-02, LSB-26, LSB-27, LSB-29, and LSB-30) in the vicinity of the former solvent tank area during the previous investigations and the August 2022 RI. The soil analytical results for AOC 1 are summarized as follows:

- One VOC, PCE (1.6 milligrams per kilogram [mg/kg]), was detected above the Unrestricted Use SCO and Protection of Groundwater SCO in one sample collected from 14.5 to 16.5 feet bsl at LB-02 during the 2021/2022 Phase II ESI.
- One metal, nickel (55.8 mg/kg), was detected above the Unrestricted Use SCO in one sample collected from 14.5 to 16.5 feet bsl at LB-02 during the 2021/2022 Phase II ESI.
- SVOCs, pesticides, PCBs, herbicides, and PFAS were not detected above Unrestricted Use SCOs, Restricted Residential RUSCOs, and/or Protection of Groundwater SCOs in any soil samples collected from AOC 1.

Groundwater

Monitoring well LMW-2 was installed within the presumed area of the solvent tank and sampled during the Phase II ESI. Shallow bedrock monitoring wells LMW-6 and LMW-7 were installed to the east of the LMW-2 locations and sampled during the Phase II ESI. Permanent monitoring well LMW-9 was installed to the east of the LMW-2 location and sampled during the August 2022 RI. The groundwater analytical results for AOC 1 are summarized as follows:

- Three VOCS, including cis-1,2-DCE (9.32 micrograms per liter [µg/L] – 96.8 µg/L), PCE (24.9 µg/L – 2,660 µg/L), and TCE (54.1 µg/L – 209 µg/L), were detected above the SGVs in all groundwater samples collected. Chloroform (10.2 µg/L – 15 µg/L) was detected above the SGVs in the samples collected from LMW-6 and LMW-7 and VC (8.3 µg/L) was detected above the SGV in the sample collected from LMW-9.
- One SVOC, chrysene (0.02 µg/L), was detected above the SGV in the groundwater sample collected from LMW-9.
- Metals including total iron (26,700 µg/L), total lead (41 µg/L – 339.6 µg/L), total magnesium (204,000 µg/L), dissolved magnesium (198,000 µg/L), total manganese (13,070 µg/L – 25,100 µg/L), dissolved manganese (12,190 µg/L), total nickel (123.6 µg/L – 156 µg/L), total selenium (10.3 µg/L), total sodium (198,000 µg/L), and dissolved sodium (199,000 µg/L) were detected above the SGVs in both groundwater samples collected.

- PFOS (0.0624 μg/L) and PFOA (0.239 μg/L) were detected above the PFAS Guidance Values in the groundwater sample collected from LMW-9.
- Pesticides, PCBs and herbicides were not detected above the SGVs in any groundwater samples collected.

Soil Vapor

Soil vapor points SV-02, LSV-8, and LSV-14 through LSB-16 were installed in the vicinity of AOC 1 and sampled as part of the Phase II ESI and August 2022 RI. Soil vapor analytical results for AOC 1 are summarized as follows:

- According to the NYSDOH Soil Vapor Intrusion Guidance Matrix A, concentrations of cis-1,2-DCE (6.44 micrograms per cubic meter [μg/m^3] – 40.8 μg/m^3) and TCE (169 μg/m^3 – 489 μg/m^3) in soil vapor were identified above the minimum monitoring and/or mitigation matrix threshold of 6 μg/m^3 in both soil vapor samples, and the concentration of 1,1-DCE (7.97 μg/m^3) was identified above the monitoring and/or mitigation threshold of 6 μg/m^3 in LSV-8.
- According to the NYSDOH Soil Vapor Intrusion Guidance Matrix B, PCE (339 μg/m^3 – 8,610 μg/m^3) concentrations in soil vapor were identified above the minimum monitoring and/or mitigation matrix threshold of 100 μg/m^3 in soil vapor samples SV-02, LSV-8, LSV-14, and LSV-16.
- Petroleum-related VOCs including BTEX (123 μg/m^3 – 3,319 μg/m^3) and 1,2,4-trimethylbenzene (5.56 μg/m^3 – 71.3 μg/m^3) were detected in all five soil vapor samples.

AOC-1 Conclusions

Chlorinated VOC impacts were detected in soil, groundwater, and soil vapor in the vicinity of the solvent tank formerly located in the northern portion of the Site. The concentrations of PCE and associated breakdown compounds detected in soil, groundwater, and soil vapor are indicative of a release from the former solvent tank and the presence of chlorinated VOCs in groundwater in the bedrock wells installed during the Phase II ESI at depths of up to 45 feet bsl indicate that chlorinated VOC contamination has migrated into bedrock at the site. No CVOCs were detected in the delineation soil samples and, as such, the delineation of impacts in soil is complete based on the analytical results for LSB-26, LSB-27, LSB-29, and LSB-30.

SVOC and PFAS exceedances in groundwater may be associated with the quality of the contaminated fill material; however, as SVOCs and PFAS were not detected in exceedance of the Protection of Groundwater SCOs throughout the Site footprint, detections in groundwater may be attributable to an unknown on-Site or off-Site source. Detections of total metals are attributed to sediment entrainment in the samples, and detections of dissolved metals are likely attributable to naturally occurring background concentrations.

Cis-1,2-DCE, TCE, PCE, and 1,1-DCE were detected in SV-02, LSV-8, LSV-14, and LSV-16 at concentrations exceeding the minimum NYSDOH soil vapor intrusion matrix guidance levels for which monitoring or mitigation is recommended; an indoor air quality assessment was not completed. The presence of elevated concentrations of CVOCs in soil vapor is attributed to releases associated with the former solvent tank. Petroleum-related VOCs including BTEX and 1,2,4-trimethylbenzene were detected in the soil vapor samples collected in the vicinity of the former solvent tank. As the presence of petroleum-related VOCs were not detected at elevated concentrations in soil or groundwater at the Site and no historical source of these impacts has been identified, the presence of these compounds in soil vapor is likely attributed to an off-Site source.

2.4.2.2 AOC-2: Fuel Oil ASTs

Two fuel oil aboveground storage tanks (ASTs) have been documented at the site; one 550-gallon No. 2 fuel oil AST encased in concrete is located in the basement of the vacant building in the northwestern corner of the site and one approximately 250-gallon fuel oil AST was found buried in the debris of the building demolished by the previous owners. A release was observed when the 250-gallon AST was discovered and reported to NYSDEC and assigned Spill No. 2109276. Additionally, during a Phase II Environmental Site Assessment completed by Cider in 2016, the geophysical survey identified the potential presence of one suspected 275-gallon UST of unknown contents in the northern-central portion of the Site.

On 21 January 2022, the 250-gallon AST was removed and staged on tarpaulins and all surrounding demolition debris visually observed to be impacted with product from the AST was excavated and staged on tarpaulins. AST cleaning and closure activities commenced on 14 March 2022, which included tank cleaning and removal and removal of all stockpiled petroleum-impacted demolition debris that had been removed from the area immediately surrounding the AST. No staining was observed on the demolition debris or on the concrete slab (approximately 9 feet bsl) in the location where the AST was originally found; however, a small area of stained soil beneath a 3-ft by 3-ft stained concrete slab area was observed immediately below where the AST and stockpiled demolition debris had been staged on tarpaulins. Poly-sheeting was placed above the stained soil as a demarcation layer for future remediation under the BCP.

Additionally, Cider identified the potential presence of one suspected 275-gallon UST of unknown contents in the northern-central portion of the Site during the 2016 Phase II ESA. During Langan's 2022 Phase II ESI, two soil borings were completed immediately to the east and west of the suspected UST location reported in the Cider Phase II ESA. Soil analytical results revealed no detections of VOCs or petroleum-related SVOCs. The presence of this tank or any other undocumented tanks has not been observed.

Five soil borings (LB-06, LB-07, LSB-13, LSB-16, and LSB-17) and two soil vapor points (LSV-8 and LSV-11) were installed in the vicinity of the suspected, existing, and former fuel oil ASTs.

<u>Soil</u>

Nine discrete soil samples were collected from four soil borings (LB-06, LB-07, LSB-13, LSB-16, and LSB-17) in the vicinity of the suspected, existing, and former fuel oil ASTs during the Phase II ESI and the August 2022 RI. Four samples were collected from the fill layer (also discussed in Section 6.7.4) and six samples were collected from the underlying sand. The soil analytical results and field observations for AOC 2 are summarized as follows:

- Elevated PID readings of 21.6 ppm were detected at LSB-13 between approximately 15 and 15.5 feet bsl. Additionally, odors and globules potentially associated with the 250-gallon AST that had previously been discovered and removed nearby were also observed at LSB-13.
- Four pesticides including 4,4'-DDD (0.0044 mg/kg), 4,4'-DDE (0.0416 mg/kg), 4,4'-DDT (0.133 mg/kg), and dieldrin (0.00541 mg/kg) were detected above the Unrestricted Use SCOs in one sample collected from 8 to 10 feet bsl in the fill layer. The pesticide 4,4'-DDT (0.00344 mg/kg – 0.00527 mg/kg) was detected above the Unrestricted Use SCO in two samples collected from between 13 to 19 feet bsl in the underlying sand.
- Four metals, including copper (441 mg/kg), lead (206 mg/kg – 345 mg/kg), mercury (0.355 mg/kg), and zinc (156 mg/kg – 626 mg/kg) were detected above the Unrestricted Use SCOs and/or Restricted Residential RUSCOs in three of the soil samples collected from between 8 and 11.5 feet bsl in the fill layer. Two metals, including nickel (43.8 mg/kg – 47.3 mg/kg) and silver (4.57 mg/kg), were detected above the Unrestricted Use SCO in two of the samples collected from between 15 and 17.5 feet bsl in the underlying sand.
- PFOS (0.00211 mg/kg) was detected above the Unrestricted Use Guidance Value and PFOA (0.0011 mg/kg) was detected above the Unrestricted Use and Protection of

Groundwater Guidance Values from 8 to 10 feet bsl in one sample collected from the fill layer.

- VOCs, SVOCs, PCBs and herbicides were not detected above Unrestricted Use SCOs, Restricted Residential RUSCOs, and/or Protection of Groundwater SCOs in any soil samples collected.

Groundwater

Groundwater samples were not collected to evaluate AOC 2 as part of the Phase II ESI or the August 2022 RI.

Soil Vapor

Soil vapor points LSV-8, LSV-11, and LSV-16 were installed in the vicinity of the Fuel Oil ASTs throughout the northern portion of the Site. A summary of the soil vapor analytical results for AOC 2 is summarized as follows:

- CVOCs detected in LSV-8 are discussed in Section 6.7.1.
- Petroleum-related VOCs including BTEX (35 µg/m^3 – 3,319 µg/m^3), 1,2,4-trimethylbenzene (6.59 µg/m^3 – 71.3 µg/m^3), and 1,3,5-trimethylbenzene (2.63 µg/m^3 – 86 µg/m^3) were detected in all three samples. The highest concentrations of petroleum related compounds were identified in LSV-8 located in the northeastern portion of the Site.

AOC-2 Conclusions

Concentrations of pesticides and metals in soil are attributed to the presence of contaminated fill material overlying the sand layer or an off-Site source. The sources of PFAS contamination may be related to the condition of the contaminated fill, undocumented to releases from the historical dyeing and cleaning operations, or an unidentified off-site source.

Petroleum-related VOCs including BTEX, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene were detected in all three soil vapor samples and may be attributed to the presence of petroleum storage at the Site. However, as the presence of petroleum-related VOCs were not detected at elevated concentrations in soil or groundwater at the Site and no other potential on-Site source of these impacts has been identified, the presence of these compounds in soil vapor may also be attributed to an off-Site source.

2.4.2.3 AOC-3: Historical Site Uses

Operations of concerns were historically located within the northern and central portions of the Site including dyeing and cleaning operations. Potential releases of solvents and/or other hazardous materials associated with these uses during the on-site operations may have adversely affected soil, groundwater, and/or soil vapor.

Six soil borings (LB-3, LB-04, LB-08, LSB-16, LSB-20, and LSB-21), two monitoring wells (MW-03 and MW-04), and ten soil vapor points (SV-01, SV-03 through SV-7, and LSV-10 through LSV-13) were installed in the footprint of the historical uses of concern and throughout the Site footprint in order to evaluate potential soil vapor impacts form historical Site operations.

Soil

Fourteen discrete soil samples were collected from six soil borings (LB 3, LB-04, LB-08, LSB-16, LSB-20, and LSB-21) in the vicinity of historical site uses of concern during the Phase II ESI and the August 2022 RI. Four samples were collected from the fill layer (also discussed in Section 6.7.4) and ten samples were collected from the underlying sand. A summary of the RI soil analytical results for AOC 3 is summarized as follows:

- Four pesticides including 4,4'-DDD (0.0044 mg/kg), 4,4'-DDE (0.0416 mg/kg), 4,4'-DDT (0.133 mg/kg), and dieldrin (0.00541 mg/kg) were detected above the Unrestricted Use SCOs in one sample collected from 8 to 10 feet bsl in the fill layer. Three pesticides including 4,4'-DDD (0.0281 mg/kg), 4,4'-DDE (0.0188 mg/kg), and 4,4'-DDT (0.0419 mg/kg) were detected above the Unrestricted Use SCOs in one sample collected from between 8 to 10 feet bsl in the sand layer.
- Four metals, including copper (53.8 mg/kg – 441 mg/kg), lead (277 mg/kg – 474 mg/kg), mercury (0.355 mg/kg), and zinc (247 mg/kg – 626 mg/kg) were detected above the Unrestricted Use SCOs, Restricted Residential RUSCOs, and/or Protection of Groundwater SCOs in three of the soil samples collected from between 8 and 11.5 feet bsl in the fill layer. Five metals, including copper (62.2 mg/kg), lead (259 mg/kg), mercury (0.915 mg/kg), nickel (32.6 mg/kg – 44.4 mg/kg), and zinc (442 mg/kg) were detected above the Unrestricted Use SCOs, Restricted Residential RUSCOs, and/or Protection of Groundwater SCOs in three of the samples collected from between 8 and 19 feet bsl in the sand layer.
- PFOS (0.00211 mg/kg) was detected above the Unrestricted Use SCO guidance value and PFOA (0.00111 mg/kg) was detected above the Unrestricted Use SCO and the Protection of Groundwater SCO guidance values from 8 to 10 feet bsl in one sample

collected from the fill layer. PFOS (0.00109 mg/kg) was detected above the Unrestricted Use SCO guidance value in one sample collected from 8 to 10 feet bsl in the sand layer.

- VOCs, SVOCs, PCBs and herbicides were not detected above Unrestricted Use SCOs, Restricted Residential RUSCOs, and/or Protection of Groundwater SCOs in any soil samples collected.

Groundwater

Monitoring wells MW-03 and MW-04 were installed in the footprint of the historical site uses of concern and sampled during the Phase II ESI. The groundwater analytical results for AOC 3 are summarized as follows:

- Three VOCS including cis-1,2-DCE (6.79 µg/L – 61.1 µg/L), PCE (124 µg/L), and TCE (60.6 µg/L) were detected above the SGVs in all groundwater samples collected.
- Metals including total manganese (2,950 µg/L – 4,990 µg/L) and total nickel (113 µg/L) were detected above the SGVs in both groundwater samples collected.
- SVOCs, pesticides, PCBs and herbicides were not detected above the SGVs in any groundwater samples collected.

Soil Vapor

Soil vapor points SV-01, SV-03 through SV-7, and LSV-10 through LSV-13 were installed in the footprint of the historical uses of concern and throughout the Site footprint in order to evaluate potential soil vapor impacts form historical Site operations. A summary of the soil vapor analytical results for AOC 3 is summarized as follows:

- No NYSDOH Soil Vapor Intrusion Guidance Matrix compounds were detected above the minimum monitoring and/or mitigation matrix thresholds in any of the soil vapor samples.
- Petroleum-related VOCs including BTEX (35 µg/m^3 – 145 µg/m^3), 1,2,4-trimethylbenzene (6.05 µg/m^3 – 21.9 µg/m^3), and 1,3,5-trimethylbenzene (1.6 µg/m^3 – 5.12 µg/m^3) were detected in all the soil vapor samples collected, with the exception of SV-6 collected during the August 2022 RI. The highest concentrations of petroleum related compounds were identified in SV-03 located in the central portion of the Site.

AOC-3 Conclusions

Concentrations of pesticides and metals in soil are attributed to the quality of the fill material.

Concentrations of chlorinated VOCs in groundwater in AOC-3 may be attributed to either undocumented releases from historical cleaning and dyeing operations or may be associated with migration from the solvent tank discussed in Section 6.7.1.

Concentrations of NYSDOH Soil Vapor Intrusion Guidance Matrix CVOC compounds were not detected above the minimum monitoring and/or mitigation matrix thresholds in any of the samples collected. Petroleum-related VOCs including BTEX, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene were detected in all four samples and may be attributed to the presence of petroleum storage at the Site. However, as the presence of petroleum-related VOCs were not detected at elevated concentrations in soil or groundwater at the Site and no other potential on-Site source of these impacts has been identified, the presence of these compounds in soil vapor may also be attributed to an off-Site source.

2.4.2.4 AOC-4: Historic Fill

Fill material was identified as part of the previous investigations completed at the Site and was further evaluated as part of this RI. During the Phase II ESI and August 2022 RI, the fill layer was visually observed to range from approximately 1 foot to approximately 4 feet thick at the Site to between approximately 5 and 12 feet bsl across the Site footprint. The fill predominately consisted of grayish brown to brown, fine- to coarse-grained sand with varying amounts of gravel, silt, brick, clay, organics, miscellaneous debris, and concrete.

Eleven soil borings (LB-01, LB-3, LB-04, LB-06 through LB-08, LSB-9, LSB-11, LSB-16, LSB-17, and LSB-23) and seven monitoring wells (MW-01, MW-02, MW-05, LMW-6, LMW-7, LMW-9, and LMW-10) were installed in order to assess the on-Site historic fill.

Soil

Eleven discrete soil samples were collected from the fill layer in eleven soil borings (LB-01, LB-3, LB-04, LB-06 through LB-08, LSB-9, LSB-11, LSB-16, LSB-17, and LSB-23) during the Phase II ESI and the August 2022 RI. Exceedances of pesticides and metals, above the NYSDEC Unrestricted Use SCOs, Restricted Residential RUSCOs, and/or Protection of Groundwater SCOs were detected within the fill layer.

The soil analytical results for AOC 4 are provided below.

- Four pesticides including 4,4'-DDD (0.0044 mg/kg), 4,4'-DDE (0.0416 mg/kg), 4,4'-DDT (0.133 mg/kg), and dieldrin (0.00541 mg/kg) were detected above the Unrestricted Use SCOs in one sample collected from between 8 and 10 feet bsl in the fill layer.
- Five metals, including copper (53.8 mg/kg – 441 mg/kg), lead (206 mg/kg – 474 mg/kg), mercury (0.35 mg/kg – 0.355 mg/kg), nickel (35.2 mg/kg – 36.2 mg/kg), and zinc (156 mg/kg – 626 mg/kg) were detected above the Unrestricted Use SCOs, Restricted Residential RUSCOs, and/or Protection of Groundwater SCOs in eight of the soil samples collected from between 8 and 11.5 feet bsl in the fill layer.
- PFOS (0.0018 mg/kg – 0.00211 mg/kg) was detected above the Unrestricted Use SCO guidance value from 8 to 10 feet bsl in two samples collected from the fill layer. PFOA (0.00111 mg/kg) was detected above the Unrestricted Use SCO and the Protection of Groundwater SCO guidance value from 8 to 10 feet bsl in one sample collected from the fill layer.
- VOCs, SVOCs, PCBs and herbicides were not detected above Unrestricted Use SCOs, Restricted Residential RUSCOs, and/or Protection of Groundwater SCOs in any soil samples collected.

<u>*Groundwater*</u>

Groundwater samples were collected from permanent monitoring wells MW-01, MW-02, and MW-05 in order to assess AOC-4 during the previous investigations and from LMW-6, LMW-7, LMW-9, and LMW-10 during the August 2022 RI. The groundwater elevation was measured at or near the fill/sand interface in the overburden monitoring wells. A summary of the groundwater analytical results for AOC 4 is summarized as follows:

- Three VOCs including cis-1,2-DCE (9.32 µg/L – 70 µg/L), TCE (47.2 µg/L – 209 µg/L), and PCE (24.5 µg/L – 2,660 µg/L) were detected above the SGVs in MW-02, MW-05, and LMW-9. The VOC acetone (15,000 µg/L) was detected above the SGV in LMW-6 and VC (8.3 µg/L) was detected above the SGV in LMW-9.
- One SVOC, chrysene (0.02 µg/L), was detected above the SGV in LMW-9 and the SVOC phenol (5.5 µg/L) was detected above the SGV in LMW-6.
- Seven metals including total beryllium (4.22 µg/L), total copper (242.4 µg/L), total iron (3,360 µg/L – 54,600 µg/L), total lead (25.5 µg/L – 1,496 µg/L), total magnesium (96,400 µg/L – 244,000 µg/L), total manganese (1,159 µg/L – 28,740 µg/L), total nickel (123.6 µg/L – 169.8 µg/L), total selenium (10.3 µg/L – 25.7 µg/L), and/or total sodium

(29,900 µg/L – 198,000 µg/L) were detected above the SGVs in all seven groundwater samples collected. The metals dissolved antimony (3.21 µg/L), dissolved iron (1,540 µg/L), dissolved magnesium (158,000 µg/L – 198,000 µg/L), dissolved manganese (370.7 µg/L – 30,740 µg/L), dissolved nickel (173.9 µg/L), dissolved selenium (10.7 µg/L), and/or dissolved sodium (33,100 µg/L – 199,000 µg/L) were detected above the SGVs in all four groundwater samples collected during the 2022 RI.

- PFOS (0.0624 µg/L – 0.127 µg/L) and PFOA (0.081 µg/L – 0.239 µg/L) were detected above the PFAS Guidance Values in the groundwater samples collected from LMW-6, LMW-7, LMW-9, and LMW-10.
- Pesticides, PCBs and herbicides were not detected above the SGVs in any groundwater samples collected.

Soil Vapor

Soil vapor analytical results are discussed in detail above.

AOC-4 Conclusions

Concentrations of pesticides and metals in soil are attributed to the presence of contaminated fill material to between 8 and 12 feet bsl. Detections of total metals in groundwater are attributed to sediment entrainment in the samples; in particular, total beryllium, copper, and lead were detected in the groundwater samples, but were not detected in the dissolved phase. Detections of dissolved metals associated with AOC-4 are likely attributable to naturally occurring background concentrations or an unknown off-Site source. The sources of PFAS contamination may be related to the condition of the contaminated fill, undocumented releases from the historical dyeing and cleaning operations, or an unidentified off-site source. The detection of acetone in perched groundwater above the SGVs may be attributed to undocumented releases from the historical dyeing and cleaning operations or an unidentified off-site source. Acetone was not detected above the SGVs in the field blank sample collected during groundwater sampling or in any other perched water sample collected. Notably, acetone was detected in one bedrock well set (LMW-10R-S/D) during the PDB sampling discussed in Section 6.3.3.1 of the RIR. Additional sampling was completed during the packer testing to further assess for the presence and distribution of acetone in Site groundwater.

2.4.3 Nature and Extent of Contamination

2.4.3.1 CVOC Impacts

A solvent tank was identified on Sanborn Maps on former Lot 30 from 1951 to 2005. Sample analytical results from the Phase I ESI identified chlorinated solvent impacts in soil, groundwater, and soil vapor in the vicinity of the former solvent tank location. On 24 January 2022, three test pits were excavated in the northern portion of the site (former Lot 30) to look for evidence of the former solvent tank. Two test pits (TP-1 and TP-2) were excavated to a depth of approximately 3.5 feet below former basement slab (corresponding to approximately 12 feet bsl) and one test pit (TP-3) was excavated to the top of bedrock at approximately 9 feet below former basement slab (corresponding to approximately 17.5 feet bsl). Odors and elevated PID readings between 14 and 23 ppm were observed in soil immediately above bedrock in TP-3; however, the presence of the tank was not identified in any of the test pits completed.

Chlorinated VOC impacts were detected in the sand layer (LB-02) above the Unrestricted Use SCOs and Protection of Groundwater SCOs, in perched groundwater (MW 02 and LMW-9) above the SGVs, and soil vapor (SV-02, LSV-8, LSV-14, and LSV-16) above the minimum NYSDOH monitoring and/or mitigation matrix thresholds in the immediate vicinity of the solvent tank formerly located in the northern portion of the Site. Chlorinated VOC impacts were also detected in perched groundwater downgradient (MW-03, MW-04, and MW-05) of the former solvent tank at concentrations above the SGVs. The concentrations of PCE and associated breakdown compounds detected in soil, groundwater, and soil vapor are indicative of a release from the former solvent tank, and the presence of chlorinated VOCs in groundwater in the bedrock wells installed during the Phase II ESI (MW-6 and MW-7) at depths of up to 45 feet bsl indicate that chlorinated VOC contamination has migrated into bedrock at the site.

During the RI, no CVOCs were detected in the delineation soil samples collected surrounding LB-02 and, as such, the delineation of impacts in soil is considered to be complete based on the analytical results for LSB-26, LSB-27, LSB-29, and LSB-30.

2.4.3.2 Petroleum Impacts

Historically two fuel oil ASTs have been documented at the site; one 550-gallon No. 2 fuel oil AST encased in concrete is located in the basement of the vacant building in the northwestern corner of the site and one approximately 250 gallon fuel oil AST was found buried in the debris of the building demolished by the previous owners. A release was observed when the 250 gallon AST was discovered and reported to NYSDEC and assigned Spill No. 2109276. Additionally, during a Phase II Environmental Site Assessment completed by Cider in 2016, the geophysical survey identified the potential presence of one suspected 275-gallon UST of unknown contents in the northern-central portion of the Site.

On 21 January 2022, the 250-gallon AST was removed and staged on tarpaulins and all surrounding demolition debris visually observed to be impacted with product from the AST was excavated and staged on tarpaulins. AST cleaning and closure activities commenced on 14 March 2022, which included tank cleaning and removal and removal of all stockpiled petroleum-impacted demolition debris that had been removed from the area immediately surrounding the AST. No staining was observed on the demolition debris or on the concrete slab (approximately 9 feet bsl) in the location where the AST was originally found; however, a small area of stained soil beneath a 3-ft by 3-ft stained concrete slab area was observed immediately below where the AST and stockpiled demolition debris had been staged on tarpaulins. Poly-sheeting was placed above the stained soil as a demarcation layer for future remediation under the BCP.

Additionally, Cider identified the potential presence of one suspected 275 gallon UST of unknown contents in the northern-central portion of the Site during the 2016 Phase II ESA. The presence of this tank or any other undocumented tanks has not been observed.

During Langan's Phase II ESI and August 2022 RI, four soil borings were completed in the vicinity of the suspected, existing, and former fuel oil ASTs. Elevated PID readings of 21.6 ppm were detected at LSB-13 between approximately 15 and 15.5 feet bsl. Additionally, odors and globules potentially associated with the 250-gallon AST that had previously been discovered and removed nearby were also observed at LSB-13. Soil analytical results revealed no detections of VOCs or petroleum-related SVOCs. Petroleum-related VOCs including BTEX, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene were detected in all soil vapor samples collected and may be attributed to the presence of petroleum storage at the Site. However, as the presence of petroleum-related VOCs were not detected at elevated concentrations in soil or groundwater at the Site and no other potential on-Site source of these impacts has been identified, the presence of these compounds in soil vapor may also be attributed to an off-Site source.

2.4.3.3 Soil Contamination

Fill

Metals including copper, lead, mercury, nickel, and zinc were detected from 8 to 11.5 feet bsl in two soil samples collected from the fill layer throughout the Site footprint during the August 2022 RI and six soil samples collected during the Phase II ESI at concentrations exceeding Unrestricted Use SCOs, Restricted Residential RUSCOs, and/or Protection of Groundwater SCOs.

The pesticides 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and dieldrin were detected from 8 to 10 feet bsl at concentrations exceeding the Unrestricted Use SCOs in one sample collected from the fill layer during the August 2022 investigation. Concentrations of pesticides and metals in soil are likely associated with the general quality of the contaminated fill material.

VOCs, SVOCs, PCBs, and herbicides were not detected above the Unrestricted Use SCOs, Restricted Residential RUSCOs, and/or Protection of Groundwater SCOs in any of the samples collected from the fill layer.

PFOS and PFOA were detected above the Unrestricted Use SCOs and/or Protection of Groundwater Guidance Values in two samples from 8 to 10 feet bsl in the fill layer during the August 2022 investigation. The sources of PFAS contamination may be related to the condition of the contaminated fill, undocumented releases from the historical dyeing and cleaning operations, or an unidentified off-site source.

Soil sample analytical results exceeding the Unrestricted Use Guidance Values, Restricted Residential RUSCOs, and/or Protection of Groundwater SCOs for pesticides and metals were detected between 8 and 10 feet bsl throughout the Site and are generally attributed to the presence of a contaminated historic fill layer observed up to 12 feet bsl at the Site.

Sand Layer

In addition to the CVOC impacts detected from 14.5 to 16.5 feet bsl discussed above in Section 8.1, the VOC acetone was detected above the Unrestricted Use SCO and Protection of Groundwater SCO in one sample collected from between 10 and 12 feet bsl in the sand layer.

Three pesticides including 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT were detected above the Unrestricted Use SCOs in three samples collected from between 8 and 19 feet bsl in the sand layer.

Metals including barium, copper, lead, mercury, nickel, silver, and zinc were detected from 8 to 10 feet bsl in one soil sample collected from the sand layer and from 12 to 19 feet bsl in ten soil samples collected throughout the Site footprint during the Phase II ESI at concentrations exceeding Unrestricted Use SCOs, Restricted Residential RUSCOs, and/or Protection of Groundwater SCOs.

PFOS and PFOA were detected above the Unrestricted Use SCO guidance values from 8 to 10 feet bsl in three samples collected from the sand layer. The sources of PFAS contamination may be related to the condition of the overlying contaminated fill, undocumented releases from the historical dyeing and cleaning operations, or an unidentified off-site source.

SVOCs, PCBs, and herbicides were not detected above the Unrestricted Use SCOs, Restricted Residential RUSCOs, and/or Protection of Groundwater SCOs in any of the samples collected from the sand layer.

2.4.3.4 Groundwater Contamination

Groundwater sample analytical results did not identify the presence of pesticides, herbicides, or PCBs at concentrations above the SGVs in samples collected during the RI or previous investigations.

In addition to the CVOC impacts discussed above, the VOC acetone was detected above the SGV in one groundwater sample (LMW-6). Based on the detection in both LMW-6 and the associated duplicate sample, acetone in groundwater is attributed to an unknown on- or off-Site source. Acetone was not detected in the field blank or trip blank on the day on which LMW-6 and the duplicate sample were collected, and therefore is not considered to be a laboratory artifact. The detection of acetone above the SGVs may be attributed to undocumented releases from the historical dyeing and cleaning operations or an unidentified off-site source. Notably, acetone was detected in one bedrock well set (LMW-10R-S/D) during the PDB sampling. Additional sampling to be completed during the forthcoming packer testing will further assess for the presence and distribution of acetone in Site groundwater

SVOCs including chrysene and phenol were detected at concentrations exceeding the SGVs in two groundwater samples (LMW-6 and LMW-9) collected in the northeastern portion of the Site during the August 2022 investigation. SVOCs were not detected above the SGVs in groundwater during the previous investigations and were not detected above the SCOs in soil samples collected at the Site. As SVOCs were not detected in exceedance of the Protection of Groundwater SCOs throughout the Site footprint, detections in groundwater are attributed to an off-Site source.

Metals including dissolved antimony, total beryllium, total copper, total iron, dissolved iron, total lead, total magnesium, dissolved magnesium, total manganese, dissolved manganese, total nickel, dissolved nickel, total selenium, dissolved selenium, total sodium, and dissolved sodium were detected in groundwater at concentrations exceeding the SGVs during the RI and previous investigations. Groundwater analytical results exceeding the SGVs for metals were detected throughout the site and detections of total metals are generally attributed to sediment entrainment in the samples; detections of dissolved metals are likely attributable to naturally occurring background concentrations or an unknown off-Site source. PFOS and PFOA were detected above the PFAS Guidance Values in all groundwater samples collected as part of the August 2022 RI. PFAS compounds were detected in all groundwater samples collected for which it was analyzed. The sources of PFAS contamination may be related to the condition of the contaminated fill, undocumented releases from the historical dyeing and cleaning operations, or an unidentified off-site source.

Initial bedrock groundwater sampling was completed at 53 sampling intervals via PDBs as a screening tool to evaluate vertical and horizontal contaminant distribution and refine the forthcoming packer testing intervals. Analytical results from the PDB sampling revealed the presence of PCE and TCE above the SGVs in six of the eight shallow bedrock wells and in one of the eight deep bedrock wells. The highest concentrations of PCE and TCE were detected in the northern portion of the Site in the vicinity of the former solvent tank.

2.5 Qualitative Human Exposure Assessment

Based upon the CSM and the review of environmental data, incomplete exposure pathways appear to be present under current conditions at the Site. Institutional and/or engineering controls will be implemented to prevent complete on-Site exposure pathways in construction/remediation and future conditions.

Complete exposure pathways have the following five elements: 1) a contaminant source; 2) a contaminant release and transport mechanism; 3) a point of exposure; 4) a route of exposure; and 5) a receptor population. A discussion of the five elements comprising a complete pathway as they pertain to the Site is provided below.

In addition to the human health exposure assessment, NYSDEC DER-10 requires an on-Site and off-Site Fish and Wildlife Resources Impact Analysis (FWRIA) if certain criteria are met. Based on the requirements stipulated in Section 3.10 and Appendix 3C of DER-10, a FWRIA for the Site is not required.

2.5.1 Current Conditions

The Site is located in the Upper East Side of Manhattan, New York and is identified as Block 1452, Lot 27 [formerly consisting of Lots 27, 28, 29, and 30]. The Site is an approximately 10,050-square foot parcel that was most recently occupied by two four-story vacant buildings in the southern and northwestern portions of the Site, which have been demolished. The remaining portions of the site consist of vacant land, where former building basements were partially backfilled with remnant demolition debris from sidewalk level to the assumed depth of the former basement slabs at approximately 8 to 10 feet below sidewalk level (bsl) by the previous owner. The vacant portion of the site was heavily vegetated with uneven topography; however, vegetation was cleared and the remnant demolition debris was graded to a flat surface ranging from 4 to 8 feet bsl. Stone was imported in January 2022 from Clinton Quarry, located in Union Township, New Jersey, in order to grade the site to a flat surface ranging from 4 to 8 feet bsl. Additional clean fill was imported in October and November 2022 from Allocco Recycling Corp. in accordance with the 25 October 2022 NYSDEC approval to level the Site in preparation for the demolition of the Site buildings.

Site access is currently limited to personnel completing remediation in accordance with the IRMWP and other authorized personnel also have access. In areas where human exposure to contaminated soil is possible, the potential exposure pathway for dermal absorption, inhalation and ingestion is mitigated by limiting Site access to authorized personnel, maintenance of a secure construction fence, and implementation of the HASP and CAMP, as appropriate.

Similarly, implementation of a community air monitoring plan (CAMP) in accordance with the HASP protects the adjacent public from exposure during soil disturbance activities; there were no exceedances of the monitoring levels identified in the CAMP and HASP for either dust or vapor at the downwind perimeter of the Site during implementation of the RI. Therefore, the potential exposure pathway for dermal absorption, inhalation, and ingestion has been and will continue to be fully controlled throughout the planned remediation and construction activities at the Site.

Due to the observed depth of groundwater, and the fact that groundwater in New York City is not used as a potable water source, there is no complete exposure pathway to groundwater under current Site conditions. However, there is a potential exposure pathway through dermal absorption, inhalation, and ingestion for personnel conducting remedial injections, but this pathway is controlled through the implementation of the HASP.

Because the Site consists of vacant land, there are minimal current on-Site exposure pathways for soil vapor intrusion. Soil vapor that may penetrate through the surface of the Site primarily migrates vertically through the subsurface and will dissipate and dilute with ambient air.

2.5.2 Construction/Remediation Activities

During post-demolition remedial construction, points of exposure include disturbed and exposed soil and dust during excavation, contaminated groundwater that will be encountered during dewatering, and organic vapors generated during soil excavation and off-Site disposal. Potential routes of exposure include ingestion and dermal absorption of contaminated soil, inhalation of organic vapors arising from contaminated soil, and inhalation of dust arising from contaminated soil. The potential receptor population includes construction and remediation workers and, to a lesser extent, the public adjacent to the Site if controls are not put in place to prevent this exposure.

While the potential for completed exposure pathways is present as all five elements exist during construction, the risk will be minimized by limiting Site access and through implementation of appropriate health and safety measures, such as monitoring the air for organic vapors and dust, using vapor and dust suppression measures, cleaning truck undercarriages before they leave the Site to prevent off-Site soil tracking, maintaining Site security, wearing the appropriate personal protective equipment (PPE), and implementation of the Construction Health and Safety Plan (CHASP) and CAMP.

2.5.3 Proposed Future Conditions

Excavation for Site remediation and construction of the proposed building is expected to remove all on-Site contaminants to a depth of approximately 23 feet bsl (with deeper excavations up to between 31 42 feet bsl) across the entire Site footprint. After construction, if there are any residual contaminants that may remain present, such contaminants will be located beneath the anticipated building footprint. Contaminant release and transport mechanisms include penetrations through the building foundations and any remaining exposed soil in the unlikely event that any future excavation at that depth will occur following completion of the development. If protective measures and remediation are not implemented, points of exposure include potential cracks in the proposed building foundation and exposure during any future deep soil-disturbing activities. Routes of exposure may include inhalation of vapors entering the buildings or dust during any soil-disturbing work. The receptor population includes the building tenants, residents, property employees, visitors and maintenance workers. However, the possible routes of exposure will be avoided or mitigated by implementation of a Site Management Plan, if necessary.

2.5.4 Human Health Exposure Assessment Conclusions

1. Under current conditions, there is a low risk for exposure if the integrity of the demolition debris and imported clean fill cover and foundation slabs are compromised or during remedial injection. Potential exposure to groundwater is limited to those completing remedial injection activities. The exposure risks can be avoided or minimized by limiting Site access and implementing the appropriate health and safety and vapor and dust suppression measures outlined in a Site-specific HASP and CAMP during ground-intrusive activities.
2. Post-demolition and in the absence of protective measures, there is a moderate risk of exposure during the construction and remediation activities. The primary exposure pathways are:
    a. Dermal contact, ingestion and inhalation of contaminated soil, groundwater, or soil vapor by Site visitors and construction and remediation workers.
    b. Dermal contact, ingestion and inhalation of soil (dust) and inhalation of soil vapor by the community in the vicinity of the Site.

    These exposure pathways can be avoided or minimized by performing the community air monitoring plan (CAMP) and by following the appropriate health and safety plans, implementing vapor and dust suppression techniques, and using Site security to control access.
3. The existence of a complete exposure pathway for Site contaminants to human receptors during proposed future conditions is unlikely, as the majority of on-Site sources of contamination will be treated in-situ in accordance with the IRMWP discussed in Section 4.0 or will be excavated and transported for off-Site disposal. Regional groundwater is not used as a potable water source in this part of New York City. Excavation will be completed to bedrock across much of the Site and the building will be constructed within the groundwater table. The presence of soil vapor requiring monitoring or mitigation per the NYSDOH soil vapor guidance values is not anticipated due to the construction of the new building foundation into bedrock and the groundwater table combined with the groundwater treatment proposed in the IRMWP and currently being implemented.

2.6 Significant Threat

Following the review of the results of the Remedial Investigation, NYSDEC and NYSDOH have determined that the Site does not pose a significant threat to the public health or the environment.

2.7 Remedial Action Objectives

Based on the results of the RI, the following Remedial Action Objectives (RAOs) have been identified:

2.7.1 Soil

RAOs for Public Health Protection:

- Prevent ingestion/direct contact with contaminated soil
- Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil or contaminated soil in particulate form

RAOs for Environmental Protection:

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

2.7.2 Groundwater

RAOs for Public Health Protection:

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

RAOs for Environmental Protection:

- Remove Site source(s) of groundwater contamination

2.7.3 Soil Vapor

RAOs for Public Health Protection:

- Mitigate the risk of impacts to public health resulting from existing, or the potential for, soil vapor intrusion into building(s) at the Site.

3.0 DESCRIPTION OF REMEDIAL ACTION PLAN

This section presents an analysis of the proposed remedial alternatives that can potentially be achieved under the BCP. The proposed SCOs under Alternative I will be the Part 375 Unrestricted Use SCOs under a Track 1 cleanup. Alternative II will be the Part 375 Restricted Residential RUSCOs under a Track 2 cleanup. Both alternatives are expected to achieve the established RAOs. SCOs for the Alternatives are presented in Table 4.

3.1 Technical Description of Alternative I – Track 1

- Development and implementation of a CHASP and CAMP for the protection of on-Site workers, community/residents, and the environment during remediation and construction activities.
- Removal of soil imported to facilitate the demolition of the on-Site buildings.
- Bedrock well decommissioning in accordance with NYSDEC policy CP-43 Groundwater Monitoring Well Decommissioning Policy.
- Bedrock well re-installation in immediate proximity to the original well locations. Downhole geophysical evaluation of the bedrock wells to verify fracture depths, and performance monitoring well sampling 6 months following the completion of treatment injections in accordance with the EZVI Injection Remedial Design as described in Section 2.2.
- Design and construction of the support of excavation (SOE) system around the Site boundary to facilitate the remedial excavation up to a depth of 19 feet bsl (with development excavation being to 23 feet bsl and deeper excavations to between 31 and 42 feet bsl for deeper foundation elements).
- Dewatering in compliance with city, state, and federal laws and regulations. Extracted groundwater will be treated under a permit from NYCDEP/NYSDEC that will be required to meet effluent limitations prior to discharge to the sewer system.
- Implementation of soil erosion, pollution and sediment control measures in compliance with applicable laws and regulations.
- Screening for indications of contamination (by visual means, odor, and monitoring with PIDs) of excavated material during intrusive Site work.
- Excavation, stockpiling, off-Site transport, and disposal of soil that exceeds Unrestricted Use SCOs as defined by 6 NYCRR Part 375-6.8 from ground surface to a minimum depth between 12 and 19 feet bsl at various locations throughout the Site footprint to remove known elevated concentrations of VOCs, pesticides, and metals exceeding the Unrestricted Use SCOs at various locations throughout the Site footprint. The remediation depth may extend deeper if endpoint samples reveal elevated concentrations of compounds above the Unrestricted Use SCOs and over-excavation is required to achieve a Track 1 Unrestricted Use cleanup. The Track 1

Unrestricted Use cleanup may potentially be achieved by the removal of all on site soil to the top of bedrock if over-excavation is required.

- Appropriate off-Site disposal of material removed from the Site in accordance with federal, state and local rules and regulations for handling, transport, and disposal.
- Removal and decommissioning of any encountered USTs and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) and disposal off-Site during Site redevelopment in accordance with DER-10, 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements.
- Collection and analysis of confirmation soil samples from the remedial excavation base, in accordance with DER-10 to confirm Track 1 Unrestricted Use SCOs were achieved.
- Importation and backfilling of remediated areas, as necessary for development, with certified-clean material (meeting Track 1 Unrestricted Use SCOs), recycled concrete aggregate (RCA), or virgin, native crushed stone to backfill areas excavated deeper than the development depth.
- Reuse of Site soil meeting the Track 1 Unrestricted Use SCOs, if necessary.
- Installation of a vapor barrier membrane below the slab of the proposed building and along sidewalls of any subgrade foundation elements beneath occupied spaces as a green remediation component.
- As directed by the NYSDEC and NYSDOH, an appropriate vapor intrusion evaluation will be completed.
- All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State and local rules and regulations.

The Alternative I remediation extent is shown on Figure 7 and is based on data presented in the RIR.

3.1.1 On-Site Worker, Public Health, and Environmental Protection

A Site-specific HASP will be enforced during excavation and foundation construction to protect on-Site workers from accidents and acute and chronic exposures to the identified contaminated media. Public health will be protected by implementing and enforcing dust, odor, and organic vapor control and monitoring procedures included in the CAMP and in this RAWP. The CAMP will include continuous upwind and downwind perimeter monitoring of dust and organic vapor using DustTrak aerosol monitors and PIDs capable of recording data and calculating 15-minute averages. A field engineer, scientist, or geologist will monitor Site perimeters for visible dust and odors. The environment will be protected by implementing and enforcing the appropriate soil erosion prevention measures.

3.1.2 Bedrock Well Decommissioning and Re-Installation

If wells cannot be adequately protected during remedial excavation and foundation construction, bedrock well decommissioning will be conducted in accordance with NYSDEC policy CP-43 Groundwater Monitoring Well Decommissioning Policy. Bedrock wells will be reinstalled in the immediate proximity of the original well locations installed during the RI. Downhole geophysical evaluation of the bedrock wells will be completed to verify fracture depths that were targeted during the treatment injections. Performance monitoring well sampling will be completed 6 months following the completion of treatment injections in accordance with the EZVI Injection Remedial Design.

3.1.3 Excavation Dewatering

Dewatering of groundwater will be required to accommodate remedial excavation of soil that exceeds Track 1 Unrestricted Use SCOs. The contractor will be responsible for dewatering in accordance with applicable New York City Department of Environmental Protection (NYCDEP) and NYSDEC regulations. Treatment of dewatering fluids will be required to reduce contaminant concentrations below NYCDEP/NYSDEC effluent limitations prior to discharge. The dewatering and treatment system will be designed by the contractor's NYS-licensed Professional Engineer.

3.1.4 SOE Construction and Fill and Soil Removal

VOCs, pesticides, metals, and PFAS were detected at concentrations that exceed the Track 1 Unrestricted Use SCOs. To achieve a Track 1 remedy, soil removal and disposal will extend from surface grade to a minimum depth between 12 and 19 feet bsl to remove exceedances of the Unrestricted Use SCOs across the Site.

An SOE system will be constructed around the Site boundary to accommodate remedial excavation for removal of soil exceeding Track 1 SCOs up to approximately 19 feet bsl across the Site footprint and to accommodate excavation for Site redevelopment to approximately 23 feet bsl (with deeper excavations to between 31 and 42 feet bsl for deeper foundation elements). The SOE drawings are provided in Appendix I.

The estimated volume of material requiring removal and off-Site disposal for a Track 1 cleanup is approximately 3,180 cubic yards. Additionally, approximately 1,240 cubic yards of clean fill, previously imported to facilitate the demolition of the on-Site buildings, will require removal. This estimate is based on vertical excavation limits derived from the field observations and laboratory analytical results presented in the RIR. The remediation depth may extend deeper if endpoint samples reveal elevated concentrations of compounds above the Unrestricted Use SCOs and over-excavation is required to achieve a Track 1 cleanup. A Track 1 cleanup may potentially be achieved by the removal of all on site soil to the top of bedrock if over-excavation is required. The excavated material will be transported and disposed off-Site in accordance with municipal, state, and federal regulations. The estimated extent of the remedial excavation for the Track 1 alternative is shown on Figure 7.

3.1.5 Tank System Removal

Two fuel oil aboveground storage tanks (ASTs) have been documented at the site; one 550-gallon No. 2 fuel oil AST encased in concrete is located in the basement of the vacant building in the northwestern corner of the site and one approximately 250-gallon fuel oil AST was found buried in the debris of the building demolished by the previous owners. The 250-gallon fuel oil AST was closed and removed on 14 March 2022. Additionally, during a Phase II Environmental Site Assessment completed by Cider in 2016, the geophysical survey identified the potential presence of one suspected 275-gallon UST of unknown contents in the northern-central portion of the Site.

These tanks and any other USTs and/or associated appurtenances encountered during remedial excavation (e.g., fill lines, vent line, and electrical conduit) will be decommissioned in accordance with applicable NYSDEC tank closure requirements, including DER-10 Section 5.5, 6 NYCRR Part 613.9, and NYSDEC CP-51. USTs and/or associated appurtenances will be registered and administratively closed with the NYSDEC petroleum bulk storage (PBS) unit. All excavation areas will be screened and inspected for the presence of petroleum-impacts to the surrounding soils. Petroleum-impacted soil, if encountered, will be excavated, stockpiled separately, characterized, and disposed of off-Site at a permitted disposal facility in accordance with applicable regulations. If the remedial or development excavation does not extend beyond the bottom of the encountered tank, additional confirmation soil samples will be collected as required. Closure documentation, such as contractor affidavits, bills of lading for sludge disposal, and tank disposal receipts, would be provided as appendices in the Final Engineering Report (FER).

3.1.6 Confirmation Soil Sampling

Confirmation soil samples will be collected from the remedial excavation base of approximately 12 to 19 feet bsl at a frequency of one per 900 square feet to verify that the selected cleanup requirement has been achieved. Sidewall samples will not be collected from the site perimeter because excavation will extend across the site footprint and SOE measures (e.g., sheeting and lagging) will preclude access to soil from the excavation sidewalls. An estimated 11 confirmation soil samples, plus QA/QC samples, will be collected to confirm remedial performance and will be analyzed for the full TAL/TCL of VOCs, SVOCs, PCBs, pesticides/herbicides, cyanide, metals including hexavalent and trivalent chromium, PFAS, and 1,4-dioxane. If endpoint samples reveal elevated concentrations of compounds above the Unrestricted Use SCOs and over-excavation is required to achieve a Track 1 cleanup, over-excavation and additional endpoint sample collection may be implemented. Confirmation endpoint samples will not be collected where precluded by bedrock.

3.1.7 Imported Material for Excavation Backfill

The import of backfill may be necessary to restore the Site grade to the development elevation needed for foundation construction following completion of a Track 1 remedial excavation, to manage Site conditions, and to construct a stabilized truck entrance. Any imported backfill shall comply with 6 NYCRR Part 375-6.7(d), NYSDEC DER-10 Section 5.4(e), Table 5.4(e)10, and Appendix 5, and the June 2021 Sampling, Analysis, and Assessment of PFAS Under NYSDEC's Part 375 Remedial Programs.

Imported material for excavation backfill will consist of fill that meets the Track 1 SCOs, Sampling, Analysis, and Assessment of PFAS Under NYSDEC's Part 375 Remedial Programs guidance document (June 2021), and Part 360.13(f) requirements for acceptable fill material uses, or other acceptable fill material such as virgin stone from a quarry or RCA. If RCA is imported to the Site, it will come from a NYSDEC-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of RCA acquisition. RCA imported from compliant facilities will not require chemical testing, unless required by NYSDEC under its terms for operation of the facility. Imported RCA must be derived from recognizable and uncontaminated concrete (less than 10% by weight passing through a No. 10 sieve). RCA is not acceptable for, and will not be used as, Site cover or drainage material.

3.1.8 Vapor Barrier/Waterproofing Membrane

The proposed building cellar will generally be constructed to el 14.5 with excavation for deep foundation elements reaching el -15 NAVD88. The groundwater elevation range measured during the RI was generally between el 22 and el 25 NAVD88. As such, the building will be constructed below the elevation of groundwater in bedrock. A vapor barrier/waterproofing membrane will be installed beneath the building as a green remediation component. The vapor barrier membrane will be installed under the slab and along sidewalls of any subgrade foundation elements spaces, will be a minimum 20 mil thickness, and will be compatible with potential petroleum and CVOC contaminants.

3.2 Technical Description of Alternative II – Track 2

Alternative II is a Track 2 Residential or Restricted Residential remedy and would include all of the elements of Alternative I, with the following modifications, as required:

- If soil remains at the site following excavation for foundation construction and Unrestricted Use SCOs are not achieved based on the analytical results of the endpoint samples, a Track 2 cleanup will have been achieved by a minimum excavation depth of 15 feet below street level in accordance with 6 NYCRR Part 375-3.8(e)(2)(iii)(a-d).
- Collection and analysis of documentation soil samples to document soil quality remaining at the Site.
- Establishment of use restrictions including prohibitions on the use of groundwater from the Site and prohibitions on sensitive Site uses, such as farming or vegetable gardening, to eliminate future exposure pathways.
- Potential establishment of an approved SMP to ensure long-term management of institutional controls, including periodic certification that the controls are performing as they were intended.
- Recording of an Environmental Easement (EE) to memorialize the remedial action and the engineering and institutional controls to ensure that future owners of the Site continue to maintain these controls as required

The Alternative II remediation extent is shown on Figure 8 and is based on data presented in the RIR and the proposed development plans. The requirements for each of the Alternative II tasks, as modified from the Alternative I tasks, are described below.

3.2.1 SOE Construction and Fill and Soil Removal

The Phase II EI and RI revealed that fill is present up to 12 feet bsl at various locations at the Site. Additionally, the Phase II ESI and RI revealed that the underlying sand layer is impacted with VOCs, pesticides, and metal above the Unrestricted Use SCOs. As such, the proposed excavation depth for the Track 1 remedy (between approximately 12 and 19 feet bsl, with potential over-excavation to try and achieve Track 1 SCOs, as needed) may not remove all contamination that exceeds the Unrestricted Use SCOs. As a result, only a Track 2 remedy may be possible on all or some portions of the Site. If soil remains at the Site following excavation for foundation construction and Unrestricted Use SCOs are not achieved based on the analytical results of the endpoint samples, a Track 2 cleanup will have been achieved by a minimum excavation depth of 15 feet below street level in accordance with 6 NYCRR Part 375-3.8(e)(2)(iii)(a-d).

An SOE system will be constructed around the perimeter of the excavation area to accommodate Site-wide removal of soil to a depth of 15 feet bsl to achieve a Track 2 cleanup. The excavated material will be transported and disposed off-Site in accordance with municipal, state, and federal regulations. Remediation would take place to accommodate concurrent development. The estimated extent of the remedial excavation for the Track 2 alternative is shown on Figure 8.

3.2.2 Documentation Soil Sampling

As described in Section 3.1.2, confirmation samples will be collected to confirm remedial performance; however, if a confirmation sample exceeds the Unrestricted Use SCOs, the sample will be identified as a documentation soil sample and will be used to evaluate the quality of soil to remain in place after the excavation.

3.2.3 Environmental Easement

An environmental easement will be recorded referencing Institutional Controls (ICs) that are part of the selected remedy, which will be binding upon all subsequent owners and occupants of the property. The ICs will: 1) restrict the Site to restricted residential, commercial and industrial uses, although land use is subject to local zoning laws; 2) restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDEC or NYSDOH; 3) require implementation of an NYSDEC-approved SMP; 4) require the completion and submission to the NYSDEC a periodic certification of ICs in accordance with Part 375; and 5) include a Soil Excavation Work Plan to manage future excavation of on-Site soil.

3.2.4 Site Management Plan

The SMP will identify all use restrictions and long-term monitoring and maintenance requirements to ensure the ICs remain in place and are effective. The SMP will include, but may not be limited to:

1. Descriptions of the provisions of the environmental easement including any land use, and/or groundwater use restrictions.
2. Maintaining Site access controls and NYSDEC notification.
3. The steps necessary for the periodic reviews and certification of the ICs.

3.3 Evaluation of Remedial Alternatives

The following is an evaluation of the proposed remedial alternatives based on the NYSDEC BCP remedy evaluation criteria listed below. The first two criteria are considered "threshold criteria", and the remaining criteria are "balancing criteria". A remedial alternative must meet the threshold criteria in order to be considered and evaluated further under the balancing criteria.

1. Protection of Human Health and Environment
2. Compliance with Standards Criteria and Guidance (SCGs)
3. Short-Term Effectiveness and Impacts
4. Long-Term Effectiveness and Permanence
5. Reduction of Toxicity, Mobility, or Volume
6. Implementability
7. Cost Effectiveness
8. Community Acceptance
9. Land Use

3.3.1 Overall Protection of Public Health and the Environment

Alternative I - This remedy will eliminate pathways of exposure from on-Site contaminated media. Remediating the Site to Track 1 standards will result in the removal of all on-Site soil with contaminant concentrations above Unrestricted Use SCOs to between 12 and 19 feet bsl throughout the Site footprint. Excavation across the entire Site footprint will be required to remove contaminants in material above Unrestricted Use SCOs.

Alternative II – This remedy will also eliminate pathways of exposure from on-Site contaminated media and all contaminated soil to 15 feet below street level will be removed; however, contamination exceeding the Track 1 Unrestricted Use SCOs will remain present. The environment will be protected by implementing and enforcing soil management controls when needed during future Site excavation and any other institutional and engineering controls by implementation of the SMP and through enforcement of the EE.

For each Alternative, any encountered USTs would be decommissioned, removed and disposed off-Site, and petroleum-impacted material, if encountered, would be excavated and disposed off-Site. The RAOs for public health and environmental protection will be met through the removal of contaminated source soil, which will eliminate possible ingestion, inhalation, or dermal contact.

Public health will be protected during remediation under both remedial alternatives by implementing and enforcing dust, odor, and organic vapor control and monitoring plans, procedures when needed.

3.3.2 Compliance with Standards, Criteria, and Guidance

Both Alternatives will be in compliance with all applicable standards, criteria, and guidance listed in Section 4.1.1 by removing a majority of on-Site sources of contamination to achieve the RAOs or through the use of long term Site Management controls. While implementing either remedy, protection of public health and the environment will be maintained by enforcing a Site-specific HASP and CAMP. Occupational Safety and Health Administration (OSHA) requirements for on-Site construction safety will be followed by Site contractors performing work.

3.3.3 Short-Term Effectiveness and Permanence

Alternative I - In the short-term, there will be increased truck traffic and operational noise levels associated with the transport of impacted material excavated to achieve Track 1 standards

Disposal of all excavated soil, fill, rock, and previously imported clean fill completed for remediation and redevelopment will require approximately 220 20-cubic-yard trips. Implementing the Alternative I concept will require approximately 6 months of effort (assuming normal work hours). Flaggers will be used to protect pedestrians at Site entrances and exits. Dust, odors, and/or organic vapor from the excavation and construction-related noise all need to be controlled during this period of time.

Alternative II - A Track 2 remedial excavation would involve comparable soil removal related to construction, for a similar duration as Alternative I but some end point samples may not achieve the Unrestricted Use SCOs. The excavated soil, fill, and previously imported clean fill would require approximately 240 20-cubic-yard truck trips. Implementing the Alternative II concept would also require approximately 6 months of effort (assuming normal work hours). Dust, odors, and potential organic vapor from the excavation and construction-related noise would have a similar duration relative to Alternative I. This remedy is similar in scope to Alternative I, and therefore has a similar level of permanence; however, contamination exceeding the Track 1 Unrestricted Use SCOs will remain present.

Under both remedial alternatives, dust will be controlled by the on-Site application of water spray as needed and the truck inspection station to avoid off-Site tracking of soil. Engineering controls, such as slowing the pace of work, applying foam and/or dust suppressant, and/or covering portions of the excavation will be used to suppress odors/dust when required. Work will be modified or stopped according to the action levels defined in the CAMP. Short term impacts are similar between Alternative I and Alternative II.

3.3.4 Long-Term Effectiveness and Permanence

Alternative I – A Track 1 remedy will remove all soil exceeding Unrestricted Use SCOs. Groundwater in this area of New York City is not used for drinking water; therefore, the long-term effectiveness of this remedy will eliminate risks and satisfy the objectives of this criterion. Because an EE and SMP will not be required for a Track 1 remedy, Article 141 of the NYSDOH code and local restrictions on the potable use of groundwater will be relied upon to prevent ingestion of groundwater, which prohibits potable use of groundwater without prior approval. Future Site use will be unrestricted; therefore, the long-term effectiveness of this remedy will eliminate environmental risks and satisfy the objectives of this criterion.

Alternative II – A Track 2 remedy will remove all source media soils exceeding Restricted Residential RUSCOs to a minimum excavation depth of 15 feet below street level in accordance with 6 NYCRR Part 375-3.8(e)(2)(iii)(a-d). Groundwater in this area of New York City is not used for drinking water; therefore, the long-term effectiveness of this remedy would eliminate risks and satisfy the objectives of this criterion. An EE would be put in place, supported by an SMP, to prohibit ingestion of groundwater, which is also prevented by Article 141 of the NYCDOH code and local restrictions on the potable use of groundwater, which prohibits potable use of groundwater without prior approval. The long-term effectiveness of this remedy mitigates environmental risks and satisfies the objectives of this criterion and will only be implemented to the extent the Track 1 Unrestricted Use SCOs cannot be feasibly achieved throughout or in certain locations at the bottom of the excavation.

3.3.5 Reduction of Toxicity, Mobility, and Volume

Both remedial alternatives will permanently and significantly reduce the toxicity, mobility, and volume of contamination through the removal of the vast majority of contaminated fill/soil source material through excavation and off-Site disposal.

3.3.6 Implementability

The implementability of each Alternative presented below is high due to the availability of local contractors, personnel, and equipment suitable to working in a structurally challenging environment due to the frequency of this type of remediation in this region.

Alternative I – The Track 1 remedy will consist primarily of excavation and backfilling with standard bucket excavators. Additional coordination between trades may be required. This alternative is considered feasible.

Alternative II – The technical feasibility of implementing the Track 2 Alternative II remedy is similar to that of Alternative I, as a similar extent of excavation will be required in an attempt to achieve the Track 1 Unrestricted Use SCOs; however, achieving Track 1 Unrestricted Use SCOs may not be possible if soil remains at the site following excavation for foundation construction and Unrestricted Use SCOs are not achieved based on the analytical results of the endpoint samples. Additional coordination between trades may be required, however, this alternative is considered feasible.

3.3.7 Cost Effectiveness

Alternative I – Based on the assumptions detailed for Alternative I, the estimated remediation cost of a Track 1 Cleanup is approximately $3.23 million. This Alternative I is the cost effective option because it remedies the contamination on-Site in the most economically and technically feasible manner while achieving the highest level cleanup given the very deep historic fill soils at the Site and does not require long-term monitoring of institutional controls. Table 5 details the individual cost components used to arrive at this cost estimate.

Alternative II – Based on the assumptions detailed for Alternative II, the estimated remediation cost of a Track 2 Cleanup is approximately $3.13 million. The excavation cost for this alternative is similar to Alterative I; however, some contamination will be left in place above the Track 1 Unrestricted Use SCOs, which would require the implementation of institutional controls and long-term monitoring. Table 6 details the individual cost components used to arrive at this cost estimate.

Remediation costs noted above do not include the costs associated with the ongoing remedial injections being completed in accordance with the IRMWP.

3.3.8 Community Acceptance

Both remedial Alternatives are expected to be acceptable to the community because the potential exposure pathways to on-Site contamination will be addressed upon completion of the respective remedies. The selected remedy will be subject to a 45-day public comment period and will incorporate substantive public comments before being approved.

3.3.9 Land Use

The current, intended, and reasonably anticipated future land use of the Site and its surroundings are compatible with both of the Alternatives.

3.4 Selection of Preferred Remedy

Both alternatives will be protective of human health and the environment and meet the remedy selection criteria. Alternative II achieves all of the remedial action goals established for the redevelopment project, effectively reduces contaminant mobility, and is effective in the reduction of contaminant toxicity and volume. However, Alternative I is preferable if it can be achieved since the more stringent Track 1 Unrestricted Use SCOs will be achieved. Therefore, the preferred remedy will be the Track 1 Alternative I remedy if it can be achieved Site-wide. It is also possible that portions of the Site will achieve a Track 2 Restricted Residential cleanup while other portion of the Site will remain Track 1, resulting in a split Track 1/2 remedy. Alternative II or an ultimately split Track 1/2 remedy, would require some long-term Site management potentially including ICs such as the SMP and EE.

Alternative I is recommended over Alternative II if it can be feasibly and practically implemented Site-wide at a similar cost while resulting in slightly less residual contamination and thus providing greater overall protection to human health and the environment. However, Alternative II is similarly protective of human health and the environment since the residual contamination left after completion of the remedial excavation to 15 feet and the development excavation to 23 feet would remain at and be located under the proposed new building, which is unlikely to be encountered or excavated again in the future. The controls should be easily implementable long term pursuant to an SMP and EE, which runs with the land. Alternative I is the selected remedy. Figure 7 depicts the Alternative I cleanup plan.

3.4.1 Zoning

According to the New York City Planning Commission Zoning Map 9a, the Site is within a Commercial District (C2-8), which consists of commercial districts that are predominantly residential in nature. Site zoning is consistent with future use of the Site.

3.4.2 Surrounding Property Uses

The surrounding land uses include multi-story mixed-use residential/commercial buildings and residential buildings.

The current, intended, and reasonably anticipated future land use of the Site and its surroundings are compatible with the selected remedy.

3.4.3 Citizen Participation

The CPP is discussed in Section 4.1.9.

3.4.4 Environmental Justice Concerns

The Site is located in a potential Environmental Justice area. NYSDEC's Office of Environmental Justice acts as an advocate on behalf of these areas, which are disproportionately affected by environmental burdens. Construction and operation of the future building will provide new employment opportunities and housing to the area.

3.4.5 Land Use Designations

There are no federal or state land use designations.

3.4.6 Population Growth Patterns

The population growth patterns and projections support the proposed land use.

3.4.7 Accessibility to Existing Infrastructure

To remediate the Site, the on-Site structures were demolished as a Site preparation activity. To demolish the structures, the property was disconnected from its existing infrastructure. Asbestos abatement for demolition was completed in March and April 2022. A Change of Use Form was submitted on 21 October 2022 for the demolition of the on-Site buildings and building demolition has been completed. Upon completion of the proposed remediation, water and sewer service will be provided by NYC water and sewer utilities, and electric and natural gas services will be supplied by Consolidated Edison. The property is nearby New York City subway and bus routes.

3.4.8 Proximity to Cultural Resources

There are 51 sites listed as City Landmarks (L) and 2 areas listed as Historic Districts within ½-mile of the site, summarized in the table below. The proposed remedy is not anticipated to adversely impact these cultural resources.

Property/Site	Status	Address
412 East 85th Street House	L	412 East 85th Street Manhattan, NY
Yorkville Bank Building	L	1511 3 Avenue Manhattan, NY
Sidewalk Clock	L	1501 3 Avenue Manhattan, NY
116 East 80th Street House	L	116 East 80th Street Manhattan, NY
120 East 80th Street House	L	120 East 80th Street Manhattan, NY
Clarence Dillon House	L	124 East 80th Street Manhattan, NY
Junior League of the City of New York	L	130 East 80th Street Manhattan, NY
157 East 78th Street House	L	157 East 78th Street Manhattan, NY
159 East 78th Street House	L	159 East 78th Street Manhattan, NY
161 East 78th Street House	L	161 East 78th Street Manhattan, NY
163-165 East 78th Street	L	163-165 East 78th Street Manhattan, NY
New York Public Library – Yorkville Branch	L	222 East 79th Street Manhattan, NY
St. Jean Baptiste Church	L	1067 Lexington Avenue Manhattan, NY
208 East 78th Street House	L	208 East 78th Street Manhattan, NY
210 East 78th Street House	L	210 East 78th Street Manhattan, NY
212 East 78th Street House	L	212 East 78th Street Manhattan, NY

Property/Site	Status	Address
214 East 78th Street House	L	214 East 78th Street Manhattan, NY
216 East 78th Street House	L	216 East 78th Street Manhattan, NY
218 East 78th Street House	L	218 East 78th Street Manhattan, NY
Bohemian National Hall	L	325 East 73rd Street Manhattan, NY
Shively Sanitary Tenements	L	509 East 77th Street Manhattan, NY
Shively Sanitary Tenements	L	508 East 78th Street Manhattan, NY
City and Suburban Homes Company, Avenue A (York Avenue) Estate	L	1472 York Avenue Manhattan, NY
City and Suburban Homes Company, Avenue A (York Avenue) Estate	L	504 East 79th Street Manhattan, NY
City and Suburban Homes Company, Avenue A (York Avenue) Estate	L	510 East 79th Street Manhattan, NY
City and Suburban Homes Company, Avenue A (York Avenue) Estate	L	516 East 79th Street Manhattan, NY
City and Suburban Homes Company, Avenue A (York Avenue) Estate	L	524 East 79th Street Manhattan, NY
City and Suburban Homes Company, Avenue A (York Avenue) Estate	L	532 East 79th Street Manhattan, NY
City and Suburban Homes Company, Avenue A (York Avenue) Estate	L	542 East 79th Street Manhattan, NY
City and Suburban Homes Company, Avenue A (York Avenue) Estate	L	555 East 78th Street Manhattan, NY
City and Suburban Homes Company, Avenue A (York Avenue) Estate	L	535 East 78th Street Manhattan, NY
City and Suburban Homes Company, Avenue A (York Avenue) Estate	L	527 East 78th Street Manhattan, NY
City and Suburban Homes Company, Avenue A (York Avenue) Estate	L	519 East 78th Street Manhattan, NY
City and Suburban Homes Company, Avenue A (York Avenue) Estate	L	511 East 78th Street Manhattan, NY
City and Suburban Homes Company, Avenue A (York Avenue) Estate	L	503 East 78th Street Manhattan, NY
National Society of Colonial Dames in New York State Headquarters	L	215 East 71st Street Manhattan, NY
161 East 73rd Street Carriage House	L	161 East 73rd Street Manhattan, NY
163 East 73rd Street Carriage House	L	163 East 73rd Street Manhattan, NY

Property/Site	Status	Address
165 East 73rd Street Carriage House	L	165 East 73rd Street Manhattan, NY
167 East 73rd Street Carriage House	L	167 East 73rd Street Manhattan, NY
171 East 73rd Street Carriage House	L	171 East 73rd Street Manhattan, NY
173 East 73rd Street Carriage House	L	173 East 73rd Street Manhattan, NY
175 East 73rd Street Carriage House	L	175 East 73rd Street Manhattan, NY
177-179 East 73rd Street Carriage House	L	177-179 East 73rd Street Manhattan, NY
166 East 73rd Street Carriage House	L	166 East 73rd Street Manhattan, NY
168 East 73rd Street Carriage House	L	168 East 73rd Street Manhattan, NY
170 East 73rd Street Carriage House	L	170 East 73rd Street Manhattan, NY
172-174 East 73rd Street Carriage House	L	172-174 East 73rd Street Manhattan, NY
178 East 73rd Street Carriage House	L	178 East 73rd Street Manhattan, NY
180 East 73rd Street Carriage House	L	180 East 73rd Street Manhattan, NY
182 East 73rd Street Carriage House	L	182 East 73rd Street Manhattan, NY
Upper East Side Historic District	L	–
Upper East Side Historic District Extension	L	–
Sources: NYS Historic Preservation Office, New York City Landmark's Preservation Commission https://nyclpc.maps.arcgis.com/apps/webappviewer/index.html?id=93a88691cace4067828b1eede432022b, and Cultural Resource Information System https://cris.parks.ny.gov/		

3.4.9 Proximity to Natural Resources

Potential wetlands on or near the Site were evaluated by reviewing the National Wetlands Inventory and NYSDEC regulated wetlands. Based on these documents, no mapped wetlands are listed on the subject property. The East River is approximately ¼-mile east of the Site.

3.4.10 Off Site Groundwater Impacts

Municipal water supply wells are not present in this area of New York City; therefore, groundwater from the Site cannot affect municipal water supply wells or recharge areas.

3.4.11 Proximity to Flood Plains

According to the National Flood Insurance Rate map for the City of New York published by the FEMA (Community Panel No. 3604970089F, effective date September 5, 2007), the Site is located in Zone X, which is designated for areas determined to be outside the 0.2% annual chance of flood and in an area of minimal flood hazard.

3.4.12 Geography and Geology of the Site

The Site geology is described in Section 2.2 of this report.

3.4.13 Current Institutional Controls

The Site does not have any current institutional controls.

3.5 Summary of Selected Remedial Actions

Alternative I, a Track 1 Unrestricted Use cleanup utilizing the NYSDEC Unrestricted Use SCOs, will include the following tasks:

- Development and implementation of a CHASP and CAMP for the protection of on-Site workers, community/residents, and the environment during remediation and construction activities.
- Removal of soil imported to facilitate the demolition of the on-Site buildings.
- Bedrock well decommissioning in accordance with NYSDEC policy CP-43 Groundwater Monitoring Well Decommissioning Policy.
- Bedrock well re-installation in immediate proximity to the original well locations. Downhole geophysical evaluation of the bedrock wells to verify fracture depths, and performance monitoring well sampling 6 months following the completion of treatment injections in accordance with the EZVI Injection Remedial Design as described in Section 2.2.
- Design and construction of the support of excavation (SOE) system around the Site boundary to facilitate the remedial excavation up to a depth of 19 feet bsl (with development excavation being to 23 feet bsl and deeper excavations to between 31 and 42 feet bsl for deeper foundation elements).

- Dewatering in compliance with city, state, and federal laws and regulations. Extracted groundwater will be treated under a permit from NYCDEP/NYSDEC that will be required to meet effluent limitations prior to discharge to the sewer system.
- Implementation of soil erosion, pollution and sediment control measures in compliance with applicable laws and regulations.
- Screening for indications of contamination (by visual means, odor, and monitoring with PIDs) of excavated material during intrusive Site work.
- Excavation, stockpiling, off-Site transport, and disposal of soil that exceeds Unrestricted Use SCOs as defined by 6 NYCRR Part 375-6.8 from ground surface to a minimum depth between 12 and 19 feet bsl at various locations throughout the Site footprint to remove known elevated concentrations of VOCs, pesticides, and metals exceeding the Unrestricted Use SCOs at various locations throughout the Site footprint. The remediation depth may extend deeper if endpoint samples reveal elevated concentrations of compounds above the Unrestricted Use SCOs and over-excavation is required to achieve a Track 1 cleanup. The Track 1 cleanup may potentially be achieved by the removal of all on site soil to the top of bedrock if over-excavation is required.
- Appropriate off-Site disposal of material removed from the Site in accordance with federal, state and local rules and regulations for handling, transport, and disposal.
- Removal and decommissioning of any encountered USTs and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) and disposal off-Site during Site redevelopment in accordance with DER-10, 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements.
- Collection and analysis of confirmation soil samples from the remedial excavation base, in accordance with DER-10 to confirm Track 1 Unrestricted Use SCOs were achieved.
- Importation and backfilling of remediated areas, as necessary for development, with certified-clean material (meeting Track 1 Unrestricted Use SCOs), recycled concrete aggregate (RCA), or virgin, native crushed stone to backfill areas excavated deeper than the development depth.
- Reuse of Site soil meeting the Track 1 Unrestricted Use SCOs, if necessary.
- Installation of a vapor barrier membrane below the slab of the proposed building and along sidewalls of any subgrade foundation elements beneath occupied spaces as a green remediation component.

- As directed by the NYSDEC and NYSDOH, an appropriate vapor intrusion evaluation will be completed.
- All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State and local rules and regulations.

Remedial activities will be completed in accordance with this RAWP and the Department-issued Decision Document. Deviations from the RAWP and/or Decision Document will be promptly reported to the NYSDEC for approval and documented in the FER.

4.0 REMEDIAL ACTION PROGRAM

4.1 Governing Documents

The primary documents governing the remedial action are summarized in this section. Where referenced, copies of the full plan are provided in the appendices.

4.1.1 Standards, Criteria and Guidance

The following standards, criteria, and guidance are typically applicable to Remedial Action projects in New York State, and will be consulted and adhered to as applicable:

- 29 CFR Part 1910.120 – Hazardous Waste Operations and Emergency Response
- 6 NYCRR Part 371 – Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 372 – Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities
- 6 NYCRR Subpart 373-4 – Facility Standards for the Collection of Household Hazardous Waste and Hazardous Waste from Conditionally Exempt Small Quantity Generators
- 6 NYCRR Subpart 374-1 – Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
- 6 NYCRR Subpart 374-3 – Standards for Universal Waste
- 6 NYCRR Part 375 – Environmental Remediation Programs
- 6 NYCRR Part 376 – Land Disposal Restrictions
- 6 NYCRR Part 750 –SPDES Permits
- CP-43 – CP on Groundwater Monitoring Well Decommissioning (December 2009)

- CP-51 – Soil Cleanup Guidance (2010)
- DER-10 – Technical Guidance for Site Investigation and Remediation (May 3, 2010)
- DER-23 – Citizen Participation Handbook for Remedial Programs (March, 2010)
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006)
- TOGS 1.1.1 – Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- Sampling, Analysis, and Assessment of PFAS Under NYSDEC's Part 375 Remedial Programs (June 2021)
- USEPA OSWER Directive 9200.4-17 – Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (December 1997)
- Screening and Assessment of Contaminated Sediment (Division of Fish, Wildlife and Marine Resources, June 2014)

4.1.2 Site Specific Construction Health & Safety Plan

The Remediation Engineer (RE) prepared a Site-specific construction HASP (CHASP), which is included as Appendix C. The CHASP will address Site-specific contaminants and will apply only to remedial and construction-related work on-Site. Contractors operating on the Site are required to adhere to their own plans that, at a minimum, meet the requirements of the CHASP. Remedial work performed under this plan will be in compliance with governmental requirements, including Site and worker safety requirements mandated by the Federal Occupational Safety and Health Administration (OSHA). The CHASP provides a mechanism for establishing on-Site safe working conditions, safety organization, procedures, and personal protective equipment (PPE) requirements during implementation of the remedy. The CHASP meets the requirements of 29 CFR 1910 and 29 CFR 1926 (which includes 29 CFR 1910.120 and 29 CFR 1926.65). The CHASP includes, but is not limited to, the following components:

- Organization and identification of key personnel
- Training requirements
- Medical surveillance requirements
- List of Site hazards
- Excavation safety

- Work zone descriptions
- Personal safety equipment and protective clothing requirements
- Decontamination requirements
- Standard operating procedures
- Protective measure plan
- CAMP
- Safety Data Sheets

The Volunteer and associated parties preparing the remedial documents submitted to the State and those performing the construction work are responsible for the preparation of an appropriate CHASP and for the appropriate performance of work according to that plan and applicable laws.

The CHASP and requirements defined in this RAWP pertain to all remedial and invasive work performed at the Site until the issuance of a Certificate of Completion. The Langan Site Safety Coordinator will be Ashley Sandve. If required for Site workers, confined space entry will comply with all OSHA requirements to address the potential risk posed by combustible and toxic gasses. Langan personnel will not enter confined spaces.

4.1.3 Quality Assurance Project Plan

The RE has prepared a Quality Assurance Project Plan (QAPP) that describes the quality control components that will ensure that the proposed remedy accomplishes the remedial goals, remedial action objectives, and is completed in accordance with the design specifications. The QAPP is provided as Appendix D and includes:

- Responsibilities of key personnel and their organizations for the proposed remedy;
- Qualifications of the quality assurance officer;
- Sampling requirements including methodologies, quantity, volume, locations, frequency, acceptance and rejection criteria; and
- Description of the reporting requirements for quality assurance activities including weekly quality assurance review reports, periodic quality assurance and quality control audits, and other report and data submissions.

4.1.4 Construction Quality Assurance Plan

The RE has prepared a Construction Quality Assurance Plan (CQAP) that describes the quality control components that will ensure that the proposed remedy accomplishes the remedial goals, remedial action objectives, and is completed in accordance with the design specifications. Because the remedy is being accomplished through building construction, the contractor and construction manager will have the primary responsibility to provide construction quality. A list of engineering personnel involved in implementation of the CQAP and procedures that will be carried out by the remedial engineering team are identified below. Project personnel resumes are provided in Appendix E.

The following project personnel are anticipated to implement the RAWP.

Remediation Engineer (RE):	Stewart Abrams, P.E.
Project Manager:	Amanda Forsburg, CHMM
Langan Health & Safety Officer:	Tony Moffa, ASP, CHMM, COSS
Langan Site Safety Coordinator:	Ashley Sandve
Qualified Environmental Professional (QEP):	Steve Ciambruschini, P.G.
Field Team Leader:	Ashley Sandve
Quality Assurance Officer:	Joe Conboy

The QEP or RE will directly supervise field engineers, scientists, and geologists that will be on Site during the remedial action to monitor particulates and organic vapor in accordance with the CAMP. Daily reports will be submitted to the NYSDEC and NYSDOH and will include reporting of any CAMP results that exceed the specified action levels, including reasons for the exceeding concentrations, corrective measures implemented, and the effectiveness of the corrective measures.

The QEP or RE will directly supervise field engineers, scientists, and geologists who will meet with the Construction Superintendent on a daily basis to discuss the plans for that day and schedule upcoming activities. The field engineer/scientist/geologist will document remedial activities in the daily report. This document will be forwarded to the Field Team Leader on a daily basis and to the Project Manager, QEP, and the RE on a weekly basis.

The QEP or RE will directly supervise field engineers, scientists and geologists who will screen the excavation with a PID during intrusive activities. PID readings will be noted in the record. PID readings that exceed action levels will be reported to the NYSDEC and NYSDOH in the daily reports. The field engineer/scientist/geologist will collect the post-excavation soil samples in accordance with this RAWP.

A photo log will be kept to document construction activities by still photos. The photo log may also be used to record activities recorded in the daily report.

The project field book will be used to document sample collection and how it corresponds to the RAWP. Observations, field and/or laboratory tests will be recorded in the project field book or on separate logs. Recorded field observations may take the form of notes, charts, sketches, or photographs.

The Field Team Leader will maintain the current field book and original field paperwork during the performance of work. The Project Manager will maintain the field paperwork after completion and will maintain all submittal document files.

4.1.5 Soil/Materials Management Plan

The RE has prepared a Soil/Materials Management Plan (SMMP), which includes detailed plans for managing soil/materials that are disturbed at the Site, including excavation, handling, storage, transport and disposal. It also includes controls that will be applied to these efforts to assure effective, nuisance-free performance in compliance with applicable federal, state and local laws and regulations. The SMMP is further described in Section 5.4.

4.1.6 Erosion and Sediment Control Plan

Erosion and sediment controls will be implemented as necessary. Best Management Practices (BMP) for soil erosion will be selected to minimize erosion and sedimentation off Site from the start of the remediation to the completion of development. Erosion and sediment control measures will be implemented as described in Section 5.4.10. A NYSDEC Stormwater Pollution Prevention Plan (SWPPP) is not necessary because the project will disturb less than one acre, and stormwater discharge, if required, will be to a combined sewer in accordance with the New York City generic sewer discharge permit. Additionally a Determination of Non-Jurisdiction issued by NYCDEP on 3 October 2022 confirmed that the project will not require a permit under 15 RCNY Chapter 19.1 as construction documents for the project were submitted prior to 15 February 2022.

4.1.7 Community Air Monitoring Program

A CAMP was prepared for the Site as part of the CHASP (Appendix C), and is further discussed in Section 5.4.12.

4.1.8 Contractor's Site Operations Plan

The RE will review plans and submittals for this remedial project (including those listed above and contractor and sub-contractor document submittals) and will confirm that the plans and submittals comply with this RAWP. The RE is responsible for documenting that contractor and sub-contractor submittals for this remedial project comply with this RAWP. Remedial documents will be submitted to NYSDEC and NYSDOH in a timely manner and prior to the start of work associated with the remedial document.

4.1.9 Citizen Participation Plan

Fact Sheets describing the Remedial Action proposed in the RAWP have been and will continue to be distributed through DEC Delivers, the NYSDEC's email listserv service and online Environmental Notice Bulletin. Additional Fact Sheets will be distributed to parties on the Site Contact List to announce: 1) a 45-day comment period for this RAWP; 2) the completion of the Remedial Action once implemented, with a summary of the FER; and, 3) the issuance of the Certificate of Completion for the Site.

No changes will be made to the approved Fact Sheets without written consent of the NYSDEC. Other information, such as brochures and flyers, will not be included with the Fact Sheet mailing. The Draft CPP for this project is included in Appendix F.

Document repositories have been established at the following locations and contain all applicable project documents:

Manhattan Community Board No. 8
Russel Squire, Chair
505 Park Avenue, Suite 620
New York, NY 10022
Phone: (212) 758-4616
Email: info@cb8m.com
Website: https://www.cb8m.com/

New York Public Library – Webster Library
1465 York Avenue
New York, NY 10075
Phone: (212) 288-5049
Hours (Call to verify):

Monday – Thursday	11:00 a.m. to 7:00 p.m.
Friday and Saturday	10:00 a.m. to 5:00 p.m.
Sunday	Closed

Documents will also be posted on the NYSDEC DECinfo Locator website (https://www.dec.ny.gov/data/DecDocs/C231152/).

4.1.10 Remedial Design and Green Remediation Principles

A remedial design program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and Site management of the remedy as per DER-31. The major green remediation components are as follows:

- Installation of a vapor barrier membrane below the slab of the proposed building and along sidewalls of any subgrade foundation elements beneath occupied spaces as a green remediation component.
- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term.
- Reducing direct and indirect greenhouse gases and other emissions.
- Increasing energy efficiency and minimizing use of non-renewable energy.
- Conserving and efficiently managing resources and materials.
- Reducing waste, increasing recycling and increasing reuse of materials that would otherwise be considered a waste.
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals.
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

4.2 General Remedial Construction Information

4.2.1 Project Organization

This section presents the anticipated project organization and associated roles, including key personnel, descriptions of duties, and lines of authority in the management of the RAWP. Information regarding the organization/personnel and their associated responsibilities is provided below. Resumes of key personnel involved in the Remedial Action are included in Appendix E.

4.2.2 Remedial Engineer

The RE for this project will be Stewart Abrams, P.E. The RE is a registered professional engineer licensed by the State of New York. The RE will have primary direct responsibility for implementation of the remedial program for the 1487 First Avenue Redevelopment Site. The RE will certify in the FER that the remedial activities were observed by Langan personnel under his supervision and that the remediation requirements set forth in the RAWP and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with the RAWP.

The RE will document the work of other contractors and subcontractors involved in aspects of remedial construction, including soil excavation, stockpiling, characterization, removal and disposal, air monitoring, and implementation, construction of ECs, emergency spill response services, import of backfill material, and management of waste transport and disposal. The RE will be responsible for all appropriate communication with NYSDEC and NYSDOH.

The RE will review pre-remedial plans submitted by contractors for compliance with this RAWP and will certify compliance in the FER. The RE will provide the certifications listed in the FER.

4.2.3 Remedial Action Construction Schedule

The remedial action construction schedule is discussed below in Section 11 and is provided in Appendix G. The NYSDEC will be promptly notified of proposed changes, delays and/or deviations to the schedule.

4.2.4 Work Hours

The hours for operation of remedial construction will conform to the New York City Department of Buildings (NYCDOB) construction code requirements or according to specific variances issued by that agency. NYSDEC will be notified by the Volunteer of any variances issued by the NYCDOB. NYSDEC reserves the right to deny alternate remedial construction hours.

4.2.5 Site Security

The Site perimeter will be secured with gated, signed, plywood fencing with points of entry and exit in accordance with NYCDOB and New York City Department of Transportation (NYCDOT) permits and requirements. The purpose of the fencing is to limit Site access to authorized personnel, protect pedestrians from Site activities, and maintain Site security.

4.2.6 Traffic Control

Site traffic will be controlled through designated points of access. Access points will be continuously monitored and if necessary, a flagging system will be used to protect workers, pedestrians and authorized guests. Traffic will also adhere to applicable local, state, and federal laws.

4.2.7 Contingency Plan

Contingency plans, as described below, have been developed to effectively deal with unexpected discoveries of additional contaminated media or USTs.

4.2.7.1 Discovery of USTs

As a contingency, if an unknown UST is discovered via exploratory test pit or excavation, it will be decommissioned in accordance with 6 NYCRR Part 612.2 and 613.9, and DER-10 Section 5.5. Once the tank and its contents are removed, post-excavation soil samples will be collected per the NYSDEC DER-10 requirements, if deemed necessary by the NYSDEC and the RE. Post-excavation soil sampling is not expected where the excavation will extend below the UST. If encountered, petroleum-contaminated soils will be removed. UST closure documentation, such as contractor affidavits, bills of lading for sludge disposal, and tank disposal receipts, will be provided as appendices in the FER. The NYSDEC Petroleum Bulk Storage (PBS) registration will be updated as necessary, depending on the type, number, and capacity of discovered tanks.

4.2.7.2 Discovery of Contaminated Soil

During remediation and construction activities, the soil will be continuously monitored by the RE's field representatives using a PID as well as visual and olfactory field screening techniques to identify additional soil that may not be suitable for the selected disposal facility(ies). If discovered, this material will be segregated and sampled in accordance with disposal facility requirements. If the facility is not permitted to receive the suspect materials, the material will be disposed of off-Site at a permitted facility able to receive the material based on the characterization data.

Identification of unknown or unexpected contaminated media identified by screening during ground-intrusive Site work will be promptly communicated by phone and email to the NYSDEC Project Manager. These findings will be detailed in the daily reports and the subsequent monthly BCP progress report.

4.2.8 Worker Training and Monitoring

Worker training and monitoring will be conducted in accordance with the Site-specific CHASP, included as Appendix C.

4.2.9 Agency Approvals

The planned end use for the Site conforms to current zoning for the property as determined by New York City Department of Planning. A Certificate of Completion will not be issued for the project unless conformance with zoning designation is demonstrated.

4.2.10 Pre-Construction Meeting with NYSDEC

Prior to the onset of construction, a meeting will be held between the NYSDEC, QEP and/or RE, Volunteer, Construction Manager, and Contractor to discuss project roles, responsibilities, and expectations associated with the NYSDEC-approved RAWP. Notice will be provided to the NYSDEC seven days prior to Site mobilization.

4.2.11 Emergency Contact Information

An emergency contact sheet with names and phone numbers is included in the CHASP. That document will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

4.2.12 Remedial Action Costs

The estimated cost of the Track 1 Remedial Action is $3.23 million. An itemized and detailed summary of estimated costs for the remedy is provided in Table 5. The estimated remediation cost does not include the costs associated with the ongoing remedial injections being completed in accordance with the IRMWP.

4.3 Site Preparation

4.3.1 Mobilization

Prior to commencing the remedial excavation, the Remediation Contractor will mobilize to the Site and prepare for remedial activities. Descriptions of mobilization and Site preparation activities may include the following:

- Identifying the location of all aboveground and underground utilities (e.g., power, gas, water, sewer, communications), equipment, and structures (as necessary to implement the remediation);

- Demolition of the existing on-Site buildings in order to perform the soil remediation under the existing buildings;
- Mobilizing necessary remediation personnel, equipment, and materials to the Site;
- Constructing one or more stabilized construction entrances consisting of nonhazardous material capped with a gravel roadway at or near the Site exit, which takes into consideration the Site setting and Site perimeter;
- Constructing an equipment decontamination pad for trucks, equipment, and personnel that come into contact with impacted materials during remedial activities;
- Installing erosion and sedimentation control measures, as necessary; and,
- Installing temporary fencing or other temporary barriers to limit unauthorized access to areas where remediation activities will be conducted.

4.3.2 Erosion and Sedimentation Controls

Since the planned earthwork activities will be below the adjacent sidewalk grade, full-time erosion and sedimentation measures are not anticipated. Best management practices for soil erosion will be selected and implemented, as needed, to minimize erosion and sedimentation off Site.

4.3.3 Monitoring Well Decommissioning

Existing perched groundwater monitoring wells will be properly decommissioned in accordance with NYSDEC policy CP-43 Groundwater Monitoring Well Decommissioning Policy or will be removed during excavation as part of future foundation construction. If bedrock wells cannot be adequately protected during remedial excavation and foundation construction, bedrock well decommissioning will be completed in accordance with NYSDEC policy CP-43 Groundwater Monitoring Well Decommissioning Policy.

4.3.4 Temporary Gravel Construction Entrance(s)

A temporary gravel construction entrance and exit will be installed on-Site for all vehicles exiting the BCP Site. The entrances will be covered with gravel or RCA and graded so that runoff water will be directed back into the Site. Vehicles exiting construction areas will be cleaned using clean water or dry brushing, as needed, to remove Site soil from the tires and undercarriages and prevent off-Site tracking. The Contractor will protect and maintain the sidewalks and roadway at Site access and existing points.

4.3.5 Utility Marker and Easements Layout

The Volunteer and its contractors are responsible for identifying utilities that might be affected by the remedial work and implementation of all required, appropriate, or necessary health and safety measures under this RAWP. The Volunteer and its contractors are responsible for safe execution of all invasive and other work performed under this RAWP. The Volunteer and its contractors must obtain any local, state, or federal permits or approvals pertinent to such work that may be required to implement this RAWP. Approval of this RAWP by NYSDEC does not constitute satisfaction of these requirements.

The presence of utilities and easements on the Site has been investigated. It has been determined that no risk or impediment to the planned work under this RAWP is posed by utilities or easements on the Site.

4.3.6 Support-of-Excavation

Appropriate management of structural stability of on-Site or off-Site structures during remedial activities, including excavation, is the responsibility of the Volunteer and its contractors. The Volunteer and its contractors are solely responsible for safe execution of work performed under this RAWP. The Volunteer and its contractors must obtain the necessary local, state, or federal permits or approvals that may be required to perform work under this RAWP. Further, the Volunteer and its contractors are responsible for the implementation of all required, appropriate, or necessary health and safety measures during performance of work under the approved RAWP. The currently contemplated perimeter SOE will include the installation of drilled soldier piles with lagging and tieback anchors along the northern and eastern property boundaries, a secant pile wall with internal bracing consisting of heelblocks and rakers along the western property boundary and a secant pile wall along the southern property boundary.

4.3.7 Equipment and Material Staging

The Contractor will notify the RE and the Volunteer, in writing with receipt confirmed, of pending Site mobilization at least 30 calendar days in advance. During mobilization, construction equipment will be delivered to the Site, temporary facilities constructed, and temporary utilities installed. The Contractor will place and maintain temporary toilet facilities within the work areas for use by all Site personnel. The contractor will provide drinking water for all Site personnel.

4.3.8 Truck Wash and Inspection Station

An outbound-truck inspection station will be set up at or near the Site exit. Before exiting the Site, trucks will be required to stop at the truck inspection station and will be examined for evidence of contaminated soil on the undercarriage, body, and wheels. If observed, soil and debris will be removed. Brooms, shovels and potable water will be utilized for the removal of soil from vehicles and equipment, as necessary. The Contractor is responsible for collecting any soil that is inadvertently tracked immediately off Site and returning the soil to the Site.

4.3.9 Site Fencing

The Site perimeter will be secured with gated, signed, plywood fencing. The purpose of the fencing is to limit Site access to authorized personnel, protect pedestrians from Site activities, minimize construction noise, and maintain Site security.

4.3.10 Demobilization

After remediation and construction is completed, the Contractor will be responsible for demobilizing labor, equipment, and materials not designated for off-Site disposal. The RE will document that the Contractor performs follow-up coordination and maintenance for the following activities:

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

4.4 Reporting

Periodic reports and an FER will be submitted to the NYSDEC as required to document the remedial action. The Project RE responsible for certifying all reports will be an individual licensed to practice engineering in the State of New York. Stewart Abrams, P.E. of Langan, will have this responsibility. Should Mr. Abrams become unable to fulfill this responsibility, another suitably qualified Professional Engineer will take his place.

Daily and monthly reports will be included as appendices to the FER. In addition to the periodic reports and the FER, copies of the relevant contractor documents will be submitted to the NYSDEC.

4.4.1 Daily Reports

Daily reports will be submitted to NYSDEC and NYSDOH Project Managers during on-Site remedial construction activities by the end of each day following the reporting period and will include:

- An update of progress made during the reporting day;
- Locations of work and quantities of material imported and exported from the Site;
- References to an alpha-numeric map for Site activities;
- A summary of complaints with relevant details (names, phone numbers);
- A summary of CAMP findings, including trigger action levels; and,
- An explanation of notable Site conditions.

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

Daily Reports will reference the NYSDEC-assigned project number and include a description of daily activities keyed to an alpha-numeric map that identifies work areas. These reports will include a summary of air monitoring results, odor and dust problems and corrective actions, and complaints received from the public.

4.4.2 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers by the 10th day of the month following the reporting period and will include the following information, as well as the information required in the BCA:

- Activities relative to the Site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (e.g. tons of material exported and imported);
- Description of approved activity modifications, including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and,

- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

4.4.3 Other Reporting

Photographs of remedial activities will be taken and submitted to the NYSDEC. Photographs will illustrate the remedial program elements and will be of acceptable quality. Representative photographs of the Site will be provided. Field photographs will be included in daily and monthly reports, as necessary, and a comprehensive photograph log will be included in the FER. Upon request, photographs will be submitted to the NYSDEC and NYSDOH Project Managers on CD or other acceptable electronic media. CDs will have a label and a general file inventory structure that separates photographs into directories and sub-directories according to logical Remedial Action components. A photograph log keyed to photo file ID numbers will be prepared to provide explanation for all representative photographs.

Site record keeping for all remedial work will be appropriately documented. These records will be maintained on Site at all times during the project and will be available for inspection by NYSDEC and NYSDOH staff.

4.4.4 Complaint Management Plan

The management plan for documenting complaints is detailed below.

Item	Description
Approach	Complaints regarding remediation or construction activities/operations to be minimized and mitigation measures implemented to reduce the incidence of complaints.
Objective	To manage environmental complaints from the community regarding construction or remediation.
Implementation Strategy/Mitigation Measures	All complaints will be documented on a complaint register. The register will be maintained as an ongoing record. The entry will include following information: • Time, date and nature of complaint; • Type of communication (telephone, letter, personal, etc.); • Name, contact address and contact number; • Response and investigation undertaken as a result of the complaint; and action taken and signature of responsible person. Each complaint will be investigated as soon as practical in relation to requirements.
Monitoring	A representative of the Volunteers or the RE will follow up on the complaint within two weeks of receipt to ensure it is resolved.

Item	Description
Reporting	Upon receipt and following the complaint investigation and resolution, the NYSDEC will be notified. Complaint resolutions will be documented in daily reports.
Corrective Action	Should an incident or failure to comply occur in relation to the management of environmental complaints, one or more of the following corrective actions will be undertaken as appropriate: • Conduct additional training of staff to handle environmental complaints • Investigate why the environmental complaint was not addressed within the specified time frame • Investigate complaint and action follow-up to results of investigation

4.4.5 Deviations from the RAWP

Necessary deviations from the RAWP will be coordinated with the NYSDEC in advance. Notification will be provided to the NYSDEC by telephone/email for conditions requiring immediate action (e.g., conditions judged to be a danger to the surrounding community). Based on the significance of the deviation, an addendum to this RAWP may be necessary and will include:

- Reasons for deviating from the approved RAWP;
- Approval process to be followed for changes/editions to the RAWP; and,
- Effect of the deviations on the overall remedy.

5.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE

5.1 Soil Cleanup Objectives

The Soil Cleanup Objectives for the Site are the Unrestricted Use SCOs; SCOs for the selected remedy are listed in Table 4.

Soil and materials management on-Site and off-Site will be conducted in accordance with the SMMP as described below.

5.2 Remedial Performance Evaluation (Confirmation Soil Sampling)

5.2.1 Confirmation Soil Sampling Frequency

Where the Track 1 remedial excavation does not extend to bedrock, confirmation soil samples will be collected from the remedial excavation base of between approximately 12 and 19 feet bsl at a frequency of one confirmation sample per 900 square feet accordance with DER-10 to confirm that the remaining soil does not exceed the Unrestricted Use SCOs. Sidewall samples will not be collected from the Site perimeter because excavation will extend across the Site footprint and SOE measures (e.g. secant pile walls, sheeting, lagging) will preclude access to soil from the excavation sidewalls. An estimated 11 confirmation soil samples, plus QA/QC samples, will be collected and will be analyzed for the full TAL/TCL of VOCs, SVOCs, PCBs, pesticides/herbicides, cyanide, metals including hexavalent and trivalent chromium, PFAS, and 1,4-dioxane to confirm remedial performance. If endpoint samples reveal elevated concentrations of compounds above the Unrestricted Use SCOs and over-excavation is required to achieve a Track 1 cleanup, over-excavation and additional endpoint sample collection may be implemented. Confirmation endpoint samples will not be collected where precluded by bedrock. As such, the number of samples may change based on over-excavation needs and the depth at which bedrock is encountered.

In the location of unidentified USTs, if the remedial or development excavation does not extend beyond the bottom of the encountered tank, five documentation samples will be collected from each excavation and will consist of one sample per excavation sidewall and a sample from each excavation base. As necessary, post removal soil samples will be collected in accordance with the requirements of CP-51. Samples will be analyzed for CP-51 List VOCs and SVOCs and compared to the CP-51 Table 2 Soil Cleanup Levels for Gasoline Contaminated Soils or Table 3 Soil Cleanup Levels for Fuel Oil Contaminated Soil and the 6 NYCRR Part 375-6.8(a) Unrestricted Use SCOs, depending on the contents of the USTs.

No additional excavation is anticipated; however, if hotspots are encountered during remedial construction, one base sample and one sidewall soil sample will be collected for every 30 linear feet of sidewall for those areas.

5.2.1.1 Methodology

Confirmation soil samples will be collected from the surface of soil between approximately 12 and 19 feet bsl to verify that the selected cleanup requirement has been achieved r and will be analyzed for the full TAL/TCL of VOCs, SVOCs, PCBs, herbicides, pesticides, cyanide, metals including hexavalent and trivalent chromium, and per- and PFAS and 1,4-dioxane. Should additional soil sampling be deemed necessary (e.g., over-excavation to achieve Track 1 SCOs, additional tank closure, unknown environmental condition through visual evidence of a remaining source), confirmation sampling will be conducted in accordance with NYSDEC DER-10. No off-Site excavation is required or proposed. NYSDEC ASP Category B deliverables will be requested from the laboratory for data validation purposes.

5.2.1.2 Quality Assurance/Quality Control

Quality control procedures for confirmation soil sampling are included in the QAPP (refer to Appendix D). Confirmation analytical results will be provided in the NYSDEC's electronic data deliverable (EDD) format for EQuIS™. Guidance on the sampling frequency is presented in NYSDEC DER-10 Section 5.4.

The QA/QC procedures required by the NYSDEC Analytical Services Protocol (ASP) and SW-846 methods will be followed. This will include instrument calibration, standard compound spikes, surrogate compound spikes, and analysis of quality control samples. The laboratory will provide sample bottles, which will be pre-cleaned and preserved. Where there are differences in the SW-846 and NYSDEC ASP requirements, the NYSDEC ASP will take precedence.

5.2.2 Data Usability Summary Reports

ASP Category B deliverables will be prepared for all remedial performance samples collected during implementation of this RAWP. Data Usability Summary Reports (DUSR) will be prepared by a qualified data validator and the findings will be reported in the FER.

5.2.3 Sample Reporting

Analytical laboratories that analyze samples, prepare results, and perform contingency sampling will be NYSDOH ELAP-certified laboratories. Confirmation soil sampling will be performed in accordance with NYSDEC DER-10 sample frequency requirements and as described in Section 5.2.1. The FER will provide a tabular and map summary of all soil sample results with a comparison to the Unrestricted Use SCOs. Soil samples with concentrations of contaminants above the Unrestricted Use SCOs, if any, will be identified.

5.3 Estimated Material Removal and Backfill Quantities

The estimated volume of soil requiring removal and off-Site disposal for the Track 1 remedy is up to approximately 3,180 cubic yards. The import of backfill may be necessary to restore the Site grade to the development elevation needed for foundation construction following completion of a Track 1 remedial excavation, to manage Site conditions, and to construct a stabilized truck entrance. Backfill that meets the Unrestricted Use SCOs and the requirements outlined in Section 5.4.9 will be imported to the Site or on-Site material that meets the requirements of 5.4.6 will be reused at the Site.

5.4 Soil/Materials Management Plan

This section presents the approach to management, disposal, and reuse of soil, fill, and materials excavated from the Site. This plan is based on the current knowledge of Site conditions and will be augmented, as necessary, using additional data collected during remediation. A field engineer, scientist, or geologist, under the direction of the RE will monitor and document the handling and transport of contaminated material removed from the Site for disposal as a regulated solid waste. A field engineer, scientist, or geologist, under the direction of the RE, will assist the remediation contractor in identifying impacted materials during remediation, determining materials suitable for direct load out versus temporary on-Site stockpiling, selection of samples for waste characterization, if necessary, and determining the proper off-Site disposal facility. Separate stockpile areas will be constructed as needed for the various materials to be excavated or generated, with the intent to most efficiently manage and characterize the materials and to avoid comingling impacted materials with non-impacted soil.

The following material types are reasonably anticipated to be encountered during remediation and other Site activities associated with redevelopment:

- Non-hazardous Contaminated Fill Material – This material refers to fill that contains concentrations of metals and pesticides above the Unrestricted Use SCOs and will not be reused on-Site. This material will be excavated to approximately 12 feet bsl across the entire Site footprint. This material will be transported off-Site and disposed of at a facility permitted to accept the material.
- Non-hazardous Contaminated Soil – Analytical results indicate contaminants are present at concentrations above the Track 1 Unrestricted Use SCOs in the sand underlying the contaminated fill. This material will be excavated to between approximately 12 and 19 feet bsl across the Site footprint. The remediation depth may extend deeper if endpoint samples reveal elevated concentrations of compounds above the Unrestricted Use SCOs and over-excavation is required to achieve a Track 1 cleanup. Non-hazardous native soil excavated from areas exceeding the Track 1 Unrestricted Use SCOs will be transported off-Site and disposed of at a facility permitted to accept the material. Confirmation soil samples will be collected from the base of the remedial excavation as described in Section 5.2.1 to document compliance with the Unrestricted Use SCOs. A proposed endpoint confirmation sample location plan is provided as Figure 9.
- Soil Meeting the Unrestricted Use SCOs and Rock – Analytical results indicate contaminants are present to between approximately 12 and 19 feet bsl across the Site footprint, which will be excavated for off-site disposal as described above. The underlying

material that will be excavated for site development consists of soil meeting the Unrestricted Use SCOs and bedrock, which will be removed to a depth of approximately 23 feet bsl with deeper excavations into bedrock to between 31 and 42 feet bsl for the construction of deeper foundation elements.

5.4.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed by an engineer, geologist, or scientist under the direct supervision of a PE or QEP during all remedial and development excavations into known or potentially contaminated material. Soil screening will be performed regardless of the time of year that invasive work is conducted and will take place during excavation and invasive work performed as part of the remedy and development-related construction performed prior to issuance of the Certificate of Completion, including, but not limited to, excavating for remediation, foundation construction, and utility work.

Screening will be performed by qualified environmental professionals. Resumes are provided herein for personnel responsible (i.e., those representing the RE) for field screening the excavation and other ground-intrusive work performed during remediation and development.

5.4.2 Stockpile Methods

Stockpiles will be constructed as necessary to separate and stage excavated material pending loading or characterization sampling. Stockpile areas will meet the following minimum requirements:

- Separate stockpile areas will be constructed to avoid comingling materials of differing waste types. Separate stockpiles will be created where material types are different (e.g., petroleum-impacted material stockpiled in a contaminated soil area) to the extent feasible. Where material of different waste types cannot be otherwise separated, excavated soil will be placed onto a minimum thickness of 6 mil low-permeability liner of sufficient strength and thickness to prevent puncture during use. The use of multiple layers of thinner liners equivalent to 6-mil thickness in total is permissible.
- Equipment and procedures will be used to place and remove the soil that will minimize the potential to jeopardize the integrity of the liner.
- Stockpiles located at or above sidewalk grade will be covered at the designated times (see below) with minimum 6-mil plastic sheeting or tarps which will be securely anchored to the ground. Stockpiles will be routinely inspected and broken sheeting covers will be promptly replaced.

- Stockpiles will be covered upon reaching their capacity (i.e., approximately 1,000 cubic yards) until ready for loading. Stockpiles that have not reached their capacity, whether active or inactive, will be covered at the end of each workday.
- Stockpiles located at or above sidewalk grade will be encircled with silt fences and hay bales, as needed, to contain and filter particulates from rainwater that has drained off the soils and to mitigate the potential for surface water run-off.
- Stockpiles will be inspected at a minimum of once daily and after every storm event. Results of inspections will be recorded in a logbook, maintained at the Site, and made available for inspection by the NYSDEC.

5.4.3 Materials Excavation and Load Out

A field engineer, scientist, or geologist under the supervision of the RE will monitor ground-intrusive work and the excavation and load-out of excavated material.

The Volunteer and its contractors are solely responsible for safe execution of ground-intrusive and other remedial work performed under this RAWP. The Volunteer and its contractors are solely responsible for the identification of utilities and/or easements that might be affected by the work conducted under this RAWP.

Loaded vehicles leaving the Site will be appropriately lined (as needed), securely covered, manifested, and placarded in accordance with the appropriate federal, state, and local requirements, including applicable transportation requirements (i.e., New York State Department of Transportation [NYSDOT] and NYCDOT requirements). Trucks hauling contaminated fill material will not be lined unless free liquids are present or the material is grossly impacted.

A truck wash will be operated on Site. The RE will be responsible for documenting that outbound trucks will be washed at the truck wash, as necessary, before leaving the Site until the remedial construction is complete. Locations where vehicles enter or exit the Site will be inspected daily for evidence of off-Site sediment tracking.

The RE will be responsible for documenting that egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during remediation and development. The remediation contractor will clean adjacent streets as necessary to maintain a clean condition with respect to Site-derived materials.

The Volunteer and associated parties preparing the remedial documents submitted to New York State, and the parties performing this work, are responsible for the safe performance of ground-intrusive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings).

The Volunteer and associated parties will ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this RAWP.

Development-related excavation will not interfere with, or otherwise impair or compromise, the performance of remediation required by this RAWP.

Mechanical processing of contaminated fill and contaminated soil on-Site is prohibited unless otherwise approved by NYSDEC.

Primary contaminant sources (including, but not limited to, tanks and hotspots) identified during Site characterization, the RI, and implementation of the remedy will be located via field measurements to the nearest permanent structures or property lines. The information will be shown on maps to be included with the FER.

5.4.4 Materials Transport Off-Site

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. The trucking entrance will be determined prior to the initiation of the remedy. All trucks loaded with Site materials exit the vicinity of the Site using only approved truck routes.

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

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

Truck routes are shown on Figure 10. Trucks will be prohibited from excessive stopping and idling in the neighborhood outside of the Site.

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

To the extent possible, queuing of trucks will be performed on-Site in order to minimize off-Site impacts. Off-Site queuing will be minimized to the maximum extent feasible.

Material transported by trucks exiting the Site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

5.4.5 Materials Disposal Off-Site

Disposal facilities will be determined later and will be reported to the NYSDEC Project Manager prior to off-Site transport and disposal of excavated material. Soil/fill/solid waste excavated and removed from the Site will be handled, transported and disposed in accordance with local, State (including 6 NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated disposal (e.g., clean soil removed for development purposes), a formal request with an associated plan will be made to NYSDEC's Project Manager. Unregulated off-Site management of materials from this Site is prohibited without formal NYSDEC approval.

The following documentation will be obtained and reported by the RE for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the Site conforms to applicable laws:

(1) A letter from the RE or BCP Volunteer to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation Site in New York State. The letter will provide the project identity and the name and phone number of the RE. The letter will include as an attachment a summary of all chemical data for the material being transported (including waste characterization data).

(2) A letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material.

These documents will be included in the FER.

Hazardous and non-hazardous contaminated fill material and contaminated soil transported off-Site will be handled, at a minimum, as a solid waste per 6 NYCRR Part 360. Contaminated fill and soil excavated from the Site are prohibited from being disposed of at Part 360 Registration Facilities (also known as Soil Recycling Facilities).

Soil that is contaminated but non-hazardous and is being removed from the Site may be sent to a permitted Part 360 landfill. This material is prohibited from being sent or redirected to a Part 360-15 Registration Facility.

The FER will include an accounting of the destination of material removed from the Site during implementation of the remedy, including excavated soil, contaminated soil and fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of each material type must also include records and approvals for receipt of the material. This information will also be presented in a table to be included in the FER.

A "Bill of Lading" system or equivalent will be used for off-Site movement of non-hazardous wastes and contaminated soils. This information will be reported in the FER. Hazardous wastes derived from the Site, including lead identified in soil during waste characterization investigation activities, will be stored, transported, and disposed of in compliance with applicable local, state, and federal regulations.

Appropriately licensed haulers, in compliance with applicable local, state, and federal regulations, will be used to transport the material removed from this Site.

A waste characterization study was performed for soil intended for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results, and QA/QC results will be reported in the FER. Data available for excavated material to be disposed of at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

5.4.6 Materials Reuse On-Site

Soil excavated during implementation of the remedy may be reused on Site if the requirements in this section are met. Grossly-impacted soil will not be reused. Reused soil must be non-hazardous and must meet the Unrestricted Use SCOs (refer to Table 4). Soil removed during implementation of the remedy or removed for grading or other purposes that meets the Unrestricted Use SCOs may be reused as backfill but will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site is prohibited for reuse on-Site. Material deemed unfit for reuse will be transported for off-Site disposal. Soil excavated and then replaced within or within the immediate vicinity of the source excavation is not considered reuse.

5.4.7 Fluids Management

Dewatering will occur in support of redevelopment activities.

Liquids discharged into the New York City sewer system will receive prior approval by New York City Department of Environmental Protection (NYC DEP). The NYC DEP regulates discharges to the New York City sewers under Title 15, Rules of the City of New York Chapter 19. Discharge to the New York City sewer system will require an authorization and sampling data demonstrating that the groundwater meets the City's discharge criteria. The dewatering fluid will be pretreated as necessary to meet the NYC DEP discharge criteria. If discharge to the City sewer system is not appropriate, the dewatering fluids will be managed by transportation and disposal at an off-Site treatment facility.

Discharge of water generated during remedial construction to surface waters (e.g. a stream or river) is prohibited without a SPDES permit issued by New York State Department of Environmental Conservation.

5.4.8 Backfill from Off-Site Sources

Materials proposed for import onto the Site will be approved by the RE and NYSDEC, and will comply with the provisions in this RAWP prior to receipt at the Site. Imported soil for backfill must meet the Unrestricted Use SCOs or be another type of acceptable fill material such as virgin, native stone from a quarry or RCA.

Clean fill will be segregated at a source/facility that is free of environmental contaminants. Qualified environmental personnel will collect representative samples at a frequency consistent with NYSDEC DER-10 Table 5.4(e)10 – Recommended Number of Soil Samples for Soil Imported To or Exported From a Site. The samples will be analyzed for Part 375 VOCs, SVOCs, pesticides/herbicides, PCBs, cyanide, metals including trivalent and hexavalent chromium and PFAS, and 1,4-dioxane by a NYSDOH ELAP-certified laboratory. Upon meeting these criteria, the certified-clean fill will be transported to the Site and segregated from impacted material, as necessary, on plastic sheeting until it is used as backfill.

If RCA is imported to the Site, it will be from a NYSDEC-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require chemical testing, unless required by the NYSDEC under the terms for operation of the facility. RCA imported to the Site must be derived from recognizable and uncontaminated concrete, with no more than 10% by weight passing through a No. 10 sieve. RCA is not acceptable for and will not be used as cover or drainage material or to fill areas beneath the groundwater table. Crushed virgin stone from a permitted mine or quarry may also be imported without chemical testing if sieve analysis shows no more than 10% by weight passing through a No. 10 sieve.

Trucks entering the Site with imported soils will be secured with tight fitting covers.

Non-compliant soils will not be imported to the Site. Material from industrial Sites, spill Sites, other environmental remediation Sites, or other potentially contaminated Sites will not be imported to the Site. Solid waste will not be imported onto the Site. Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by the NYSDEC. The contents of this RAWP and NYSDEC approval of this RAWP should not be construed as an approval for this purpose.

Documentation of backfill sources will be provided to NYSDEC for review and approval prior to importing material to the site.

The FER will include the following certification by the RE: "I certify that all import of soils from off-Site, including source evaluation, approval, and sampling, has been performed in a manner that is consistent with the methodology defined in the RAWP".

5.4.9 Demarcation

It is anticipated that the Site will achieve a Track 1 Unrestricted Use cleanup; therefore, engineering controls for soil, such as a Site cover system and associated demarcation layer, are not proposed. However, a survey denoting the base and sidewalls of the excavation may still be required if analytical results from the confirmation samples are detected exceeding the Unrestricted Use SCOs, because an Environmental Easement will be filed as part of the Alternative II Track 2 or Split Track 1/2 remedies.

5.4.10 Stormwater Pollution Prevention

As the majority of planned earthwork activities will be below the adjacent sidewalk grade, full-time erosion and sedimentation measures are not anticipated. Best management practices for soil erosion will be selected and implemented, as needed, to minimize erosion and sedimentation off Site.

5.4.11 Contingency Plan

If USTs or other previously unidentified contaminant sources are found during on-Site remedial excavation or development-related construction, sampling will be performed on product, if encountered, and surrounding subsurface materials (e.g., soil, stone, etc.) in accordance with Section 5.2.1. Chemical analyses will be for full scan parameters (full TAL/TCL VOCs, SVOCs, PCBs, pesticides, herbicides, cyanide, metals including hexavalent and trivalent chromium,1,4-dioxane, and PFAS). Analyses will not be otherwise limited without NYSDEC approval.

Identification of unknown or unexpected contaminated media identified by screening during ground-intrusive work will be promptly communicated by phone to the NYSDEC Project Manager. These findings will also be detailed in the daily reports and the subsequent monthly BCP progress report.

It is anticipated that a Track 1 cleanup will be achieved. Unrestricted Use SCOs for a Track 1 cleanup are presented in Table 4.

5.4.12 Community Air Monitoring Plan

Community air monitoring will be conducted in compliance with the NYSDOH Generic CAMP outlined below and provided as Appendix H.

The CAMP will include real-time monitoring for VOCs and particulates at the upwind perimeter of the Site and downwind perimeter of each designated work area when ground-intrusive work is in progress. Continuous monitoring will be required for all ground-intrusive work. Ground-intrusive work includes, but is not limited to, soil/fill excavation and handling and utility trenching. Periodic monitoring for VOCs may be required during non-intrusive work such as the collection of soil samples. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location and taking a reading prior to leaving a sample location.

CAMP monitoring of total VOC levels will be conducted using PIDs, and monitoring for particulates will be conducted using particulate sensors equipped with filters that can detect airborne particulates less than 10 microns in diameter (PM10). Monitoring for particulates and odors will be conducted during ground-intrusive work by a field engineer, scientist, or geologist under the supervision of the RE. The work zone is defined as the general area in which machinery is operating in support of remediation. A portable PID will be used to monitor the work zone and for periodic monitoring of total VOC levels during work such as soil sampling. The Site perimeter will be visually monitored for fugitive dust emissions. A background reading will be collected at the upwind perimeter of the Site at the beginning of each work day prior to the start of soil disturbance.

The following actions will be taken based on total VOC levels measured:

- If total VOC levels exceed 5 ppm above background for the 15-minute average at the perimeter, work will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work will resume with continued monitoring.
- If total VOC levels at the downwind perimeter of the work zone persist at levels in excess of 5 ppm above background but less than 25 ppm, work will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work will resume provided that the total VOC level 200 feet downwind of the hot zone or half the distance to the nearest potential receptor or residential/ commercial structure, whichever is less – but in no case less than 20 feet, is below 5 ppm above background for the 15-minute average.
- If the total VOC level is above 25 ppm at the perimeter of the hot zone, work will be shut down.

The following actions will be taken based on dust levels measured or visual dust observations:

- If the downwind particulate level is 100 $\mu g/m^3$ greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression must be employed. Work may continue with dust suppression techniques provided that downwind PM10 levels do not exceed 150 $\mu g/m^3$ above the background level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM10 levels are greater than 150 µg/m³ above the background level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM10 concentration to within 150 µg/m³ of the background level and in preventing visible dust migration.

Sustained concentrations of VOCs or PM10 will be reported to the NYSDEC and NYSDOH Project Managers and included in the daily report, including reasons for the exceeding concentrations, corrective measures implemented, and the effectiveness of the corrective measures. In addition, a map showing the location of the downwind and upwind CAMP stations will be included in the daily report.

5.4.13 Odor, Dust and Nuisance Control Plan

Dust, odor, and nuisance control will be accomplished by the remediation contractor as described in this section. The FER will include the following certification by the RE: "I certify that ground-intrusive work during remediation and development-related construction was conducted in accordance with dust and odor suppression methodology defined in the RAWP."

5.4.13.1 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-Site. Specific odor control methods to be used on a routine basis (if needed) will include application of foam suppressants or tarps over the odor or VOC source areas, if encountered. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of all other complaints about the project. Implementation of all odor controls, including the halt of work, will be the responsibility of the Volunteers' RE, who is responsible for certifying the FER. Application of odor controls is the responsibility of the Remedial Contractor.

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

Although not anticipated, where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-Site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems as a last resort.

5.4.13.2 Dust Control Plan

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

- Dust suppression will be achieved through the use of a dedicated water distribution system or on-Site water truck for road wetting, or an alternate source with suitable supply and pressure for use in dust control.
- Stockpiles shall be maintained in accordance with Section 5.4.2.
- 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 spraying.

5.4.13.3 Other Nuisances

A plan for rodent control will be developed and used by the remediation contractor during Site preparation (including clearing and grubbing) and during remedial work.

A plan for noise control will be developed and used by the remediation contractor during Site preparation and remedial work and will conform, at a minimum, to the NYCDEP noise control standards.

6.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

Residual contaminated soil will not exist beneath the development footprint after the Track 1 remedy is complete. Residual contaminated groundwater may remain in bedrock following implementation of the IRMWP as determined by the performance monitoring sampling; however, groundwater in New York City is not a permitted source of potable water. Therefore, ECs and ICs will not be required to protect human health and the environment if a Track 1 remedy is achieved. If a Track 1 is not achieved, residual contamination will be managed in place through the implementation of institutional controls under the Track 2 or Split Track 1/Track 2 alternative remedy.

The FER will document the end point sample results on the Site in tabular and map form. This will include presentation of and exceedances of Unrestricted Use SCOs, Protection of Groundwater SCOs, and Restricted Residential RUSCOs.

7.0 ENGINEERING CONTROLS

Following completion of the remedy, it is anticipated that the Site will meet either a Track 1 Unrestricted Use or Track 2 Restricted Residential Use throughout the Site footprint. As such, implementation of a composite cover system will not be required.

8.0 INSTITUTIONAL CONTROLS

If a Track 1 Unrestricted Use cleanup cannot be achieved, the Site will have achieved a Track 2 Restricted Residential cleanup and residual contamination will remain in place. Two elements have been designed to ensure continual and proper management of residual contamination in perpetuity: an Environmental Easement recorded against title to the Site and an SMP requiring compliance with the management of remaining contamination at the Site. These elements are described in this section.

A Site-specific Environmental Easement will be recorded in the Office of the New York City Register (New York City Registrar) to provide an enforceable means of ensuring the continual and proper management of residual contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. It requires that the grantor of the Environmental Easement and the grantor's successors and assigns adhere to all ICs placed on this Site by this NYSDEC-approved remedy. ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ICs. The SMP describes appropriate methods and procedures to ensure compliance with all ICs that are required by the Environmental Easement. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the Environmental Easement and grantor's successors and assigns.

8.1 Environmental Easement

An Environmental Easement, as defined in Article 71, Title 36 of the Environmental Conservation Law, is required when residual contamination above Unrestricted Use SCOs is left on-Site after the Remedial Action is complete. If the Site will have residual contamination after completion of all Remedial Actions, then an Environmental Easement is required. As part of the alternative Track 2 remedy, an Environmental Easement approved by NYSDEC will be filed and recorded with the New York City Registrar if necessary. The recorded Environmental Easement will be submitted as part of the FER as applicable.

The Environmental Easement renders the Site a Controlled Property. The Environmental Easement must be recorded with the New York City Registrar before the Certificate of Completion can be issued by NYSDEC. A series of ICs are required under this remedy to prevent future exposure to residual contamination by controlling disturbances of the subsurface soil and restricting the use of the Site to restricted residential, commercial, and industrial use(s) only. These ICs are requirements or restrictions placed on the Site that are listed in, and required by, the Environmental Easement. ICs are closely integrated with the SMP, which provides all of the methods and procedures to be followed to comply with this remedy.

Adherence to these ICs for the Site is mandated by the Environmental Easement and will be implemented under the SMP (discussed in the next section).

The Controlled Property (Site) will also have a series of ICs in the form of Site restrictions and requirements. The Site restrictions that apply to the Controlled Property are:

- Vegetable gardens and farming on the Controlled Property are prohibited;
- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose as approved by NYSDOH and NYSDEC;
- All future activities on the Controlled Property that will disturb residual contaminated material, if present, are prohibited unless they are conducted in accordance with the soil management provisions in the SMP;
- The Controlled Property may be used for restricted residential, commercial, or industrial use only, provided the long-term ICs included in the SMP are employed and in compliance with current zoning;
- The Controlled Property may not be used for a higher level of use, such as unrestricted or residential use without an amendment or extinguishment of this Environmental Easement;
- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC

retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This statement must be certified by an expert that the NYSDEC finds acceptable.

8.2 Site Management Plan

Site Management is the last phase of remediation. If a Track 1 Unrestricted Use cleanup cannot be achieved, the SMP will be submitted as part of the FER but will be written in a manner that allows its use as a complete and independent document. Site Management continues in perpetuity or until released in writing by NYSDEC. The property owner is responsible to ensure that all Site Management responsibilities defined in the Environmental Easement and the SMP are performed.

The SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the Site following completion of the alternative Track 2 Remedial Action in accordance with the BCA with the NYSDEC. This includes: (1) development, implementation, and management of all ICs; (2) development and implementation of monitoring systems and a Monitoring Plan, if applicable; (3) development of a plan to operate and maintain any treatment, collection, containment, or recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual), if applicable; (4) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of Site information to NYSDEC; and (5) defining criteria for termination of treatment system operation, if applicable.

The SMP will include two plans: (1) an Institutional Control Plan for implementation and management of ICs; and (2) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC. The SMP will be prepared in accordance with the requirements in NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation and the guidelines provided by NYSDEC.

Site management, reporting, and IC certification will be scheduled on a certification period basis. The certification period will be annual. The SMP will be based on a calendar year and will be due for submission to NYSDEC by March 1 of the year following the reporting period.

No exclusions for handling of residual contaminated soils, if any is remaining on the Site, will be provided in the SMP. All handling of residual contaminated material, if any, will be subject to provisions contained in the SMP.

9.0 FINAL ENGINEERING REPORT

A FER will be submitted to the NYSDEC following implementation of the remedy defined in this RAWP. The FER will be prepared in conformance with NYSDEC DER-10 and will include the following:

- Documentation that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan
- A comprehensive account of the locations and characteristics of material removed from the Site including the surveyed map(s) of each source, as necessary
- As-built drawings for constructed elements, certifications, manifests, and bills of lading
- A description of the changes to the remedy from the elements provided in the RAWP and associated design documents, if any
- A tabular summary of performance evaluation sampling results and material characterization results and other sampling and chemical analyses performed as part of the remedy
- Written and photographic documentation of remedial work performed under this remedy
- An itemized tabular description of actual costs incurred during implementation of the remedy
- If necessary, a thorough summary of remaining contamination and an explanation for why the material was not removed as part of the remedy. A table and a map that shows remaining contamination in excess of the Unrestricted Use SCOs and Restricted Residential RUSCOs, if any, will also be included.
- An accounting of the destination of material removed from the Site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with the disposal of material must also include records and approvals for receipt of the material.
- An accounting of the origin and chemical quality of each material type imported onto the Site

Before approval of the FER and issuance of a Certificate of Completion, the daily reports and monthly BCP progress reports must be submitted in digital form on electronic media (e.g., PDF).

9.1 Certifications

The following certification will appear in front of the FER Executive Summary. The certification will be signed by the PE, Stewart Abrams, who is a NYS-licensed Professional Engineer. The certification will be appropriately signed and stamped. The certification will include the following statements:

I, Stewart Abrams, am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program activities, and I certify that the Remedial Action Work Plan was implemented and that all construction activities were completed in substantial conformance with the Department-approved Remedial Action Work Plan.

I certify that the data submitted to the Department with this Final Engineering Report demonstrates that the remediation requirements set forth in the Remedial Action Work Plan and in all applicable statutes and regulations have been or will be achieved in accordance with the time frames, if any, established for the remedy.

I certify that all use restrictions, Institutional Controls, Engineering Controls, and/or any operation and maintenance requirements applicable to the Site are contained in an environmental easement created and recorded pursuant ECL 71-3605 and that all affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded.

I certify that a Site Management Plan has been submitted for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site and that such plan has been approved by Department.

I certify that all documents generated in support of this report have been submitted in accordance with the DER's electronic submission protocols and have been accepted by the Department.

I certify that all data generated in support of this report have been submitted in accordance with the Department's electronic data deliverable and have been accepted by the Department.

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, Stewart Abrams, of Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C., am certifying as Owner's Designated Site Representative and I have been authorized and designated by all site owners to sign this certification for the site.

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

10.0 SCHEDULE

Implementation of this RAWP is anticipated to begin in the second quarter of 2023. Mobilization is expected to take approximately one to two weeks. Once mobilization is complete, remediation of the Site will continue. The remedy, which will be implemented in accordance with this RAWP, is anticipated to take approximately 6 months to complete. After completion of the soil remedy, a FER and SMP, if necessary, will be submitted to the NYSDEC for review and approval.

11.0 REFERENCES

1. Cider Environmental, Phase II Environmental Site Assessment (ESA), dated 23 February 2016.
2. Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C., Phase I ESA, dated 5 January 2021.
3. Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C., Phase II Environmental Site Investigation (ESI) Report, dated 3 March 2022.
4. Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C., *60-Day Advance Notice of Site Change of Use*, dated 25 March 2022.
5. Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C., Remedial Investigation Work Plan, dated 16 March 2022 and last revised 26 July 2022.
6. Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C., *60-Day Advance Notice of Site Change of Use*, dated 21 October 2022.
7. Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C., Interim Remedial Measures Work Plan, dated 16 March 2022 and last revised 4 January 2023.
8. Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C., Emulsified Zero-Valent Iron Remedial Design, dated 6 March 2023.

9. Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C., Remedial Investigation Report, dated 8 November 2022, revised March 2023.

10. New York State Department of Health, Final Guidance for the Evaluation of Soil Vapor Intrusion in the State of New York, dated October 2006 as updated May 2017.

11. New York State Department of Environmental Conservation, Division of Environmental Remediation, Draft Brownfield Cleanup Program Guide, dated May 2004.

12. New York State Department of Environmental Conservation, Division of Environmental Remediation, Technical and Administrative Guidance Memorandum No. 4031 Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Waste Sites, dated October 27, 1989.

13. New York State Department of Environmental Conservation, Draft DER-10 Technical Guidance for Site Investigation and Remediation, dated May 3, 2010; effective June 18, 2010.

14. New York State Department of Environmental Conservation, Part 375 of Title 6 of the New York Compilation of Codes, Rules, and Regulations, Effective December 14, 2006.

15. Sampling, Analysis, and Assessment of PFAS Under NYSDEC's Part 375 Remedial Programs (November 2022)

16. New York State Division of Water Technical and Operational Guidance Series (TOGS) (1.1.1) dated June 1998.

17. New York State Division of Water Technical and Operational Guidance Series (TOGS) 5.1.8 New York State Stormwater Management Design Manual, dated June 2008.

18. United States Environmental Protection Agency, Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, "EPA/540/S-95/504, April 1996.

TABLES

Table 1
Remedial Action Work Plan
Soil Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use Restricted-Residential SCOs	Location	LB-01	LB-01	LB-02	LB-02	LB-3	LB-3	LB-04	LB-04	LB-05	LB-05	LB-06	LB-06	LB-07
					Sample Name	009_LB-01_0-1	010_LB-01_6.5-8.5	007_LB-02_6-8	008_LB-02_8-10	004_LB-3_0-2	005_LB-3_7-9	016_LB-04_0-2_20211110	017_LB-04_6.5-7.5_20211110	018_LB-05_6.5-8_20211110	019_LB-05_8-9_20211110	011_LB-06_0-2	012_LB-06_6-8	015_LB-07_0-2_20211110
					Sample Date	11/09/2021	11/09/2021	11/09/2021	11/09/2021	11/09/2021	11/09/2021	11/10/2021	11/10/2021	11/10/2021	11/10/2021	11/09/2021	11/09/2021	11/10/2021
					Sample Depth (ft bsl)	9.5-10.5	16-18	14.5-16.5	16.5-18.5	9.5-11.5	16.5-18.5	9.5-11.5	16-17	16-17.5	17.5-18.5	9.5-11.5	15.5-17.5	9.5-11.5
					Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatile Organic Compounds																		
1,1,1,2-Tetrachloroethane	630-20-6	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,1,1-Trichloroethane	71-55-6	0.68	0.68	100	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,1,2,2-Tetrachloroethane	79-34-5	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,1,2-Trichloroethane	79-00-5	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,1-Dichloroethane	75-34-3	0.27	0.27	26	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,1-Dichloroethene	75-35-4	0.33	0.33	100	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,1-Dichloropropene	563-58-6	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,2,3-Trichlorobenzene	87-61-6	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,2,3-Trichloropropane	96-18-4	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,2,4,5-Tetramethylbenzene	95-93-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	120-82-1	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,2,4-Trimethylbenzene	95-63-6	3.6	3.6	52	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,2-Dibromo-3-Chloropropane	96-12-8	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,2-Dichlorobenzene	95-50-1	1.1	1.1	100	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,2-Dichloroethane	107-06-2	0.02	0.02	3.1	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,2-Dichloropropane	78-87-5	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	8.4	8.4	52	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,3-Dichlorobenzene	541-73-1	2.4	2.4	49	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,3-Dichloropropane	142-28-9	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,4-Dichlorobenzene	106-46-7	1.8	1.8	13	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
1,4-Diethyl Benzene	105-05-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dioxane (P-Dioxane)	123-91-1	0.1	0.1	13	mg/kg	<0.061 U	<0.043 U	<0.046 U	<0.044 U	<0.051 U	<0.046 U	<0.053 U	<0.045 U	<0.029 U	<0.043 U	<0.053 U	<0.044 U	<0.04 U
2,2-Dichloropropane	594-20-7	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
2-Chlorotoluene	95-49-8	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
2-Hexanone (MBK)	591-78-6	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
4-Chlorotoluene	106-43-4	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
4-Ethyltoluene	622-96-8	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	67-64-1	**0.05**	0.05	100	mg/kg	<0.0061 U	0.0099	<0.0046 U	<0.0044 U	<0.0051 U	<0.0046 U	<0.0053 U	<0.0045 U	0.017	0.0069 J	<0.0053 U	<0.0044 U	<0.004 U
Acrolein	107-02-8	NS	NS	NS	mg/kg	<0.0061 U	<0.0043 U	<0.0046 U	<0.0044 U	<0.0051 U	<0.0046 U	<0.0053 U	<0.0045 U	<0.0029 U	<0.0043 U	<0.0053 U	<0.0044 U	<0.004 U
Acrylonitrile	107-13-1	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Benzene	71-43-2	0.06	0.06	4.8	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Bromobenzene	108-86-1	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Bromochloromethane	74-97-5	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Bromodichloromethane	75-27-4	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Bromoform	75-25-2	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Bromomethane	74-83-9	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Carbon Disulfide	75-15-0	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Carbon Tetrachloride	56-23-5	0.76	0.76	2.4	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Chlorobenzene	108-90-7	1.1	1.1	100	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Chloroethane	75-00-3	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Chloroform	67-66-3	0.37	0.37	49	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Chloromethane	74-87-3	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Cis-1,2-Dichloroethene	156-59-2	0.25	0.25	100	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Cis-1,3-Dichloropropene	10061-01-5	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Cyclohexane	110-82-7	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Cymene	99-87-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	124-48-1	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Dibromomethane	74-95-3	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Dichlorodifluoromethane	75-71-8	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Diethyl Ether (Ethyl Ether)	60-29-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	100-41-4	1	1	41	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Hexachlorobutadiene	87-68-3	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Isopropylbenzene (Cumene)	98-82-8	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
M,P-Xylene	179601-23-1	NS	NS	NS	mg/kg	<0.0061 U	<0.0043 U	<0.0046 U	<0.0044 U	<0.0051 U	<0.0046 U	<0.0053 U	<0.0045 U	<0.0029 U	<0.0043 U	<0.0053 U	<0.0044 U	<0.004 U
Methyl Acetate	79-20-9	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Methyl Ethyl Ketone (2-Butanone)	78-93-3	0.12	0.12	100	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	0.0039	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Methylcyclohexane	108-87-2	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Methylene Chloride	75-09-2	0.05	0.05	100	mg/kg	0.015	0.01	0.015	0.015	0.017	0.015	0.0065 J	0.011	0.0049 J	0.011	0.045	0.014	0.0084
Naphthalene	91-20-3	12	12	100	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	104-51-8	12	12	100	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
n-Propylbenzene	103-65-1	3.9	3.9	100	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
o-Xylene (1,2-Dimethylbenzene)	95-47-6	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
p-Cymene (p-Isopropyltoluene)	CYMP	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Sec-Butylbenzene	135-98-8	11	11	100	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	0.0056	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Styrene	100-42-5	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
T-Butylbenzene	98-06-6	5.9	5.9	100	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Tert-Butyl Alcohol	75-65-0	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Tert-Butyl Methyl Ether	1634-04-4	0.93	0.93	100	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Tetrachloroethene (PCE)	127-18-4	**1.3**	1.3	19	mg/kg	<0.0031 U	<0.0022 U	**1.6 D**	0.59 D	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Toluene	108-88-3	0.7	0.7	100	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Total 1,2-Dichloroethene (Cis and Trans)	540-59-0	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	1330-20-7	0.26	1.6	100	mg/kg	<0.0092 U	<0.0065 U	<0.0069 U	<0.0066 U	<0.0077 U	<0.0069 U	<0.0079 U	<0.0068 U	<0.0044 U	<0.0064 U	<0.008 U	<0.0067 U	<0.0059 U
Total, 1,3-Dichloropropene (Cis And Trans)	542-75-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trans-1,2-Dichloroethene	156-60-5	0.19	0.19	100	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Trans-1,3-Dichloropropene	10061-02-6	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Trans-1,4-Dichloro-2-Butene	110-57-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene (TCE)	79-01-6	0.47	0.47	21	mg/kg	<0.0031 U	<0.0022 U	0.058	0.025	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Trichlorofluoromethane	75-69-4	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Vinyl Acetate	108-05-4	NS	NS	NS	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U
Vinyl Chloride	75-01-4	0.02	0.02	0.9	mg/kg	<0.0031 U	<0.0022 U	<0.0023 U	<0.0022 U	<0.0026 U	<0.0023 U	<0.0026 U	<0.0023 U	<0.0015 U	<0.0021 U	<0.0027 U	<0.0022 U	<0.002 U

Table 1
Remedial Action Work Plan
Soil Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use Restricted-Residential SCOs	Location	LB-01	LB-01	LB-02	LB-02	LB-3	LB-3	LB-04	LB-04	LB-05	LB-05	LB-06	LB-06	LB-07
					Sample Name	009_LB-01_0-1	010_LB-01_6.5-8.5	007_LB-02_6-8	008_LB-02_8-10	004_LB-3_0-2	005_LB-3_7-9	016_LB-04_0-2_20211110	017_LB-04_6.5-7.5_20211110	018_LB-05_6.5-8_20211110	019_LB-05_8-9_20211110	011_LB-06_0-2	012_LB-06_6-8	015_LB-07_0-2_20211110
					Sample Date	11/09/2021	11/09/2021	11/09/2021	11/09/2021	11/09/2021	11/09/2021	11/10/2021	11/10/2021	11/10/2021	11/10/2021	11/09/2021	11/09/2021	11/10/2021
					Sample Depth (ft bsl)	9.5-10.5	16-18	14.5-16.5	16.5-18.5	9.5-11.5	16.5-18.5	9.5-11.5	16-17	16-17.5	17.5-18.5	9.5-11.5	15.5-17.5	9.5-11.5
					Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Semi-Volatile Organic Compounds																		
1,2,4,5-Tetrachlorobenzene	95-94-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	120-82-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	95-50-1	1.1	1.1	100	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Diphenylhydrazine	122-66-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	541-73-1	2.4	2.4	49	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	106-46-7	1.8	1.8	13	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dioxane (P-Dioxane)	123-91-1	0.1	0.1	13	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,6-Tetrachlorophenol	58-90-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	95-95-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	88-06-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	120-83-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	105-67-9	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	51-28-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	121-14-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	606-20-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	91-58-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	95-57-8	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	91-57-6	NS	NS	NS	mg/kg	<0.045 U	<0.0467 U	<0.0481 U	<0.0453 U	<0.0454 U	<0.0475 U	<0.0501 U	<0.0471 U	<0.0467 U	<0.0479 U	<0.0462 U	<0.0465 U	<0.0473 U
2-Methylphenol (o-Cresol)	95-48-7	0.33	0.33	100	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	88-74-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	88-75-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3 & 4 Methylphenol (m&p Cresol)	65794-96-9	0.33	0.33	100	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	91-94-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	99-09-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-Methylphenol	534-52-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl Phenyl Ether	101-55-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-Methylphenol	59-50-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	106-47-8	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl Phenyl Ether	7005-72-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	100-01-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	100-02-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	83-32-9	20	98	100	mg/kg	<0.045 U	<0.0467 U	<0.0481 U	<0.0453 U	<0.0454 U	<0.0475 U	<0.0501 U	<0.0471 U	<0.0467 U	<0.0479 U	<0.0462 U	<0.0465 U	<0.0473 U
Acenaphthylene	208-96-8	100	107	100	mg/kg	<0.045 U	<0.0467 U	<0.0481 U	<0.0453 U	<0.0454 U	<0.0475 U	<0.0501 U	<0.0471 U	<0.0467 U	<0.0479 U	<0.0462 U	<0.0465 U	<0.0473 U
Acetophenone	98-86-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aniline (Phenylamine, Aminobenzene)	62-53-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	120-12-7	100	1000	100	mg/kg	<0.045 U	<0.0467 U	<0.0481 U	<0.0453 U	<0.0454 U	<0.0475 U	<0.0501 U	<0.0471 U	<0.0467 U	<0.0479 U	<0.0462 U	<0.0465 U	<0.0473 U
Atrazine	1912-24-9	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzaldehyde	100-52-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzidine	92-87-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	56-55-3	1	1	1	mg/kg	0.124 D	<0.0467 U	<0.0481 U	<0.0453 U	<0.0454 U	<0.0475 U	<0.0501 U	<0.0471 U	<0.0467 U	<0.0479 U	<0.0462 U	<0.0465 U	<0.0473 U
Benzo(a)pyrene	50-32-8	1	22	1	mg/kg	0.103 D	<0.0467 U	<0.0481 U	<0.0453 U	<0.0454 U	<0.0475 U	<0.0501 U	<0.0471 U	<0.0467 U	<0.0479 U	<0.0462 U	<0.0465 U	<0.0473 U
Benzo(b)fluoranthene	205-99-2	1	1.7	1	mg/kg	0.0819 JD	<0.0467 U	<0.0481 U	<0.0453 U	<0.0454 U	<0.0475 U	<0.0501 U	<0.0471 U	<0.0467 U	<0.0479 U	<0.0462 U	<0.0465 U	<0.0473 U
Benzo(g,h,i)Perylene	191-24-2	100	1000	100	mg/kg	0.0539 JD	<0.0467 U	<0.0481 U	<0.0453 U	<0.0454 U	<0.0475 U	<0.0501 U	<0.0471 U	<0.0467 U	<0.0479 U	<0.0462 U	<0.0465 U	<0.0473 U
Benzo(k)fluoranthene	207-08-9	0.8	1.7	3.9	mg/kg	0.0948 D	<0.0467 U	<0.0481 U	<0.0453 U	<0.0454 U	<0.0475 U	<0.0501 U	<0.0471 U	<0.0467 U	<0.0479 U	<0.0462 U	<0.0465 U	<0.0473 U
Benzoic Acid	65-85-0	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl Alcohol	100-51-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl Butyl Phthalate	85-68-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Biphenyl (Diphenyl)	92-52-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-chloroethoxy) methane	111-91-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-chloroethyl) ether (2-chloroethyl ether)	111-44-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-chloroisopropyl) ether	108-60-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl) phthalate	117-81-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Caprolactam	105-60-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	86-74-8	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	218-01-9	1	1	3.9	mg/kg	0.118 D	<0.0467 U	<0.0481 U	<0.0453 U	<0.0454 U	<0.0475 U	<0.0501 U	<0.0471 U	<0.0467 U	<0.0479 U	<0.0462 U	<0.0465 U	<0.0473 U
Dibenz(a,h)anthracene	53-70-3	0.33	1000	0.33	mg/kg	<0.045 U	<0.0467 U	<0.0481 U	<0.0453 U	<0.0454 U	<0.0475 U	<0.0501 U	<0.0471 U	<0.0467 U	<0.0479 U	<0.0462 U	<0.0465 U	<0.0473 U
Dibenzofuran	132-64-9	7	210	59	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibutyl phthalate	84-74-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethyl phthalate	84-66-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	131-11-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioctyl phthalate	117-84-0	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	206-44-0	100	1000	100	mg/kg	0.198 D	<0.0467 U	<0.0481 U	<0.0453 U	<0.0454 U	<0.0475 U	<0.0501 U	<0.0471 U	<0.0467 U	<0.0479 U	<0.0462 U	<0.0465 U	<0.0473 U
Fluorene	86-73-7	30	386	100	mg/kg	<0.045 U	<0.0467 U	<0.0481 U	<0.0453 U	<0.0454 U	<0.0475 U	<0.0501 U	<0.0471 U	<0.0467 U	<0.0479 U	<0.0462 U	<0.0465 U	<0.0473 U
Hexachlorobenzene	118-74-1	0.33	3.2	1.2	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	87-68-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	77-47-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	67-72-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	8.2	0.5	mg/kg	<0.045 U	<0.0467 U	<0.0481 U	<0.0453 U	<0.0454 U	<0.0475 U	<0.0501 U	<0.0471 U	<0.0467 U	<0.0479 U	<0.0462 U	<0.0465 U	<0.0473 U
Isophorone	78-59-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	91-20-3	12	12	100	mg/kg	<0.045 U	<0.0467 U	<0.0481 U	<0.0453 U	<0.0454 U	<0.0475 U	<0.0501 U	<0.0471 U	<0.0467 U	<0.0479 U	<0.0462 U	<0.0465 U	<0.0473 U
Nitrobenzene	98-95-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodimethylamine	62-75-9	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodi-N-Propylamine	621-64-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	86-30-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	87-86-5	0.8	0.8	6.7	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	85-01-8	100	1000	100	mg/kg	0.0618 JD	<0.0467 U	<0.0481 U	<0.0453 U	<0.0454 U	<0.0475 U	<0.0501 U	<0.0471 U	<0.0467 U	<0.0479 U	<0.0462 U	<0.0465 U	<0.0473 U
Phenol	108-95-2	0.33	0.33	100	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	129-00-0	100	1000	100	mg/kg	0.173 D	<0.0467 U	<0.0481 U	<0.0453 U	<0.0454 U	<0.0475 U	<0.0501 U	<0.0471 U	0.0499 JD	<0.0479 U	<0.0462 U	<0.0465 U	<0.0473 U
Pyridine	110-86-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 1
Remedial Action Work Plan
Soil Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use Restricted-Residential SCOs	Location	LB-01	LB-01	LB-02	LB-02	LB-3	LB-3	LB-04	LB-04	LB-05	LB-05	LB-06	LB-06	LB-07
					Sample Name	009_LB-01_0-1	010_LB-01_6.5-8.5	007_LB-02_6-8	008_LB-02_8-10	004_LB-3_0-2	005_LB-3_7-9	016_LB-04_0-2_20211110	017_LB-04_6.5-7.5_20211110	018_LB-05_6.5-8_20211110	019_LB-05_8-9_20211110	011_LB-06_0-2	012_LB-06_6-8	015_LB-07_0-2_20211110
					Sample Date	11/09/2021	11/09/2021	11/09/2021	11/09/2021	11/09/2021	11/09/2021	11/10/2021	11/10/2021	11/10/2021	11/10/2021	11/09/2021	11/09/2021	11/10/2021
					Sample Depth (ft bsl)	9.5-10.5	16-18	14.5-16.5	16.5-18.5	9.5-11.5	16.5-18.5	9.5-11.5	16-17	16-17.5	17.5-18.5	9.5-11.5	15.5-17.5	9.5-11.5
					Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Pesticides																		
4,4'-DDD	72-54-8	**0.0033**	14	13	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	72-55-9	**0.0033**	17	8.9	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	50-29-3	**0.0033**	136	7.9	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	309-00-2	0.005	0.19	0.097	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alpha BHC (Alpha Hexachlorocyclohexane)	319-84-6	0.02	0.02	0.48	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alpha Chlordane	5103-71-9	0.094	2.9	4.2	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alpha Endosulfan	959-98-8	2.4	102	24	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beta Bhc (Beta Hexachlorocyclohexane)	319-85-7	0.036	0.09	0.36	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beta Endosulfan	33213-65-9	2.4	102	24	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlordane (alpha and gamma)	57-74-9	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Delta Bhc (Delta Hexachlorocyclohexane)	319-86-8	0.04	0.25	100	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	60-57-1	**0.005**	0.1	0.2	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan Sulfate	1031-07-8	2.4	1000	24	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	72-20-8	0.014	0.06	11	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin Aldehyde	7421-93-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin Ketone	53494-70-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gamma Bhc (Lindane)	58-89-9	0.1	0.1	1.3	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gamma Chlordane (Trans-)	5103-74-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gamma-Chlordane	5566-34-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	76-44-8	0.042	0.38	2.1	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor Epoxide	1024-57-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methoxychlor	72-43-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toxaphene	8001-35-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Herbicides																		
2,4,5-T (Trichlorophenoxyacetic Acid)	93-76-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D (Dichlorophenoxyacetic Acid)	94-75-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silvex (2,4,5-Tp)	93-72-1	3.8	3.8	100	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyl																		
PCB-1016 (Aroclor 1016)	12674-11-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0185 U	<0.0187 U	<0.0189 U
PCB-1221 (Aroclor 1221)	11104-28-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0185 U	<0.0187 U	<0.0189 U
PCB-1232 (Aroclor 1232)	11141-16-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0185 U	<0.0187 U	<0.0189 U
PCB-1242 (Aroclor 1242)	53469-21-9	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0185 U	<0.0187 U	<0.0189 U
PCB-1248 (Aroclor 1248)	12672-29-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0185 U	<0.0187 U	<0.0189 U
PCB-1254 (Aroclor 1254)	11097-69-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0185 U	<0.0187 U	<0.0189 U
PCB-1260 (Aroclor 1260)	11096-82-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0185 U	<0.0187 U	<0.0189 U
PCB-1262 (Aroclor 1262)	37324-23-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-1268 (Aroclor 1268)	11100-14-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PCBs	1336-36-3	0.1	3.2	1	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0185 U	<0.0187 U	<0.0189 U
Metals																		
Aluminum	7429-90-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	7440-36-0	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	7440-38-2	13	16	16	mg/kg	5.81	<1.7 U	<1.74 U	<1.66 U	<1.65 U	<1.73 U	<1.81 U	<1.72 U	<1.69 U	<1.75 U	4.5	<1.7 U	6.28
Barium	7440-39-3	**350**	820	400	mg/kg	332	149	140	104	166	60.2	128	68.3	116	**451**	194	144	145
Beryllium	7440-41-7	7.2	47	72	mg/kg	<0.055 U	<0.057 U	<0.058 U	<0.055 U	<0.055 U	<0.058 U	<0.06 U	<0.057 U	<0.056 U	<0.058 U	<0.057 U	<0.057 U	<0.058 U
Cadmium	7440-43-9	2.5	7.5	4.3	mg/kg	1.1	0.344	0.36	<0.332 U	0.462	<0.346 U	<0.362 U	<0.344 U	<0.337 U	0.78	0.42	0.383	0.817
Calcium	7440-70-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Hexavalent	18540-29-9	1	19	110	mg/kg	NA	NA	<0.579 U	NA	<0.551 U	NA	<0.603 U	NA	NA	NA	<0.569 U	NA	NA
Chromium, Total	7440-47-3	NS	NS	NS	mg/kg	25.6	36.5	41.4	28.5	25.5	17.3	23.9	19.6	50.7	140	25.4	41.2	34.5
Cobalt	7440-48-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	7440-50-8	**50**	1720	270	mg/kg	**81.8**	42.7	47.6	25.2	**53.8**	20.3	25.6	22	38.4	**50.7**	48.5	48.1	25.5
Cyanide	57-12-5	27	40	27	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	7439-89-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	7439-92-1	**63**	450	400	mg/kg	**421**	9.17	8.9	6.92	**303**	32.6	33	6.64	32	18	**345**	13.2	**206**
Magnesium	7439-95-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	7439-96-5	1600	2000	2000	mg/kg	348	216	290	303	324	144	1,260	92.2	266	539	357	282	1,410
Mercury	7439-97-6	**0.18**	0.73	0.81	mg/kg	<0.0364 U	<0.0374 U	<0.0382 U	<0.0365 U	0.101	<0.0381 U	<0.0398 U	<0.0378 U	<0.0371 U	<0.0385 U	<0.0375 U	<0.0373 U	<0.0381 U
Nickel	7440-02-0	**30**	130	310	mg/kg	**35.2**	**39.8**	**55.8**	27	26.8	18.4	20.8	**44.4**	**44.4**	**65.1**	24.4	**47.3**	26.8
Potassium	7440-09-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	7782-49-2	3.9	4	180	mg/kg	<2.76 U	<2.83 U	<2.89 U	<2.76 U	<2.75 U	<2.89 U	<3.02 U	<2.87 U	<2.81 U	<2.92 U	<2.84 U	<2.83 U	<2.89 U
Silver	7440-22-4	**2**	8.3	180	mg/kg	0.633	1.31	1.34	1.01	0.862	<0.577 U	0.757	<0.573 U	<0.562 U	**3.19**	0.825	0.928	<0.577 U
Sodium	7440-23-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	7440-28-0	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	7440-62-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	7440-66-6	**109**	2480	10000	mg/kg	**383**	59.9	73.2	53.4	**287**	42.5	43.7	59.3	69.4	**136**	**156**	71.3	**366**
General Chemistry																		
Solids, Percent	SOLID	NS	NS	NS	Percent	90.7	88.3	86.4	90.5	90.8	86.6	82.9	87.2	88.9	85.6	87.9	88.4	86.6
Total Solids	TSOLID	NS	NS	NS	Percent	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic acids																		
N-ethyl perfluorooctane- sulfonamidoacetic Acid (NEtFOSAA)	2991-50-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-methyl perfluorooctane- sulfonamidoacetic Acid (NMeFOSA/	2355-31-9	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorobutanoic acid (PFBA)	375-22-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorodecanesulfonic Acid (PFDS)	335-77-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorodecanoic Acid (PFDA)	335-76-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorododecanoic Acid (PFDoA)	307-55-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluoroheptanoic acid (PFHpA)	375-85-9	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorohexanoic Acid (PFHxA)	307-24-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorononanoic Acid (PFNA)	375-95-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanesulfonamide (FOSA)	754-91-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	**0.00088**	0.0037	0.044	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid (PFOA)	335-67-1	**0.00066**	0.0011	0.033	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluoropentanoic Acid (PFPeA)	2706-90-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotetradecanoic Acid (PFTA)	376-06-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2) (8:2FTS)	39108-34-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2) (6:2FTS)	27619-97-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PFOA and PFOS	TOTPFOAPFOS	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 1
Remedial Action Work Plan
Soil Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use Restricted-Residential SCOs	Location	LB-07	LB-08	LB-08	LB-08	LSB-9	LSB-9	LSB-10	LSB-10	LSB-10	LSB-11	LSB-11	LSB-12	LSB-12	LSB-13	LSB-14
					Sample Name	014_LB-07_5-7_20211110	001_LB-08_0-2	002_LB-08_7.5-9.5	003_DUP-1	037_LSB-9_0-2	038_LSB-9_4-6	039_LSB-10_0-2	040_DUP-1	041_LSB-10_4-6	042_LSB-11_0-2	043_LSB-11_2-4	046_LSB-12_15-17	047_LSB-12_18-20	055_LSB-13_15-17	056_LSB-14_15-17
					Sample Date	11/10/2021	11/09/2021	11/09/2021	11/09/2021	01/25/2022	01/25/2022	01/25/2022	01/25/2022	01/25/2022	01/25/2022	01/25/2022	01/26/2022	01/26/2022	01/28/2022	02/01/2022
					Sample Depth (ft bsl)	14.5-16.5	9.5-11.5	17-19	17-19	8-10	12-14	8-10	8-10	12-14	8-10	10-12	15-17	18-20	15-17	15-17
					Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatile Organic Compounds																				
1,1,1,2-Tetrachloroethane	630-20-6	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,1,1-Trichloroethane	71-55-6	0.68	0.68	100	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,1,2,2-Tetrachloroethane	79-34-5	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,1,2-Trichloroethane	79-00-5	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,1-Dichloroethane	75-34-3	0.27	0.27	26	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,1-Dichloroethene	75-35-4	0.33	0.33	100	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,1-Dichloropropene	563-58-6	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,2,3-Trichlorobenzene	87-61-6	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,2,3-Trichloropropane	96-18-4	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,2,4,5-Tetramethylbenzene	95-93-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	120-82-1	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,2,4-Trimethylbenzene	95-63-6	3.6	3.6	52	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,2-Dibromo-3-Chloropropane	96-12-8	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,2-Dichlorobenzene	95-50-1	1.1	1.1	100	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,2-Dichloroethane	107-06-2	0.02	0.02	3.1	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,2-Dichloropropane	78-87-5	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	8.4	8.4	52	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,3-Dichlorobenzene	541-73-1	2.4	2.4	49	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,3-Dichloropropane	142-28-9	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,4-Dichlorobenzene	106-46-7	1.8	1.8	13	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
1,4-Diethyl Benzene	105-05-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dioxane (P-Dioxane)	123-91-1	0.1	0.1	13	mg/kg	<0.047 U	<0.058 U	<0.045 U	<0.046 U	<0.048 U	<0.043 U	<0.043 U	<0.048 U	<0.04 U	<0.038 U	<0.047 U	<0.053 U	<0.048 U	<0.044 U	<0.04 U
2,2-Dichloropropane	594-20-7	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
2-Chlorotoluene	95-49-8	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
2-Hexanone (MBK)	591-78-6	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
4-Chlorotoluene	106-43-4	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
4-Ethyltoluene	622-96-8	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	67-64-1	**0.05**	0.05	100	mg/kg	<0.0047 U	<0.0058 U	<0.0045 U	<0.0046 U	<0.0048 U	<0.0043 U	0.0083 J	0.011	0.0042 J	<0.0038 U	**0.085**	0.0055 J	0.025	<0.0044 U	0.005 J
Acrolein	107-02-8	NS	NS	NS	mg/kg	<0.0047 U	<0.0058 U	<0.0045 U	<0.0046 U	<0.0048 U	<0.0043 U	<0.0043 U	<0.0048 U	<0.004 U	<0.0038 U	<0.0047 U	<0.0053 U	<0.0048 U	<0.0044 U	<0.004 U
Acrylonitrile	107-13-1	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Benzene	71-43-2	0.06	0.06	4.8	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Bromobenzene	108-86-1	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Bromochloromethane	74-97-5	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Bromodichloromethane	75-27-4	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Bromoform	75-25-2	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Bromomethane	74-83-9	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Carbon Disulfide	75-15-0	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Carbon Tetrachloride	56-23-5	0.76	0.76	2.4	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Chlorobenzene	108-90-7	1.1	1.1	100	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Chloroethane	75-00-3	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Chloroform	67-66-3	0.37	0.37	49	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Chloromethane	74-87-3	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Cis-1,2-Dichloroethene	156-59-2	0.25	0.25	100	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Cis-1,3-Dichloropropene	10061-01-5	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Cyclohexane	110-82-7	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Cymene	99-87-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	124-48-1	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Dibromomethane	74-95-3	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Dichlorodifluoromethane	75-71-8	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Diethyl Ether (Ethyl Ether)	60-29-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	100-41-4	1	1	41	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Hexachlorobutadiene	87-68-3	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Isopropylbenzene (Cumene)	98-82-8	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
M,P-Xylene	179601-23-1	NS	NS	NS	mg/kg	<0.0047 U	<0.0058 U	<0.0045 U	<0.0046 U	<0.0048 U	<0.0043 U	<0.0043 U	<0.0048 U	<0.004 U	<0.0038 U	<0.0047 U	<0.0053 U	<0.0048 U	<0.0044 U	<0.004 U
Methyl Acetate	79-20-9	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Methyl Ethyl Ketone (2-Butanone)	78-93-3	0.12	0.12	100	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Methylcyclohexane	108-87-2	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Methylene Chloride	75-09-2	0.05	0.05	100	mg/kg	0.015	0.014	0.013	0.012	0.0085 J	0.0044 J	<0.0043 U	<0.0048 U	0.0057 J	0.005 J	0.0047 J	0.046	0.0068 J	<0.0044 U	<0.004 U
Naphthalene	91-20-3	12	12	100	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	104-51-8	12	12	100	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
n-Propylbenzene	103-65-1	3.9	3.9	100	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
o-Xylene (1,2-Dimethylbenzene)	95-47-6	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
p-Cymene (p-Isopropyltoluene)	CYMP	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Sec-Butylbenzene	135-98-8	11	11	100	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Styrene	100-42-5	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
T-Butylbenzene	98-06-6	5.9	5.9	100	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Tert-Butyl Alcohol	75-65-0	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Tert-Butyl Methyl Ether	1634-04-4	0.93	0.93	100	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Tetrachloroethene (PCE)	127-18-4	**1.3**	1.3	19	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	0.035	<0.0022 U	<0.002 U
Toluene	108-88-3	0.7	0.7	100	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Total 1,2-Dichloroethene (Cis and Trans)	540-59-0	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	1330-20-7	0.26	1.6	100	mg/kg	<0.007 U	<0.0087 U	<0.0068 U	<0.007 U	<0.0073 U	<0.0064 U	<0.0065 U	<0.0071 U	<0.006 U	<0.0056 U	<0.007 U	<0.008 U	<0.0071 U	<0.0067 U	<0.006 U
Total, 1,3-Dichloropropene (Cis And Trans)	542-75-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trans-1,2-Dichloroethene	156-60-5	0.19	0.19	100	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Trans-1,3-Dichloropropene	10061-02-6	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Trans-1,4-Dichloro-2-Butene	110-57-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene (TCE)	79-01-6	0.47	0.47	21	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	0.0067	<0.0022 U	<0.002 U
Trichlorofluoromethane	75-69-4	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Vinyl Acetate	108-05-4	NS	NS	NS	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U
Vinyl Chloride	75-01-4	0.02	0.02	0.9	mg/kg	<0.0023 U	<0.0029 U	<0.0023 U	<0.0023 U	<0.0024 U	<0.0021 U	<0.0022 U	<0.0024 U	<0.002 U	<0.0019 U	<0.0023 U	<0.0027 U	<0.0024 U	<0.0022 U	<0.002 U

Table 1
Remedial Action Work Plan
Soil Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use Restricted-Residential SCOs	Location	LB-07	LB-08	LB-08	LB-08	LSB-9	LSB-9	LSB-10	LSB-10	LSB-10	LSB-11	LSB-11	LSB-12	LSB-12	LSB-13	LSB-14
					Sample Name	014_LB-07_5-7_20211110	001_LB-08_0-2	002_LB-08_7.5-9.5	003_DUP-1	037_LSB-9_0-2	038_LSB-9_4-6	039_LSB-10_0-2	040_DUP-1	041_LSB-10_4-6	042_LSB-11_0-2	043_LSB-11_2-4	046_LSB-12_15-17	047_LSB-12_18-20	055_LSB-13_15-17	056_LSB-14_15-17
					Sample Date	11/10/2021	11/09/2021	11/09/2021	11/09/2021	01/25/2022	01/25/2022	01/25/2022	01/25/2022	01/25/2022	01/25/2022	01/25/2022	01/26/2022	01/26/2022	01/28/2022	02/01/2022
					Sample Depth (ft bsl)	14.5-16.5	9.5-11.5	17-19	17-19	8-10	12-14	8-10	8-10	12-14	8-10	10-12	15-17	18-20	15-17	15-17
					Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Semi-Volatile Organic Compounds																				
1,2,4,5-Tetrachlorobenzene	95-94-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.105 U	<0.095 U	<0.0973 U	<0.101 U	<0.0933 U	<0.0948 U	<0.103 U	<0.0928 U	<0.0997 U	<0.0946 U	<0.094 U
1,2,4-Trichlorobenzene	120-82-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
1,2-Dichlorobenzene	95-50-1	1.1	1.1	100	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
1,2-Diphenylhydrazine	122-66-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
1,3-Dichlorobenzene	541-73-1	2.4	2.4	49	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
1,4-Dichlorobenzene	106-46-7	1.8	1.8	13	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
1,4-Dioxane (P-Dioxane)	123-91-1	0.1	0.1	13	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0196 U	<0.019 U	<0.0198 U	<0.0192 U
2,3,4,6-Tetrachlorophenol	58-90-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.105 U	<0.095 U	<0.0973 U	<0.101 U	<0.0933 U	<0.0948 U	<0.103 U	<0.0928 U	<0.0997 U	<0.0946 U	<0.094 U
2,4,5-Trichlorophenol	95-95-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
2,4,6-Trichlorophenol	88-06-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
2,4-Dichlorophenol	120-83-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
2,4-Dimethylphenol	105-67-9	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
2,4-Dinitrophenol	51-28-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.105 U	<0.095 U	<0.0973 U	<0.101 U	<0.0933 U	<0.0948 U	<0.103 U	<0.0928 U	<0.0997 U	<0.0946 U	<0.094 U
2,4-Dinitrotoluene	121-14-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
2,6-Dinitrotoluene	606-20-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
2-Chloronaphthalene	91-58-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
2-Chlorophenol	95-57-8	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
2-Methylnaphthalene	91-57-6	NS	NS	NS	mg/kg	<0.045 U	<0.0457 U	<0.0472 U	<0.048 U	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
2-Methylphenol (o-Cresol)	95-48-7	0.33	0.33	100	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
2-Nitroaniline	88-74-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.105 U	<0.095 U	<0.0973 U	<0.101 U	<0.0933 U	<0.0948 U	<0.103 U	<0.0928 U	<0.0997 U	<0.0946 U	<0.094 U
2-Nitrophenol	88-75-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
3 & 4 Methylphenol (m&p Cresol)	65794-96-9	0.33	0.33	100	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
3,3'-Dichlorobenzidine	91-94-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
3-Nitroaniline	99-09-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.105 U	<0.095 U	<0.0973 U	<0.101 U	<0.0933 U	<0.0948 U	<0.103 U	<0.0928 U	<0.0997 U	<0.0946 U	<0.094 U
4,6-Dinitro-2-Methylphenol	534-52-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.105 U	<0.095 U	<0.0973 U	<0.101 U	<0.0933 U	<0.0948 U	<0.103 U	<0.0928 U	<0.0997 U	<0.0946 U	<0.094 U
4-Bromophenyl Phenyl Ether	101-55-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
4-Chloro-3-Methylphenol	59-50-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
4-Chloroaniline	106-47-8	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
4-Chlorophenyl Phenyl Ether	7005-72-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
4-Nitroaniline	100-01-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.105 U	<0.095 U	<0.0973 U	<0.101 U	<0.0933 U	<0.0948 U	<0.103 U	<0.0928 U	<0.0997 U	<0.0946 U	<0.094 U
4-Nitrophenol	100-02-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.105 U	<0.095 U	<0.0973 U	<0.101 U	<0.0933 U	<0.0948 U	<0.103 U	<0.0928 U	<0.0997 U	<0.0946 U	<0.094 U
Acenaphthene	83-32-9	20	98	100	mg/kg	<0.045 U	<0.0457 U	<0.0472 U	<0.048 U	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Acenaphthylene	208-96-8	100	107	100	mg/kg	<0.045 U	<0.0457 U	<0.0472 U	<0.048 U	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Acetophenone	98-86-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Aniline (Phenylamine, Aminobenzene)	62-53-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.21 U	<0.19 U	<0.195 U	<0.203 U	<0.187 U	<0.19 U	<0.206 U	<0.186 U	<0.2 U	<0.189 U	<0.188 U
Anthracene	120-12-7	100	1000	100	mg/kg	<0.045 U	<0.0457 U	<0.0472 U	<0.048 U	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Atrazine	1912-24-9	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Benzaldehyde	100-52-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Benzidine	92-87-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.21 U	<0.19 U	<0.195 U	<0.203 U	<0.187 U	<0.19 U	<0.206 U	<0.186 U	<0.2 U	<0.189 U	<0.188 U
Benzo(a)anthracene	56-55-3	1	1	1	mg/kg	<0.045 U	<0.0457 U	<0.0472 U	<0.048 U	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Benzo(a)pyrene	50-32-8	1	22	1	mg/kg	<0.045 U	<0.0457 U	<0.0472 U	<0.048 U	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Benzo(b)fluoranthene	205-99-2	1	1.7	1	mg/kg	<0.045 U	<0.0457 U	<0.0472 U	<0.048 U	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Benzo(g,h,i)Perylene	191-24-2	100	1000	100	mg/kg	<0.045 U	<0.0457 U	<0.0472 U	<0.048 U	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Benzo(k)fluoranthene	207-08-9	0.8	1.7	3.9	mg/kg	<0.045 U	<0.0457 U	<0.0472 U	<0.048 U	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Benzoic Acid	65-85-0	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Benzyl Alcohol	100-51-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Benzyl Butyl Phthalate	85-68-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Biphenyl (Diphenyl)	92-52-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Bis(2-chloroethoxy) methane	111-91-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Bis(2-chloroethyl) ether (2-chloroethyl ether)	111-44-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Bis(2-chloroisopropyl) ether	108-60-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Bis(2-ethylhexyl) phthalate	117-81-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	0.24 D	<0.05 U	<0.0474 U	<0.0471 U
Caprolactam	105-60-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.105 U	<0.095 U	<0.0973 U	<0.101 U	<0.0933 U	<0.0948 U	<0.103 U	<0.0928 U	<0.0997 U	<0.0946 U	<0.094 U
Carbazole	86-74-8	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Chrysene	218-01-9	1	1	3.9	mg/kg	<0.045 U	<0.0457 U	<0.0472 U	<0.048 U	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Dibenz(a,h)anthracene	53-70-3	0.33	1000	0.33	mg/kg	<0.045 U	<0.0457 U	<0.0472 U	<0.048 U	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Dibenzofuran	132-64-9	7	210	59	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Dibutyl phthalate	84-74-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Diethyl phthalate	84-66-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Dimethyl phthalate	131-11-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Dioctyl phthalate	117-84-0	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Fluoranthene	206-44-0	100	1000	100	mg/kg	<0.045 U	<0.0457 U	<0.0472 U	<0.048 U	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Fluorene	86-73-7	30	386	100	mg/kg	<0.045 U	<0.0457 U	<0.0472 U	<0.048 U	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Hexachlorobenzene	118-74-1	0.33	3.2	1.2	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Hexachlorobutadiene	87-68-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Hexachlorocyclopentadiene	77-47-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Hexachloroethane	67-72-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	8.2	0.5	mg/kg	<0.045 U	<0.0457 U	<0.0472 U	<0.048 U	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Isophorone	78-59-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Naphthalene	91-20-3	12	12	100	mg/kg	<0.045 U	<0.0457 U	<0.0472 U	<0.048 U	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Nitrobenzene	98-95-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
n-Nitrosodimethylamine	62-75-9	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
n-Nitrosodi-N-Propylamine	621-64-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
n-Nitrosodiphenylamine	86-30-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Pentachlorophenol	87-86-5	0.8	0.8	6.7	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Phenanthrene	85-01-8	100	1000	100	mg/kg	<0.045 U	<0.0457 U	<0.0472 U	<0.048 U	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Phenol	108-95-2	0.33	0.33	100	mg/kg	NA	NA	NA	NA	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Pyrene	129-00-0	100	1000	100	mg/kg	<0.045 U	<0.0457 U	<0.0472 U	<0.048 U	<0.0524 U	<0.0476 U	<0.0488 U	<0.0508 U	<0.0467 U	<0.0475 U	<0.0516 U	<0.0465 U	<0.05 U	<0.0474 U	<0.0471 U
Pyridine	110-86-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	<0.21 U	<0.19 U	<0.195 U	<0.203 U	<0.187 U	<0.19 U	<0.206 U	<0.186 U	<0.2 U	<0.189 U	<0.188 U

Table 1
Remedial Action Work Plan
Soil Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use Restricted-Residential SCOs	Location	LB-07	LB-08	LB-08	LB-08	LSB-9	LSB-9	LSB-10	LSB-10	LSB-10	LSB-11	LSB-11	LSB-12	LSB-12	LSB-13	LSB-14
					Sample Name	014_LB-07_5-7_20211110	001_LB-08_0-2	002_LB-08_7.5-9.5	003_DUP-1	037_LSB-9_0-2	038_LSB-9_4-6	039_LSB-10_0-2	040_DUP-1	041_LSB-10_4-6	042_LSB-11_0-2	043_LSB-11_2-4	046_LSB-12_15-17	047_LSB-12_18-20	055_LSB-13_15-17	056_LSB-14_15-17
					Sample Date	11/10/2021	11/09/2021	11/09/2021	11/09/2021	01/25/2022	01/25/2022	01/25/2022	01/25/2022	01/25/2022	01/25/2022	01/25/2022	01/26/2022	01/26/2022	01/28/2022	02/01/2022
					Sample Depth (ft bsl)	14.5-16.5	9.5-11.5	17-19	17-19	8-10	12-14	8-10	8-10	12-14	8-10	10-12	15-17	18-20	15-17	15-17
					Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Pesticides																				
4,4'-DDD	72-54-8	**0.0033**	14	13	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
4,4'-DDE	72-55-9	**0.0033**	17	8.9	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
4,4'-DDT	50-29-3	**0.0033**	136	7.9	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
Aldrin	309-00-2	0.005	0.19	0.097	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
Alpha BHC (Alpha Hexachlorocyclohexane)	319-84-6	0.02	0.02	0.48	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
Alpha Chlordane	5103-71-9	0.094	2.9	4.2	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
Alpha Endosulfan	959-98-8	2.4	102	24	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
Beta Bhc (Beta Hexachlorocyclohexane)	319-85-7	0.036	0.09	0.36	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
Beta Endosulfan	33213-65-9	2.4	102	24	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
Chlordane (alpha and gamma)	57-74-9	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0369 U	<0.0389 U	<0.0378 U	<0.0376 U
Delta Bhc (Delta Hexachlorocyclohexane)	319-86-8	0.04	0.25	100	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
Dieldrin	60-57-1	**0.005**	0.1	0.2	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
Endosulfan Sulfate	1031-07-8	2.4	1000	24	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
Endrin	72-20-8	0.014	0.06	11	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
Endrin Aldehyde	7421-93-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
Endrin Ketone	53494-70-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
Gamma Bhc (Lindane)	58-89-9	0.1	0.1	1.3	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
Gamma Chlordane (Trans-)	5103-74-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gamma-Chlordane	5566-34-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
Heptachlor	76-44-8	0.042	0.38	2.1	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
Heptachlor Epoxide	1024-57-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
Methoxychlor	72-43-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.00184 U	<0.00195 U	<0.00189 U	<0.00188 U
Toxaphene	8001-35-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.184 U	<0.195 U	<0.189 U	<0.188 U
Herbicides																				
2,4,5-T (Trichlorophenoxyacetic Acid)	93-76-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.022 U	<0.0235 U	<0.0228 U	<0.0229 U
2,4-D (Dichlorophenoxyacetic Acid)	94-75-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.022 U	<0.0235 U	<0.0228 U	<0.0229 U
Silvex (2,4,5-Tp)	93-72-1	3.8	3.8	100	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.022 U	<0.0235 U	<0.0228 U	<0.0229 U
Polychlorinated Biphenyl																				
PCB-1016 (Aroclor 1016)	12674-11-2	NS	NS	NS	mg/kg	<0.018 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0186 U	<0.0197 U	<0.0191 U	<0.019 U
PCB-1221 (Aroclor 1221)	11104-28-2	NS	NS	NS	mg/kg	<0.018 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0186 U	<0.0197 U	<0.0191 U	<0.019 U
PCB-1232 (Aroclor 1232)	11141-16-5	NS	NS	NS	mg/kg	<0.018 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0186 U	<0.0197 U	<0.0191 U	<0.019 U
PCB-1242 (Aroclor 1242)	53469-21-9	NS	NS	NS	mg/kg	<0.018 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0186 U	<0.0197 U	<0.0191 U	<0.019 U
PCB-1248 (Aroclor 1248)	12672-29-6	NS	NS	NS	mg/kg	<0.018 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0186 U	<0.0197 U	<0.0191 U	<0.019 U
PCB-1254 (Aroclor 1254)	11097-69-1	NS	NS	NS	mg/kg	<0.018 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0186 U	<0.0197 U	<0.0191 U	<0.019 U
PCB-1260 (Aroclor 1260)	11096-82-5	NS	NS	NS	mg/kg	<0.018 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0186 U	<0.0197 U	<0.0191 U	<0.019 U
PCB-1262 (Aroclor 1262)	37324-23-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-1268 (Aroclor 1268)	11100-14-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PCBs	1336-36-3	0.1	3.2	1	mg/kg	<0.018 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0186 U	<0.0197 U	<0.0191 U	<0.019 U
Metals																				
Aluminum	7429-90-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	21,900	9,880	13,700	10,700	7,800	10,600	15,400	13,300	8,040	31,200 B	15,000
Antimony	7440-36-0	NS	NS	NS	mg/kg	NA	NA	NA	NA	5.65	3.33	<2.93 U	<3.07 U	<2.81 U	<2.86 U	3.34	4.6	<3.02 U	11.6	6.86
Arsenic	7440-38-2	13	16	16	mg/kg	<1.64 U	5.01	<1.72 U	<1.74 U	<1.89 U	<1.71 U	2.23	2.45	<1.68 U	<1.72 U	1.98	<1.7 U	4.42	<1.72 U	<1.72 U
Barium	7440-39-3	**350**	820	400	mg/kg	46.3	228	111	116	161	89.5	68.8	82.9	50.3	50.3	48.9	132	93	333	131
Beryllium	7440-41-7	7.2	47	72	mg/kg	<0.055 U	<0.055 U	<0.057 U	<0.058 U	<0.063 U	<0.057 U	<0.059 U	<0.061 U	<0.056 U	<0.057 U	<0.062 U	<0.057 U	<0.06 U	<0.057 U	<0.057 U
Cadmium	7440-43-9	2.5	7.5	4.3	mg/kg	<0.329 U	0.552	<0.343 U	<0.348 U	<0.378 U	<0.343 U	<0.351 U	<0.368 U	<0.337 U	<0.343 U	<0.373 U	<0.34 U	<0.362 U	<0.345 U	0.395
Calcium	7440-70-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	1,200	1,740	5,260	10,700	1,230	1,610	1,810	14,300 B	49,500 B	2,700 B	2,430 B
Chromium, Hexavalent	18540-29-9	1	19	110	mg/kg	NA	<0.552 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.77	<0.604 U	<0.575 U	<0.575 U
Chromium, Total	7440-47-3	NS	NS	NS	mg/kg	19	21.2	32.8	34	35.2	24.3	17.9	14.7	17.3	21.9	20	39	20.6	78.5	42.2
Cobalt	7440-48-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	18.6	12.6	4.81	4.83	9.79	8.21	4.55	10.5	7.91	22.5	15.8
Copper	7440-50-8	**50**	1720	270	mg/kg	11.8	29.4	29.8	28.2	38.5	27.7	13	12.2	28	20.8	17.3	33.9	20	42.6	35.6
Cyanide	57-12-5	27	40	27	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.566 U	<0.604 U	<0.575 U	<0.575 U
Iron	7439-89-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	28,600	20,600	13,400	12,500	18,700	13,800	25,400	21,900	13,400	37,000	29,600
Lead	7439-92-1	**63**	450	400	mg/kg	3.67	**474**	8.78	8.43	15.3	7.3	37	41.4	7.33	9.54	8.44	17.4	25.9	43.8	10.1
Magnesium	7439-95-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	5,410	4,150	1,510	1,890	2,090	2,470	2,180	7,110	8,730	13,500 B	7,420 B
Manganese	7439-96-5	1600	2000	2000	mg/kg	96.8	406	207	205	881	192	113	171	302	300	56.5	230	275	395	249
Mercury	7439-97-6	**0.18**	0.73	0.81	mg/kg	<0.0361 U	<0.0364 U	<0.0377 U	<0.0383 U	<0.0378 U	<0.0343 U	<0.0351 U	**0.269**	<0.0337 U	<0.0343 U	0.0932	<0.034 U	<0.0362 U	<0.0345 U	<0.0345 U
Nickel	7440-02-0	**30**	130	310	mg/kg	13.1	20.2	**32.6**	**35.3**	**36.2**	**34.8**	12.1	11.1	25.3	20.7	16.6	27.8	16.8	**43.8**	**36.7**
Potassium	7440-09-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	4,320 B	3,410 B	1,010 B	1,040 B	1,380 B	1,780 B	1,050 B	5,070 B	2,500 B	15,700	6,630 B
Selenium	7782-49-2	3.9	4	180	mg/kg	<2.74 U	<2.76 U	<2.86 U	<2.9 U	<3.15 U	<2.86 U	<2.93 U	<3.07 U	<2.81 U	<2.86 U	<3.11 U	<2.83 U	<3.02 U	<2.87 U	<2.87 U
Silver	7440-22-4	**2**	8.3	180	mg/kg	<0.548 U	0.617	1.2	1.08	0.944	<0.571 U	<0.585 U	<0.614 U	<0.561 U	<0.572 U	<0.621 U	1.33	1.05	**4.57**	1.79
Sodium	7440-23-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	253	127	109	134	67.7	63.1	74.3	186	192	341	321 B
Thallium	7440-28-0	NS	NS	NS	mg/kg	NA	NA	NA	NA	<3.15 U	<2.86 U	<2.93 U	<3.07 U	<2.81 U	<2.86 U	<3.11 U	<2.83 U	<3.02 U	<2.87 U	<2.87 U
Vanadium	7440-62-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	48.4	28	34.4	22.5	22.8	28.1	29.3	52.4	37.4	77.3	51.9
Zinc	7440-66-6	**109**	2480	10000	mg/kg	29.8	**247**	62.5	62.4	72.5	49.5	35.5	47.7	35.6	33.3	26.5	68.5	48.7	107	60.9
General Chemistry																				
Solids, Percent	SOLID	NS	NS	NS	Percent	91.3	90.6	87.4	86.3	79.4	87.5	85.4	81.4	89.1	87.4	80.5	88.4	82.8	87	87
Total Solids	TSOLID	NS	NS	NS	Percent	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic acids																				
N-ethyl perfluorooctane- sulfonamidoacetic Acid (NEtFOSAA)	2991-50-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
N-methyl perfluorooctane- sulfonamidoacetic Acid (NMeFOSA/	2355-31-9	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Perfluorobutanoic acid (PFBA)	375-22-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	0.000712	<0.000275 U	<0.00028 U
Perfluorodecanesulfonic Acid (PFDS)	335-77-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Perfluorodecanoic Acid (PFDA)	335-76-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Perfluorododecanoic Acid (PFDoA)	307-55-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Perfluoroheptanoic acid (PFHpA)	375-85-9	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Perfluorohexanoic Acid (PFHxA)	307-24-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Perfluorononanoic Acid (PFNA)	375-95-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Perfluorooctanesulfonamide (FOSA)	754-91-6	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	**0.00088**	0.0037	0.044	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Perfluorooctanoic Acid (PFOA)	335-67-1	**0.00066**	0.0011	0.033	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Perfluoropentanoic Acid (PFPeA)	2706-90-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Perfluorotetradecanoic Acid (PFTA)	376-06-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2) (8:2FTS)	39108-34-4	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2) (6:2FTS)	27619-97-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.000266 U	<0.000252 U	<0.000275 U	<0.00028 U
Total PFOA and PFOS	TOTPFOAPFOS	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 1
Remedial Action Work Plan
Soil Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use Restricted-Residential SCOs	Location	LSB-15	LSB-15	LSB-16	LSB-16	LSB-17	LSB-17	LSB-17	LSB-18	LSB-18	LSB-18
					Sample Name	058_LSB-15_15-17	057_DUP_4	LSB-16_8-10	LSB-16_12-14	LSB-17_8-10	LSB-17_13-15	LSB-17_17-19	LSB-18_8-10	LSB-18_13-15	LSB-18_16-18
					Sample Date	02/01/2022	02/01/2022	08/02/2022	08/02/2022	08/03/2022	08/03/2022	08/03/2022	08/03/2022	08/03/2022	08/03/2022
					Sample Depth (ft bsl)	15-17	15-17	8-10	12-14	8-10	13-15	17-19	8-10	13-15	16-18
					Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	630-20-6	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00021 U	<0.00019 U	<0.00045 U	<0.00067 U	<0.00047 U	<0.00051 U	<0.00052 U	<0.00044 U
1,1,1-Trichloroethane	71-55-6	0.68	0.68	100	mg/kg	<0.0019 U	<0.002 U	<0.00021 U	<0.00019 U	<0.00045 U	<0.00067 U	<0.00047 U	<0.00051 U	<0.00052 U	<0.00044 U
1,1,2,2-Tetrachloroethane	79-34-5	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00021 U	<0.00019 U	<0.00045 U	<0.00067 U	<0.00047 U	<0.00051 U	<0.00052 U	<0.00044 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	79-00-5	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	<0.001 U	<0.00089 U
1,1-Dichloroethane	75-34-3	0.27	0.27	26	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	<0.001 U	<0.00089 U
1,1-Dichloroethene	75-35-4	0.33	0.33	100	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	<0.001 U	<0.00089 U
1,1-Dichloropropene	563-58-6	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00021 U	<0.00019 U	<0.00045 U	<0.00067 U	<0.00047 U	<0.00051 U	<0.00052 U	<0.00044 U
1,2,3-Trichlorobenzene	87-61-6	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
1,2,3-Trichloropropane	96-18-4	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
1,2,4,5-Tetramethylbenzene	95-93-2	NS	NS	NS	mg/kg	NA	NA	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	0.17 J	<0.0018 U
1,2,4-Trichlorobenzene	120-82-1	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
1,2,4-Trimethylbenzene	95-63-6	3.6	3.6	52	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	0.0019 J	<0.0018 U
1,2-Dibromo-3-Chloropropane	96-12-8	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.0013 U	<0.0012 U	<0.0027 U	<0.004 U	<0.0028 U	<0.003 U	<0.0031 U	<0.0027 U
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	<0.001 U	<0.00089 U
1,2-Dichlorobenzene	95-50-1	1.1	1.1	100	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
1,2-Dichloroethane	107-06-2	0.02	0.02	3.1	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	<0.001 U	<0.00089 U
1,2-Dichloropropane	78-87-5	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	<0.001 U	<0.00089 U
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	8.4	8.4	52	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
1,3-Dichlorobenzene	541-73-1	2.4	2.4	49	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
1,3-Dichloropropane	142-28-9	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
1,4-Dichlorobenzene	106-46-7	1.8	1.8	13	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
1,4-Diethyl Benzene	105-05-5	NS	NS	NS	mg/kg	NA	NA	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	0.082 J	<0.0018 U
1,4-Dioxane (P-Dioxane)	123-91-1	0.1	0.1	13	mg/kg	<0.039 U	<0.04 U	<0.034 U	<0.031 U	<0.072 U	<0.11 U	<0.076 U	<0.081 U	<0.083 U	<0.071 U
2,2-Dichloropropane	594-20-7	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
2-Chlorotoluene	95-49-8	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	0.0049 J	<0.0018 U
2-Hexanone (MBK)	591-78-6	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.0042 U	<0.0039 U	<0.009 U	<0.013 U	<0.0095 U	<0.01 U	<0.01 U	<0.0089 U
4-Chlorotoluene	106-43-4	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
4-Ethyltoluene	622-96-8	NS	NS	NS	mg/kg	NA	NA	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
Acetone	67-64-1	**0.05**	0.05	100	mg/kg	0.0094	0.0088	<0.0042 U	<0.0039 U	<0.009 U	<0.013 U	<0.0095 U	<0.01 U	0.02 J	<0.0089 U
Acrolein	107-02-8	NS	NS	NS	mg/kg	<0.0039 U	<0.004 U	NA	NA	NA	NA	NA	NA	NA	NA
Acrylonitrile	107-13-1	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.0017 U	<0.0016 U	<0.0036 U	<0.0054 U	<0.0038 U	<0.0041 U	<0.0042 U	<0.0036 U
Benzene	71-43-2	0.06	0.06	4.8	mg/kg	<0.0019 U	<0.002 U	<0.00021 U	<0.00019 U	0.00022 J	0.00049 J	0.00041 J	0.0016	0.00022 J	0.00018 J
Bromobenzene	108-86-1	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
Bromochloromethane	74-97-5	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
Bromodichloromethane	75-27-4	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00021 U	<0.00019 U	<0.00045 U	<0.00067 U	<0.00047 U	<0.00051 U	<0.00052 U	<0.00044 U
Bromoform	75-25-2	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.0017 U	<0.0016 U	<0.0036 U	<0.0054 U	<0.0038 U	<0.0041 U	<0.0042 U	<0.0036 U
Bromomethane	74-83-9	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
Carbon Disulfide	75-15-0	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.0042 U	<0.0039 U	<0.009 U	<0.013 U	<0.0095 U	<0.01 U	0.014 J	<0.0089 U
Carbon Tetrachloride	56-23-5	0.76	0.76	2.4	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	<0.001 U	<0.00089 U
Chlorobenzene	108-90-7	1.1	1.1	100	mg/kg	<0.0019 U	<0.002 U	<0.00021 U	<0.00019 U	<0.00045 U	<0.00067 U	<0.00047 U	<0.00051 U	<0.00052 U	<0.00044 U
Chloroethane	75-00-3	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
Chloroform	67-66-3	0.37	0.37	49	mg/kg	<0.0019 U	<0.002 U	<0.00063 U	<0.00058 U	<0.0013 U	<0.002 U	<0.0014 U	<0.0015 U	<0.0016 U	<0.0013 U
Chloromethane	74-87-3	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.0017 U	<0.0016 U	<0.0036 U	<0.0054 U	<0.0038 U	<0.0041 U	<0.0042 U	<0.0036 U
Cis-1,2-Dichloroethene	156-59-2	0.25	0.25	100	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	<0.001 U	<0.00089 U
Cis-1,3-Dichloropropene	10061-01-5	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00021 U	<0.00019 U	<0.00045 U	<0.00067 U	<0.00047 U	<0.00051 U	<0.00052 U	<0.00044 U
Cyclohexane	110-82-7	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	NA	NA	NA	NA	NA	NA	NA	NA
Cymene	99-87-6	NS	NS	NS	mg/kg	NA	NA	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	0.00058 J	<0.00089 U
Dibromochloromethane	124-48-1	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	<0.001 U	<0.00089 U
Dibromomethane	74-95-3	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
Dichlorodifluoromethane	75-71-8	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.0042 U	<0.0039 U	<0.009 U	<0.013 U	<0.0095 U	<0.01 U	<0.01 U	<0.0089 U
Diethyl Ether (Ethyl Ether)	60-29-7	NS	NS	NS	mg/kg	NA	NA	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
Ethylbenzene	100-41-4	1	1	41	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	0.00035 J	<0.00089 U
Hexachlorobutadiene	87-68-3	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.0017 U	<0.0016 U	<0.0036 U	<0.0054 U	<0.0038 U	<0.0041 U	<0.0042 U	<0.0036 U
Isopropylbenzene (Cumene)	98-82-8	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	0.00012 J	<0.001 U	0.033 J	<0.00089 U
M,P-Xylene	179601-23-1	NS	NS	NS	mg/kg	<0.0039 U	<0.004 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
Methyl Acetate	79-20-9	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	NA	NA	NA	NA	NA	NA	NA	NA
Methyl Ethyl Ketone (2-Butanone)	78-93-3	0.12	0.12	100	mg/kg	<0.0019 U	<0.002 U	<0.0042 U	<0.0039 U	<0.009 U	<0.013 U	<0.0095 U	<0.01 U	0.005 J	<0.0089 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.0042 U	<0.0039 U	<0.009 U	<0.013 U	<0.0095 U	<0.01 U	<0.01 U	<0.0089 U
Methylcyclohexane	108-87-2	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	75-09-2	0.05	0.05	100	mg/kg	<0.0039 U	0.0056 J	0.0012 J	0.00098 J	<0.0045 U	<0.0067 U	<0.0047 U	<0.0051 U	<0.0052 U	<0.0044 U
Naphthalene	91-20-3	12	12	100	mg/kg	NA	NA	<0.0017 U	<0.0016 U	<0.0036 U	<0.0054 U	<0.0038 U	<0.0041 U	0.49 J	<0.0036 U
n-Butylbenzene	104-51-8	12	12	100	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	<0.001 U	<0.00089 U
n-Propylbenzene	103-65-1	3.9	3.9	100	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	0.015 J	<0.00089 U
o-Xylene (1,2-Dimethylbenzene)	95-47-6	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	0.0003 J	<0.00089 U
p-Cymene (p-Isopropyltoluene)	CYMP	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	NA	NA	NA	NA	NA	NA	NA	NA
Sec-Butylbenzene	135-98-8	11	11	100	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	1.3 J	0.00034 J
Styrene	100-42-5	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	0.00043 J	<0.00089 U
T-Butylbenzene	98-06-6	5.9	5.9	100	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	0.12 J	<0.0018 U
Tert-Butyl Alcohol	75-65-0	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	NA	NA	NA	NA	NA	NA	NA	NA
Tert-Butyl Methyl Ether	1634-04-4	0.93	0.93	100	mg/kg	<0.0019 U	<0.002 U	<0.00084 U	<0.00078 U	<0.0018 U	<0.0027 U	<0.0019 U	<0.002 U	<0.0021 U	<0.0018 U
Tetrachloroethene (PCE)	127-18-4	**1.3**	1.3	19	mg/kg	<0.0019 U	<0.002 U	<0.00021 U	<0.00019 U	0.00031 J	0.0041	0.00052	<0.00051 U	<0.00052 U	<0.00044 U
Toluene	108-88-3	0.7	0.7	100	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	0.00059 J	<0.001 U	<0.00089 U
Total 1,2-Dichloroethene (Cis and Trans)	540-59-0	NS	NS	NS	mg/kg	NA	NA	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	<0.001 U	<0.00089 U
Total Xylenes	1330-20-7	0.26	1.6	100	mg/kg	<0.0058 U	<0.0061 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	0.0003 J	<0.00089 U
Total, 1,3-Dichloropropene (Cis And Trans)	542-75-6	NS	NS	NS	mg/kg	NA	NA	<0.00021 U	<0.00019 U	<0.00045 U	<0.00067 U	<0.00047 U	<0.00051 U	<0.00052 U	<0.00044 U
Trans-1,2-Dichloroethene	156-60-5	0.19	0.19	100	mg/kg	<0.0019 U	<0.002 U	<0.00063 U	<0.00058 U	<0.0013 U	<0.002 U	<0.0014 U	<0.0015 U	<0.0016 U	<0.0013 U
Trans-1,3-Dichloropropene	10061-02-6	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	<0.001 U	<0.00089 U
Trans-1,4-Dichloro-2-Butene	110-57-6	NS	NS	NS	mg/kg	NA	NA	<0.0021 U	<0.0019 U	<0.0045 U	<0.0067 U	<0.0047 U	<0.0051 U	<0.0052 U	<0.0044 U
Trichloroethene (TCE)	79-01-6	0.47	0.47	21	mg/kg	<0.0019 U	<0.002 U	<0.00021 U	<0.00019 U	<0.00045 U	<0.00067 U	<0.00047 U	<0.00051 U	<0.00052 U	<0.00044 U
Trichlorofluoromethane	75-69-4	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.0017 U	<0.0016 U	<0.0036 U	<0.0054 U	<0.0038 U	<0.0041 U	<0.0042 U	<0.0036 U
Vinyl Acetate	108-05-4	NS	NS	NS	mg/kg	<0.0019 U	<0.002 U	<0.0042 U	<0.0039 U	<0.009 U	<0.013 U	<0.0095 U	<0.01 U	<0.01 U	<0.0089 U
Vinyl Chloride	75-01-4	0.02	0.02	0.9	mg/kg	<0.0019 U	<0.002 U	<0.00042 U	<0.00039 U	<0.0009 U	<0.0013 U	<0.00095 U	<0.001 U	<0.001 U	<0.00089 U

Analyte	LSB-19	LSB-19	LSB-19	LSB-20	LSB-20	LSB-20	LSB-20	LSB-21
Sample Name	LSB-19_8-10	LSB-19_12.5-14.5	LSB-19_16-18	LSB-20_8-10	LSB-20_13-15	LSB-20_18-20	DUP-1_20220804	LSB-21_8-10
Sample Date	08/02/2022	08/02/2022	08/02/2022	08/04/2022	08/04/2022	08/04/2022	08/04/2022	08/04/2022
Sample Depth (ft bsl)	8-10	12.5-14.5	16-18	8-10	13-15	18-20	18-20	8-10
Unit	Result	Result	Result	Result	Result	Result	Result	Result
Volatile Organic Compounds								
1,1,1,2-Tetrachloroethane	<0.00046 U	<0.00049 U	<0.00044 U	<0.00044 U	<0.00047 U	<0.00049 U	<0.00046 U	<0.00048 U
1,1,1-Trichloroethane	<0.00046 U	<0.00049 U	<0.00044 U	<0.00044 U	<0.00047 U	<0.00049 U	<0.00046 U	<0.00048 U
1,1,2,2-Tetrachloroethane	<0.00046 U	<0.00049 U	<0.00044 U	<0.00044 U	<0.00047 U	<0.00049 U	<0.00046 U	<0.00048 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
1,1-Dichloroethane	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
1,1-Dichloroethene	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
1,1-Dichloropropene	<0.00046 U	<0.00049 U	<0.00044 U	<0.00044 U	<0.00047 U	<0.00049 U	<0.00046 U	<0.00048 U
1,2,3-Trichlorobenzene	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
1,2,3-Trichloropropane	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
1,2,4,5-Tetramethylbenzene	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
1,2,4-Trichlorobenzene	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
1,2,4-Trimethylbenzene	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
1,2-Dibromo-3-Chloropropane	<0.0028 U	<0.0029 U	<0.0026 U	<0.0026 U	<0.0028 U	<0.003 U	<0.0028 U	<0.0029 U
1,2-Dibromoethane (Ethylene Dibromide)	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
1,2-Dichlorobenzene	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
1,2-Dichloroethane	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
1,2-Dichloropropane	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
1,3,5-Trimethylbenzene (Mesitylene)	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
1,3-Dichlorobenzene	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
1,3-Dichloropropane	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
1,4-Dichlorobenzene	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
1,4-Diethyl Benzene	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
1,4-Dioxane (P-Dioxane)	<0.074 U	<0.078 U	<0.07 U	<0.07 U	<0.075 U	<0.079 U	<0.074 U	<0.077 U
2,2-Dichloropropane	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
2-Chlorotoluene	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
2-Hexanone (MBK)	<0.0093 U	<0.0097 U	<0.0088 U	<0.0088 U	<0.0093 U	<0.0099 U	<0.0092 U	<0.0096 U
4-Chlorotoluene	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
4-Ethyltoluene	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
Acetone	<0.0093 U	<0.0097 U	<0.0088 U	0.018	<0.0093 U	<0.0099 U	0.0056 J	<0.0096 U
Acrolein	NA	NA	NA	NA	NA	NA	NA	NA
Acrylonitrile	<0.0037 U	<0.0039 U	<0.0035 U	<0.0035 U	<0.0037 U	<0.0039 U	<0.0037 U	<0.0038 U
Benzene	<0.00046 U	<0.00049 U	0.00016 J	<0.00044 U	<0.00047 U	<0.00049 U	<0.00046 U	<0.00048 U
Bromobenzene	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
Bromochloromethane	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
Bromodichloromethane	<0.00046 U	<0.00049 U	<0.00044 U	<0.00044 U	<0.00047 U	<0.00049 U	<0.00046 U	<0.00048 U
Bromoform	<0.0037 U	<0.0039 U	<0.0035 U	<0.0035 U	<0.0037 U	<0.0039 U	<0.0037 U	<0.0038 U
Bromomethane	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
Carbon Disulfide	<0.0093 U	<0.0097 U	<0.0088 U	<0.0088 U	<0.0093 U	<0.0099 U	<0.0092 U	<0.0096 U
Carbon Tetrachloride	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
Chlorobenzene	<0.00046 U	<0.00049 U	<0.00044 U	<0.00044 U	<0.00047 U	<0.00049 U	<0.00046 U	<0.00048 U
Chloroethane	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
Chloroform	<0.0014 U	<0.0015 U	<0.0013 U	0.00041 J	<0.0014 U	<0.0015 U	<0.0014 U	<0.0014 U
Chloromethane	<0.0037 U	<0.0039 U	<0.0035 U	<0.0035 U	<0.0037 U	<0.0039 U	<0.0037 U	<0.0038 U
Cis-1,2-Dichloroethene	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
Cis-1,3-Dichloropropene	<0.00046 U	<0.00049 U	<0.00044 U	<0.00044 U	<0.00047 U	<0.00049 U	<0.00046 U	<0.00048 U
Cyclohexane	NA	NA	NA	NA	NA	NA	NA	NA
Cymene	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
Dibromochloromethane	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
Dibromomethane	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
Dichlorodifluoromethane	0.0022 J	0.0025 J	<0.0088 U	<0.0088 U	<0.0093 U	<0.0099 U	<0.0092 U	<0.0096 U
Diethyl Ether (Ethyl Ether)	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
Ethylbenzene	<0.00093 U	<0.00097 U	0.00017 J	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
Hexachlorobutadiene	<0.0037 U	<0.0039 U	<0.0035 U	<0.0035 U	<0.0037 U	<0.0039 U	<0.0037 U	<0.0038 U
Isopropylbenzene (Cumene)	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
M,P-Xylene	<0.0019 U	<0.0019 U	0.00058 J	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
Methyl Acetate	NA	NA	NA	NA	NA	NA	NA	NA
Methyl Ethyl Ketone (2-Butanone)	<0.0093 U	<0.0097 U	<0.0088 U	0.0026 J	<0.0093 U	<0.0099 U	<0.0092 U	<0.0096 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	<0.0093 U	<0.0097 U	<0.0088 U	<0.0088 U	<0.0093 U	<0.0099 U	<0.0092 U	<0.0096 U
Methylcyclohexane	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	0.0027 J	<0.0049 U	0.0024 J	<0.0044 U	<0.0047 U	<0.0049 U	<0.0046 U	<0.0048 U
Naphthalene	<0.0037 U	<0.0039 U	<0.0035 U	<0.0035 U	<0.0037 U	<0.0039 U	<0.0037 U	<0.0038 U
n-Butylbenzene	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
n-Propylbenzene	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
o-Xylene (1,2-Dimethylbenzene)	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
p-Cymene (p-Isopropyltoluene)	NA	NA	NA	NA	NA	NA	NA	NA
Sec-Butylbenzene	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	0.00023 J	<0.00096 U
Styrene	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
T-Butylbenzene	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
Tert-Butyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA
Tert-Butyl Methyl Ether	<0.0019 U	<0.0019 U	<0.0018 U	<0.0018 U	<0.0019 U	<0.002 U	<0.0018 U	<0.0019 U
Tetrachloroethene (PCE)	<0.00046 U	<0.00049 U	0.0006	<0.00044 U	<0.00047 U	<0.00049 U	<0.00046 U	<0.00048 U
Toluene	<0.00093 U	<0.00097 U	0.00058 J	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
Total 1,2-Dichloroethene (Cis and Trans)	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
Total Xylenes	<0.00093 U	<0.00097 U	0.00058 J	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
Total, 1,3-Dichloropropene (Cis And Trans)	<0.00046 U	<0.00049 U	<0.00044 U	<0.00044 U	<0.00047 U	<0.00049 U	<0.00046 U	<0.00048 U
Trans-1,2-Dichloroethene	<0.0014 U	<0.0015 U	<0.0013 U	<0.0013 U	<0.0014 U	<0.0015 U	<0.0014 U	<0.0014 U
Trans-1,3-Dichloropropene	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U
Trans-1,4-Dichloro-2-Butene	<0.0046 U	<0.0049 U	<0.0044 U	<0.0044 U	<0.0047 U	<0.0049 U	<0.0046 U	<0.0048 U
Trichloroethene (TCE)	<0.00046 U	<0.00049 U	<0.00044 U	<0.00044 U	<0.00047 U	<0.00049 U	<0.00046 U	<0.00048 U
Trichlorofluoromethane	<0.0037 U	<0.0039 U	<0.0035 U	<0.0035 U	<0.0037 U	<0.0039 U	<0.0037 U	<0.0038 U
Vinyl Acetate	<0.0093 U	<0.0097 U	<0.0088 U	<0.0088 U	<0.0093 U	<0.0099 U	<0.0092 U	<0.0096 U
Vinyl Chloride	<0.00093 U	<0.00097 U	<0.00088 U	<0.00088 U	<0.00093 U	<0.00099 U	<0.00092 U	<0.00096 U

Table 1
Remedial Action Work Plan
Soil Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use Restricted-Residential SCOs	Location	LSB-15	LSB-15	LSB-16	LSB-16	LSB-17	LSB-17	LSB-17	LSB-18	LSB-18	LSB-18	LSB-19	LSB-19	LSB-19	LSB-20	LSB-20	LSB-20	LSB-20	LSB-21
					Sample Name	058_LSB-15_15-17	057_DUP_4	LSB-16_8-10	LSB-16_12-14	LSB-17_8-10	LSB-17_13-15	LSB-17_17-19	LSB-18_8-10	LSB-18_13-15	LSB-18_16-18	LSB-19_8-10	LSB-19_12.5-14.5	LSB-19_16-18	LSB-20_8-10	LSB-20_13-15	LSB-20_18-20	DUP-1_20220804	LSB-21_8-10
					Sample Date	02/01/2022	02/01/2022	08/02/2022	08/02/2022	08/03/2022	08/03/2022	08/03/2022	08/03/2022	08/03/2022	08/03/2022	08/02/2022	08/02/2022	08/02/2022	08/04/2022	08/04/2022	08/04/2022	08/04/2022	08/04/2022
					Sample Depth (ft bsl)	15-17	15-17	8-10	12-14	8-10	13-15	17-19	8-10	13-15	16-18	8-10	12.5-14.5	16-18	8-10	13-15	18-20	18-20	8-10
					Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Semi-Volatile Organic Compounds																							
1,2,4,5-Tetrachlorobenzene	95-94-3	NS	NS	NS	mg/kg	<0.0977 U	<0.0969 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
1,2,4-Trichlorobenzene	120-82-1	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
1,2-Dichlorobenzene	95-50-1	1.1	1.1	100	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
1,2-Diphenylhydrazine	122-66-7	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	541-73-1	2.4	2.4	49	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
1,4-Dichlorobenzene	106-46-7	1.8	1.8	13	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
1,4-Dioxane (P-Dioxane)	123-91-1	0.1	0.1	13	mg/kg	<0.0192 U	<0.0192 U	<0.029 U	<0.028 U	<0.028 U	<0.03 U	<0.029 U	<0.03 U	<0.028 U	<0.028 U	<0.028 U	<0.031 U	<0.029 U	<0.027 U	<0.029 U	<0.032 U	<0.029 U	<0.028 U
2,3,4,6-Tetrachlorophenol	58-90-2	NS	NS	NS	mg/kg	<0.0977 U	<0.0969 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	95-95-4	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
2,4,6-Trichlorophenol	88-06-2	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.12 U	<0.11 U	<0.11 U	<0.12 U	<0.12 U	<0.12 U	<0.11 U	<0.11 U	<0.11 U	<0.12 U	<0.12 U	<0.11 U	<0.12 U	<0.13 U	<0.12 U	<0.11 U
2,4-Dichlorophenol	120-83-2	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.17 U	<0.17 U	<0.17 U	<0.18 U	<0.17 U	<0.18 U	<0.16 U	<0.17 U	<0.17 U	<0.19 U	<0.17 U	<0.16 U	<0.17 U	<0.19 U	<0.17 U	<0.16 U
2,4-Dimethylphenol	105-67-9	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
2,4-Dinitrophenol	51-28-5	NS	NS	NS	mg/kg	<0.0977 U	<0.0969 U	<0.93 UJ	<0.89 UJ	<0.9 U	<0.95 U	<0.93 U	<0.96 U	<0.88 U	<0.91 U	<0.91 U	<0.99 U	<0.93 U	<0.87 U	<0.93 U	<1 U	<0.92 U	<0.88 U
2,4-Dinitrotoluene	121-14-2	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
2,6-Dinitrotoluene	606-20-2	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
2-Chloronaphthalene	91-58-7	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
2-Chlorophenol	95-57-8	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
2-Methylnaphthalene	91-57-6	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.23 U	<0.22 U	<0.22 U	<0.24 U	<0.23 U	<0.24 U	<0.22 U	0.053 J	<0.23 U	<0.25 U	<0.23 U	0.044 J	<0.23 U	<0.26 U	<0.23 U	<0.22 U
2-Methylphenol (o-Cresol)	95-48-7	0.33	0.33	100	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
2-Nitroaniline	88-74-4	NS	NS	NS	mg/kg	<0.0977 U	<0.0969 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
2-Nitrophenol	88-75-5	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.42 U	<0.4 U	<0.4 U	<0.43 U	<0.42 U	<0.43 U	<0.4 U	<0.41 U	<0.41 U	<0.45 U	<0.42 U	<0.39 U	<0.42 U	<0.46 U	<0.41 U	<0.4 U
3 & 4 Methylphenol (m&p Cresol)	65794-96-9	0.33	0.33	100	mg/kg	<0.049 U	<0.0486 U	<0.28 U	<0.27 U	<0.27 U	<0.28 U	<0.28 U	<0.29 U	<0.26 U	<0.27 U	<0.27 U	<0.3 U	<0.28 U	<0.26 U	<0.28 U	<0.31 U	<0.28 U	<0.26 U
3,3'-Dichlorobenzidine	91-94-1	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
3-Nitroaniline	99-09-2	NS	NS	NS	mg/kg	<0.0977 U	<0.0969 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
4,6-Dinitro-2-Methylphenol	534-52-1	NS	NS	NS	mg/kg	<0.0977 U	<0.0969 U	<0.5 U	<0.48 U	<0.48 U	<0.51 U	<0.5 U	<0.52 U	<0.48 U	<0.49 U	<0.49 UJ	<0.54 UJ	<0.5 UJ	<0.47 U	<0.5 U	<0.55 U	<0.5 U	<0.48 U
4-Bromophenyl Phenyl Ether	101-55-3	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
4-Chloro-3-Methylphenol	59-50-7	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
4-Chloroaniline	106-47-8	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 UJ	<0.19 U	<0.21 UJ	<0.19 UJ	<0.18 UJ
4-Chlorophenyl Phenyl Ether	7005-72-3	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
4-Nitroaniline	100-01-6	NS	NS	NS	mg/kg	<0.0977 U	<0.0969 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
4-Nitrophenol	100-02-7	NS	NS	NS	mg/kg	<0.0977 U	<0.0969 U	<0.27 U	<0.26 U	<0.26 U	<0.28 U	<0.27 U	<0.28 U	<0.26 U	<0.26 U	<0.26 U	<0.29 U	<0.27 U	<0.25 U	<0.27 U	<0.3 U	<0.27 U	<0.26 U
Acenaphthene	83-32-9	20	98	100	mg/kg	<0.049 U	<0.0486 U	<0.16 U	<0.15 U	<0.15 U	<0.16 U	<0.16 U	<0.16 U	0.029 J	0.23	<0.15 U	<0.16 U	<0.15 U	0.034 J	<0.15 U	<0.17 U	<0.15 U	<0.15 U
Acenaphthylene	208-96-8	100	107	100	mg/kg	<0.049 U	<0.0486 U	<0.16 U	<0.15 U	<0.15 U	<0.16 U	<0.16 U	<0.16 U	<0.15 U	0.076 J	<0.15 U	<0.16 U	<0.15 U	0.085 J	<0.15 U	<0.17 U	<0.15 U	<0.15 U
Acetophenone	98-86-2	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
Aniline (Phenylamine, Aminobenzene)	62-53-3	NS	NS	NS	mg/kg	<0.196 U	<0.194 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	120-12-7	100	1000	100	mg/kg	<0.049 U	<0.0486 U	<0.12 U	<0.11 U	<0.11 U	<0.12 U	<0.12 U	<0.12 U	0.042 J	0.16	<0.11 U	<0.12 U	<0.12 U	0.11	<0.12 U	<0.13 U	<0.12 U	<0.11 U
Atrazine	1912-24-9	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzaldehyde	100-52-7	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzidine	92-87-5	NS	NS	NS	mg/kg	<0.196 U	<0.194 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	56-55-3	1	1	1	mg/kg	<0.049 U	<0.0486 U	<0.12 U	<0.11 U	<0.11 U	0.095 J	<0.12 U	0.022 J	<0.11 U	0.38	<0.11 U	<0.12 U	<0.12 U	0.28	<0.12 U	<0.13 U	<0.12 U	<0.11 U
Benzo(a)pyrene	50-32-8	1	22	1	mg/kg	<0.049 U	<0.0486 U	<0.16 U	<0.15 U	<0.15 U	0.063 J	<0.16 U	<0.16 U	<0.15 U	0.42	<0.15 U	<0.16 U	<0.15 U	0.28	<0.15 U	<0.17 U	<0.15 U	<0.15 U
Benzo(b)fluoranthene	205-99-2	1	1.7	1	mg/kg	<0.049 U	<0.0486 U	<0.12 U	<0.11 U	<0.11 U	0.081 J	<0.12 U	0.036 J	<0.11 U	0.47	<0.11 U	<0.12 U	<0.12 U	0.32	<0.12 U	<0.13 U	<0.12 U	<0.11 U
Benzo(g,h,i)Perylene	191-24-2	100	1000	100	mg/kg	<0.049 U	<0.0486 U	<0.16 U	<0.15 U	<0.15 U	0.025 J	<0.16 U	0.025 J	<0.15 U	0.25	<0.15 U	<0.16 U	<0.15 U	0.2	<0.15 U	<0.17 U	<0.15 U	<0.15 U
Benzo(k)fluoranthene	207-08-9	0.8	1.7	3.9	mg/kg	<0.049 U	<0.0486 U	<0.12 U	<0.11 U	<0.11 U	<0.12 U	<0.12 U	<0.12 U	<0.11 U	0.17	<0.11 U	<0.12 U	<0.12 U	0.15	<0.12 U	<0.13 U	<0.12 U	<0.11 U
Benzoic Acid	65-85-0	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.63 UJ	<0.6 UJ	<0.6 U	<0.64 U	<0.63 U	<0.65 U	<0.6 U	<0.61 U	<0.61 U	<0.67 U	<0.63 U	<0.59 U	<0.63 UJ	<0.69 U	<0.62 U	<0.6 U
Benzyl Alcohol	100-51-6	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
Benzyl Butyl Phthalate	85-68-7	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	1.2	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
Biphenyl (Diphenyl)	92-52-4	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.44 U	<0.42 U	<0.42 U	<0.45 U	<0.44 U	<0.45 U	<0.42 U	0.025 J	<0.43 U	<0.47 U	<0.44 U	<0.41 U	<0.44 U	<0.49 U	<0.44 U	<0.42 U
Bis(2-chloroethoxy) methane	111-91-1	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.21 U	<0.2 U	<0.2 U	<0.21 U	<0.21 U	<0.22 U	<0.2 U	<0.2 U	<0.2 U	<0.22 U	<0.21 U	<0.2 U	<0.21 U	<0.23 U	<0.21 U	<0.2 U
Bis(2-chloroethyl) ether (2-chloroethyl ether)	111-44-4	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.17 U	<0.17 U	<0.17 U	<0.18 U	<0.17 U	<0.18 U	<0.16 U	<0.17 U	<0.17 U	<0.19 U	<0.17 U	<0.16 U	<0.17 U	<0.19 U	<0.17 U	<0.16 U
Bis(2-chloroisopropyl) ether	108-60-1	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.23 U	<0.22 U	<0.22 U	<0.24 U	<0.23 U	<0.24 U	<0.22 U	<0.23 U	<0.23 U	<0.25 U	<0.23 U	<0.22 U	<0.23 U	<0.26 U	<0.23 U	<0.22 U
Bis(2-ethylhexyl) phthalate	117-81-7	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	0.1 J	<0.18 U	<0.19 U	0.47	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	0.067 J	<0.19 U	<0.21 U	<0.19 U	<0.18 U
Caprolactam	105-60-2	NS	NS	NS	mg/kg	<0.0977 U	<0.0969 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	86-74-8	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	0.025 J	<0.19 U	<0.2 U	<0.18 U	0.054 J	<0.19 U	<0.21 U	<0.19 U	0.051 J	<0.19 U	<0.21 U	<0.19 U	<0.18 U
Chrysene	218-01-9	1	1	3.9	mg/kg	<0.049 U	<0.0486 U	<0.12 U	<0.11 U	<0.11 U	0.085 J	<0.12 U	0.024 J	<0.11 U	0.4	<0.11 U	<0.12 U	<0.12 U	0.34	<0.12 U	<0.13 U	<0.12 U	<0.11 U
Dibenz(a,h)anthracene	53-70-3	0.33	1000	0.33	mg/kg	<0.049 U	<0.0486 U	<0.12 U	<0.11 U	<0.11 U	<0.12 U	<0.12 U	<0.12 U	<0.11 U	0.055 J	<0.11 U	<0.12 U	<0.12 U	0.052 J	<0.12 U	<0.13 U	<0.12 U	<0.11 U
Dibenzofuran	132-64-9	7	210	59	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	0.075 J	0.22	<0.19 U	<0.21 U	<0.19 U	0.023 J	<0.19 U	<0.21 U	<0.19 U	<0.18 U
Dibutyl phthalate	84-74-2	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
Diethyl phthalate	84-66-2	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
Dimethyl phthalate	131-11-3	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
Dioctyl phthalate	117-84-0	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
Fluoranthene	206-44-0	100	1000	100	mg/kg	<0.049 U	<0.0486 U	0.027 J	<0.11 U	<0.11 U	0.2	0.04 J	0.045 J	<0.11 U	0.92	<0.11 U	<0.12 U	<0.12 U	0.55	<0.12 U	<0.13 U	<0.12 U	<0.11 U
Fluorene	86-73-7	30	386	100	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	0.06 J	0.26	<0.19 U	<0.21 U	<0.19 U	0.048 J	<0.19 U	<0.21 U	<0.19 U	<0.18 U
Hexachlorobenzene	118-74-1	0.33	3.2	1.2	mg/kg	<0.049 U	<0.0486 U	<0.12 U	<0.11 U	<0.11 U	<0.12 U	<0.12 U	<0.12 U	<0.11 U	<0.11 U	<0.11 U	<0.12 U	<0.12 U	<0.11 U	<0.12 U	<0.13 U	<0.12 U	<0.11 U
Hexachlorobutadiene	87-68-3	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
Hexachlorocyclopentadiene	77-47-4	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.55 U	<0.53 U	<0.53 U	<0.56 U	<0.55 U	<0.57 U	<0.52 U	<0.54 U	<0.54 UJ	<0.59 UJ	<0.55 UJ	<0.52 U	<0.55 U	<0.61 U	<0.55 U	<0.53 U
Hexachloroethane	67-72-1	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.16 U	<0.15 U	<0.15 U	<0.16 U	<0.16 U	<0.16 U	<0.15 U	<0.15 U	<0.15 U	<0.16 U	<0.15 U	<0.14 U	<0.15 U	<0.17 U	<0.15 U	<0.15 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	8.2	0.5	mg/kg	<0.049 U	<0.0486 U	<0.16 U	<0.15 U	<0.15 U	0.035 J	<0.16 U	0.028 J	<0.15 U	0.27	<0.15 U	<0.16 U	<0.15 U	0.17	<0.15 U	<0.17 U	<0.15 U	<0.15 U
Isophorone	78-59-1	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.17 U	<0.17 U	<0.17 U	<0.18 U	<0.17 U	<0.18 U	<0.16 U	<0.17 U	<0.17 U	<0.19 U	<0.17 U	<0.16 U	<0.17 U	<0.19 U	<0.17 U	<0.16 U
Naphthalene	91-20-3	12	12	100	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	0.076 J	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
Nitrobenzene	98-95-3	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.17 U	<0.17 U	<0.17 U	<0.18 U	<0.17 U	<0.18 U	<0.16 U	<0.17 U	<0.17 U	<0.19 U	<0.17 U	<0.16 U	<0.17 U	<0.19 U	<0.17 U	<0.16 U
n-Nitrosodimethylamine	62-75-9	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodi-N-Propylamine	621-64-7	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
n-Nitrosodiphenylamine	86-30-6	NS	NS	NS	mg/kg	<0.049 U	<0.0486 U	<0.16 U	<0.15 U	<0.15 U	<0.16 U	<0.16 U	<0.16 U	<0.15 U	<0.15 U	<0.15 U	<0.16 U	<0.15 U	<0.14 U	<0.15 U	<0.17 U	<0.15 U	<0.15 U
Pentachlorophenol	87-86-5	0.8	0.8	6.7	mg/kg	<0.049 U	<0.0486 U	<0.16 U	<0.15 U	<0.15 U	<0.16 U	<0.16 U	<0.16 U	<0.15 U	<0.15 U	<0.15 U	<0.16 U	<0.15 U	<0.14 U	<0.15 U	<0.17 U	<0.15 U	<0.15 U
Phenanthrene	85-01-8	100	1000	100	mg/kg	<0.049 U	<0.0486 U	<0.12 U	<0.11 U	<0.11 U	0.085 J	0.034 J	0.032 J	<0.11 U	0.88	<0.11 U	<0.12 U	<0.12 U	0.44	<0.12 U	<0.13 U	<0.12 U	<0.11 U
Phenol	108-95-2	0.33	0.33	100	mg/kg	<0.049 U	<0.0486 U	<0.19 U	<0.18 U	<0.19 U	<0.2 U	<0.19 U	<0.2 U	<0.18 U	<0.19 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U	<0.19 U	<0.21 U	<0.19 U	<0.18 U
Pyrene	129-00-0	100	1000	100	mg/kg	<0.049 U	<0.0486 U	0.028 J	<0.11 U	<0.11 U	0.16	0.035 J	0.037 J	0.056 J	0.91	<0.11 U	<0.12 U	<0.12 U	0.62	<0.12 U	<0.13 U	<0.12 U	<0.11 U
Pyridine	110-86-1	NS	NS	NS	mg/kg	<0.196 U	<0.194 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 1
Remedial Action Work Plan
Soil Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use Restricted-Residential SCOs	Location	LSB-15	LSB-15	LSB-16	LSB-16	LSB-17	LSB-17	LSB-17	LSB-18	LSB-18	LSB-18	LSB-19	LSB-19	LSB-19	LSB-20	LSB-20	LSB-20	LSB-20	LSB-21
					Sample Name	058_LSB-15_15-17	057_DUP_4	LSB-16_8-10	LSB-16_12-14	LSB-17_8-10	LSB-17_13-15	LSB-17_17-19	LSB-18_8-10	LSB-18_13-15	LSB-18_16-18	LSB-19_8-10	LSB-19_12.5-14.5	LSB-19_16-18	LSB-20_8-10	LSB-20_13-15	LSB-20_18-20	DUP-1_20220804	LSB-21_8-10
					Sample Date	02/01/2022	02/01/2022	08/02/2022	08/02/2022	08/03/2022	08/03/2022	08/03/2022	08/03/2022	08/03/2022	08/03/2022	08/02/2022	08/02/2022	08/02/2022	08/04/2022	08/04/2022	08/04/2022	08/04/2022	08/04/2022
					Sample Depth (ft bsl)	15-17	15-17	8-10	12-14	8-10	13-15	17-19	8-10	13-15	16-18	8-10	12.5-14.5	16-18	8-10	13-15	18-20	18-20	8-10
					Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Pesticides																							
4,4'-DDD	72-54-8	**0.0033**	14	13	mg/kg	<0.00192 U	<0.0019 U	**0.0044**	<0.00177 U	<0.00178 U	<0.00184 U	<0.00184 U	<0.00182 U	<0.00176 U	<0.00179 U	<0.00178 U	<0.00197 U	<0.00183 U	**0.0281**	<0.00185 U	<0.00202 U	<0.00184 U	<0.00175 U
4,4'-DDE	72-55-9	**0.0033**	17	8.9	mg/kg	<0.00192 U	<0.0019 U	**0.0416**	<0.00177 U	<0.00178 U	0.000446 J	<0.00184 U	<0.00182 U	<0.00176 U	<0.00179 U	<0.00178 U	<0.00197 U	<0.00183 U	**0.0188**	<0.00185 U	<0.00202 U	0.000557 J	<0.00175 U
4,4'-DDT	50-29-3	**0.0033**	136	7.9	mg/kg	<0.00192 U	<0.0019 U	**0.133**	<0.00177 U	<0.00178 U	**0.00527**	**0.00344**	<0.00182 U	<0.00176 U	<0.00179 U	<0.00178 U	<0.00197 U	<0.00183 U	**0.0419**	<0.00185 U	<0.00202 U	0.0016 J	<0.00175 U
Aldrin	309-00-2	0.005	0.19	0.097	mg/kg	<0.00192 U	<0.0019 U	<0.00179 U	<0.00177 U	<0.00178 U	<0.00184 U	<0.00184 U	<0.00182 U	<0.00176 U	<0.00179 U	<0.00178 U	<0.00197 U	<0.00183 U	<0.00171 U	<0.00185 U	<0.00202 U	<0.00184 U	<0.00175 U
Alpha BHC (Alpha Hexachlorocyclohexane)	319-84-6	0.02	0.02	0.48	mg/kg	<0.00192 U	<0.0019 U	<0.000748 U	<0.000739 U	<0.000743 U	<0.000766 U	<0.000765 U	<0.00076 U	<0.000731 U	<0.000744 U	<0.000743 U	<0.00082 U	<0.000762 U	<0.000713 U	<0.000772 U	<0.000842 U	<0.000766 U	<0.00073 U
Alpha Chlordane	5103-71-9	0.094	2.9	4.2	mg/kg	<0.00192 U	<0.0019 U	0.0029	<0.00222 U	<0.00223 U	0.00102 J	<0.00229 U	<0.00228 U	<0.00219 U	<0.00223 U	<0.00223 U	<0.00246 U	<0.00229 U	0.00633 J	<0.00231 U	<0.00253 U	<0.0023 U	<0.00219 U
Alpha Endosulfan	959-98-8	2.4	102	24	mg/kg	<0.00192 U	<0.0019 U	<0.00179 U	<0.00177 U	<0.00178 U	<0.00184 U	<0.00184 U	<0.00182 U	<0.00176 U	<0.00179 U	<0.00178 U	<0.00197 U	<0.00183 U	<0.00171 U	<0.00185 U	<0.00202 U	<0.00184 U	<0.00175 U
Beta Bhc (Beta Hexachlorocyclohexane)	319-85-7	0.036	0.09	0.36	mg/kg	<0.00192 U	<0.0019 U	<0.00179 U	<0.00177 U	<0.00178 U	<0.00184 U	<0.00184 U	<0.00182 U	<0.00176 U	<0.00179 U	<0.00178 U	<0.00197 U	<0.00183 U	<0.00171 U	<0.00185 U	<0.00202 U	<0.00184 U	<0.00175 U
Beta Endosulfan	33213-65-9	2.4	102	24	mg/kg	<0.00192 U	<0.0019 U	<0.00179 U	<0.00177 U	<0.00178 U	<0.00184 U	<0.00184 U	<0.00182 U	<0.00176 U	<0.00179 U	<0.00178 U	<0.00197 U	<0.00183 U	<0.00171 U	<0.00185 U	<0.00202 U	<0.00184 U	<0.00175 U
Chlordane (alpha and gamma)	57-74-9	NS	NS	NS	mg/kg	<0.0384 U	<0.0381 U	<0.015 U	<0.0148 U	<0.0149 U	<0.0153 U	<0.0153 U	<0.0152 U	<0.0146 U	<0.0149 U	<0.0148 U	<0.0164 U	<0.0152 U	<0.0142 U	<0.0154 U	<0.0168 U	<0.0153 U	<0.0146 U
Delta Bhc (Delta Hexachlorocyclohexane)	319-86-8	0.04	0.25	100	mg/kg	<0.00192 U	<0.0019 U	<0.00179 U	<0.00177 U	<0.00178 U	<0.00184 U	<0.00184 U	<0.00182 U	<0.00176 U	<0.00179 U	<0.00178 U	<0.00197 U	<0.00183 U	<0.00171 U	<0.00185 U	<0.00202 U	<0.00184 U	<0.00175 U
Dieldrin	60-57-1	**0.005**	0.1	0.2	mg/kg	<0.00192 U	<0.0019 U	**0.00541**	<0.00111 U	<0.00111 U	0.000997 J	<0.00115 U	<0.00114 U	<0.0011 U	<0.00112 U	<0.00111 U	<0.00123 U	<0.00114 U	0.00456 J	<0.00116 U	<0.00126 U	<0.00115 U	<0.0011 U
Endosulfan Sulfate	1031-07-8	2.4	1000	24	mg/kg	<0.00192 U	<0.0019 U	<0.000748 U	<0.000739 U	<0.000743 U	<0.000766 U	<0.000765 U	<0.00076 U	<0.000731 U	<0.000744 U	<0.000743 U	<0.00082 U	<0.000762 U	<0.000713 U	<0.000772 U	<0.000842 U	<0.000766 U	<0.00073 U
Endrin	72-20-8	0.014	0.06	11	mg/kg	<0.00192 U	<0.0019 U	<0.000748 U	<0.000739 U	<0.000743 U	<0.000766 U	<0.000765 U	<0.00076 U	<0.000731 U	<0.000744 U	<0.000743 U	<0.00082 U	<0.000762 U	<0.000713 U	<0.000772 U	<0.000842 U	<0.000766 U	<0.00073 U
Endrin Aldehyde	7421-93-4	NS	NS	NS	mg/kg	<0.00192 U	<0.0019 U	<0.00224 U	<0.00222 U	<0.00223 U	<0.0023 U	<0.00229 U	<0.00228 U	<0.00219 U	<0.00223 U	<0.00223 U	<0.00246 U	<0.00229 U	<0.00214 U	<0.00231 U	<0.00253 U	<0.0023 U	<0.00219 U
Endrin Ketone	53494-70-5	NS	NS	NS	mg/kg	<0.00192 U	<0.0019 U	<0.00179 U	<0.00177 U	<0.00178 U	<0.00184 U	<0.00184 U	<0.00182 U	<0.00176 U	<0.00179 U	<0.00178 U	<0.00197 U	<0.00183 U	<0.00171 U	<0.00185 U	<0.00202 U	<0.00184 U	<0.00175 U
Gamma Bhc (Lindane)	58-89-9	0.1	0.1	1.3	mg/kg	<0.00192 U	<0.0019 U	<0.000748 U	<0.000739 U	<0.000743 U	<0.000766 U	<0.000765 U	<0.00076 U	<0.000731 U	<0.000744 U	<0.000743 U	<0.00082 U	<0.000762 U	<0.000713 U	<0.000772 U	<0.000842 U	<0.000766 U	<0.00073 U
Gamma Chlordane (Trans-)	5103-74-2	NS	NS	NS	mg/kg	NA	NA	0.00142 J	<0.00222 U	<0.00223 U	<0.0023 U	<0.00229 U	<0.00228 U	<0.00219 U	<0.00223 U	<0.00223 U	<0.00246 U	<0.00229 U	0.00878 J	<0.00231 U	<0.00253 U	<0.0023 U	<0.00219 U
Gamma-Chlordane	5566-34-7	NS	NS	NS	mg/kg	<0.00192 U	<0.0019 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	76-44-8	0.042	0.38	2.1	mg/kg	<0.00192 U	<0.0019 U	<0.000897 U	<0.000887 U	<0.000892 U	<0.00092 U	<0.000918 U	<0.000912 U	<0.000878 U	<0.000893 U	<0.000891 U	<0.000984 U	<0.000914 U	<0.000855 U	<0.000926 U	<0.00101 U	<0.000919 U	<0.000876 U
Heptachlor Epoxide	1024-57-3	NS	NS	NS	mg/kg	<0.00192 U	<0.0019 U	<0.00336 U	<0.00332 U	<0.00334 U	<0.00345 U	<0.00344 U	<0.00342 U	<0.00329 U	<0.00335 U	<0.00334 U	<0.00369 U	<0.00343 U	<0.00321 U	<0.00347 U	<0.00379 U	<0.00345 U	<0.00328 U
Methoxychlor	72-43-5	NS	NS	NS	mg/kg	<0.00192 U	<0.0019 U	<0.00336 U	<0.00332 U	<0.00334 U	<0.00345 U	<0.00344 U	<0.00342 U	<0.00329 U	<0.00335 U	<0.00334 U	<0.00369 U	<0.00343 U	<0.00321 U	<0.00347 U	<0.00379 U	<0.00345 U	<0.00328 U
Toxaphene	8001-35-2	NS	NS	NS	mg/kg	<0.192 U	<0.19 U	<0.0336 U	<0.0332 U	<0.0334 U	<0.0345 U	<0.0344 U	<0.0342 U	<0.0329 U	<0.0335 U	<0.0334 U	<0.0369 U	<0.0343 U	<0.0321 U	<0.0347 U	<0.0379 U	<0.0345 U	<0.0328 U
Herbicides																							
2,4,5-T (Trichlorophenoxyacetic Acid)	93-76-5	NS	NS	NS	mg/kg	<0.0233 U	<0.0231 U	<0.194 U	<0.185 U	<0.189 U	<0.196 U	<0.195 U	<0.196 U	<0.182 U	<0.188 U	<0.192 U	<0.204 U	<0.19 U	<0.182 U	<0.196 U	<0.214 U	<0.188 U	<0.183 U
2,4-D (Dichlorophenoxyacetic Acid)	94-75-7	NS	NS	NS	mg/kg	<0.0233 U	<0.0231 U	<0.194 U	<0.185 U	<0.189 U	<0.196 U	<0.195 U	<0.196 U	<0.182 U	<0.188 U	<0.192 U	<0.204 U	<0.19 U	<0.182 UJ	<0.196 U	<0.214 UJ	<0.188 UJ	<0.183 UJ
Silvex (2,4,5-Tp)	93-72-1	3.8	3.8	100	mg/kg	<0.0233 U	<0.0231 U	<0.194 U	<0.185 U	<0.189 U	<0.196 U	<0.195 U	<0.196 U	<0.182 U	<0.188 U	<0.192 U	<0.204 U	<0.19 U	<0.182 U	<0.196 U	<0.214 U	<0.188 U	<0.183 U
Polychlorinated Biphenyl																							
PCB-1016 (Aroclor 1016)	12674-11-2	NS	NS	NS	mg/kg	<0.0194 U	<0.0192 U	<0.0371 U	<0.0368 U	<0.0377 U	<0.0388 U	<0.0387 U	<0.0398 U	<0.0364 U	<0.0368 U	<0.0382 U	<0.0408 U	<0.0386 U	<0.0351 U	<0.038 U	<0.0409 U	<0.0377 U	<0.0354 U
PCB-1221 (Aroclor 1221)	11104-28-2	NS	NS	NS	mg/kg	<0.0194 U	<0.0192 U	<0.0371 U	<0.0368 U	<0.0377 U	<0.0388 U	<0.0387 U	<0.0398 U	<0.0364 U	<0.0368 U	<0.0382 U	<0.0408 U	<0.0386 U	<0.0351 U	<0.038 U	<0.0409 U	<0.0377 U	<0.0354 U
PCB-1232 (Aroclor 1232)	11141-16-5	NS	NS	NS	mg/kg	<0.0194 U	<0.0192 U	<0.0371 U	<0.0368 U	<0.0377 U	<0.0388 U	<0.0387 U	<0.0398 U	<0.0364 U	<0.0368 U	<0.0382 U	<0.0408 U	<0.0386 U	<0.0351 U	<0.038 U	<0.0409 U	<0.0377 U	<0.0354 U
PCB-1242 (Aroclor 1242)	53469-21-9	NS	NS	NS	mg/kg	<0.0194 U	<0.0192 U	<0.0371 U	<0.0368 U	<0.0377 U	<0.0388 U	<0.0387 U	<0.0398 U	<0.0364 U	<0.0368 U	<0.0382 U	<0.0408 U	<0.0386 U	<0.0351 U	<0.038 U	<0.0409 U	<0.0377 U	<0.0354 U
PCB-1248 (Aroclor 1248)	12672-29-6	NS	NS	NS	mg/kg	<0.0194 U	<0.0192 U	<0.0371 U	<0.0368 U	<0.0377 U	<0.0388 U	<0.0387 U	<0.0398 U	<0.0364 U	<0.0368 U	<0.0382 U	<0.0408 U	<0.0386 U	<0.0351 U	<0.038 U	<0.0409 U	<0.0377 U	<0.0354 U
PCB-1254 (Aroclor 1254)	11097-69-1	NS	NS	NS	mg/kg	<0.0194 U	<0.0192 U	<0.0371 U	<0.0368 U	<0.0377 U	<0.0388 U	<0.0387 U	<0.0398 U	<0.0364 U	<0.0368 U	<0.0382 U	<0.0408 U	<0.0386 U	<0.0351 U	<0.038 U	<0.0409 U	<0.0377 U	<0.0354 U
PCB-1260 (Aroclor 1260)	11096-82-5	NS	NS	NS	mg/kg	<0.0194 U	<0.0192 U	<0.0371 U	<0.0368 U	<0.0377 U	<0.0388 U	<0.0387 U	<0.0398 U	<0.0364 U	<0.0368 U	<0.0382 U	<0.0408 U	<0.0386 U	0.0191 J	<0.038 U	<0.0409 U	<0.0377 U	<0.0354 U
PCB-1262 (Aroclor 1262)	37324-23-5	NS	NS	NS	mg/kg	NA	NA	<0.0371 U	<0.0368 U	<0.0377 U	<0.0388 U	<0.0387 U	<0.0398 U	<0.0364 U	<0.0368 U	<0.0382 U	<0.0408 U	<0.0386 U	<0.0351 U	<0.038 U	<0.0409 U	<0.0377 U	<0.0354 U
PCB-1268 (Aroclor 1268)	11100-14-4	NS	NS	NS	mg/kg	NA	NA	<0.0371 U	<0.0368 U	<0.0377 U	<0.0388 U	<0.0387 U	<0.0398 U	<0.0364 U	<0.0368 U	<0.0382 U	<0.0408 U	<0.0386 U	0.0103 J	<0.038 U	<0.0409 U	<0.0377 U	<0.0354 U
Total PCBs	1336-36-3	0.1	3.2	1	mg/kg	<0.0194 U	<0.0192 U	<0.0371 U	<0.0368 U	<0.0377 U	<0.0388 U	<0.0387 U	<0.0398 U	<0.0364 U	<0.0368 U	<0.0382 U	<0.0408 U	<0.0386 U	0.0294 J	<0.038 U	<0.0409 U	<0.0377 U	<0.0354 U
Metals																							
Aluminum	7429-90-5	NS	NS	NS	mg/kg	11,500	9,590	5,110	6,130	4,920	8,210	9,920	4,440	8,660	10,200	7,750	6,030	7,520	5,500	6,700 J	5,590 J	21,200 J	7,270
Antimony	7440-36-0	NS	NS	NS	mg/kg	3.95	3.26	1.62 J	<4.36 U	<4.52 U	<4.72 UJ	<4.7 U	<4.69 U	<4.45 U	<4.39 U	<4.58 U	<4.86 U	<4.44 U	<4.28 U	<4.54 U	<5.1 U	<4.39 U	<4.4 U
Arsenic	7440-38-2	13	16	16	mg/kg	<1.77 U	<1.76 U	3.72	1.35	1.02	3.06 J	1.26	5.32	1.71	2.92	6.82	1.54	1.64	4.28 J	2.58	2.77	2.17	3.08
Barium	7440-39-3	**350**	820	400	mg/kg	91.6	70.9	82.7 J	39.7	41.7	56.4	122	31.7	77.2	77.9	47.3	39.4	67.7	103 J	58.7 J	54.4 J	177 J	45.4
Beryllium	7440-41-7	7.2	47	72	mg/kg	<0.059 U	<0.059 U	0.232 J	0.131 J	0.1 J	0.406 J	0.292 J	0.178 J	0.427 J	0.368 J	0.211 J	0.253 J	0.373 J	0.223 J	0.261 J	0.571	1.04	0.202 J
Cadmium	7440-43-9	2.5	7.5	4.3	mg/kg	<0.355 U	<0.352 U	1.36 J	<0.871 U	<0.904 U	0.16 J	0.273 J	0.122 J	0.196 J	0.167 J	0.596 J	0.457 J	0.658 J	1.16 J	<0.908 U	0.877 J	1.17	0.704 J
Calcium	7440-70-2	NS	NS	NS	mg/kg	1,950 B	2,270 B	54,300 J	629	1,120	2,120 J	1,260	699	1,260	673	1,080	929	1,600	21,300 J	958 J	1,090 J	4,020 J	1,240
Chromium, Hexavalent	18540-29-9	1	19	110	mg/kg	<0.591 U	<0.587 U	<0.943 U	0.239 J	<0.924 U	<0.96 U	<0.96 U	<0.962 U	<0.901 U	<0.911 U	<0.934 U	<0.999 U	<0.939 U	<0.886 U	<0.951 U	<1.04 U	<0.925 U	<0.889 U
Chromium, Total	7440-47-3	NS	NS	NS	mg/kg	26.4	25.7	18.8	9.86	10.4	22.4	34.4	11	26.6	35.2	13.4	17	22.6	13.5 J	18.2	17.7 J	75.6 J	11.5
Cobalt	7440-48-4	NS	NS	NS	mg/kg	12.2	8.29	6.46	2.48	1.12 J	5.11	18.3	2.62	10.1	11.1	1.61 J	4.89	15.7	4.11 J	7.56	10.6	14.2	2.23
Copper	7440-50-8	**50**	1720	270	mg/kg	24	19.7	**441 J**	5.74	4.68	17.4	31.3	6.78	28.9	9.91	6.94	11.6	18.4	**62.2 J**	24.3 J	21.2	31.4	5.12
Cyanide	57-12-5	27	40	27	mg/kg	<0.591 U	<0.587 U	1 J	<1 UJ	<1.1 UJ	<1.2 UJ	<1.4 UJ	<1.2 UJ	<1 UJ	<1.1 UJ	<1.1 UJ	<1.2 UJ	<1.1 UJ	0.24 J	<1.1 UJ	<1.2 UJ	<1.1 UJ	<1.1 UJ
Iron	7439-89-6	NS	NS	NS	mg/kg	21,500	21,000	18,300	7,220	5,900	15,200	24,500	10,800	17,600	16,000	15,600	11,100	15,700	8,470	18,300 J	19,600	26,400	14,200
Lead	7439-92-1	**63**	450	400	mg/kg	8.21	9.46	**277 J**	6.05	6.12	10.8	8.86	8.09	16.9	4.68	6.72	4.92	8.3	**259 J**	6.8	7.62	9.06	10.4
Magnesium	7439-95-4	NS	NS	NS	mg/kg	4,200 B	3,120 B	4,730	1,230	492	2,930 J	5,110	1,130	4,210	4,490	928	1,810	3,420	4,880 J	3,000 J	2,700 J	11,800 J	868
Manganese	7439-96-5	1600	2000	2000	mg/kg	152	114	235	38.1	34.1	96.8 J	331	35.2	204	111	18.1	95.9	188	192 J	100 J	96.8 J	348 J	24.8
Mercury	7439-97-6	**0.18**	0.73	0.81	mg/kg	<0.0355 U	<0.0352 U	**0.355**	<0.084 U	<0.077 U	<0.087 U	<0.082 U	<0.085 U	<0.077 U	<0.079 U	<0.073 U	<0.079 U	<0.074 U	**0.915**	<0.077 U	<0.082 U	<0.074 U	<0.07 U
Nickel	7440-02-0	**30**	130	310	mg/kg	29	25.7	17	5.91	2.35	10.4	30	5.38	29.6	12.5	4.27	11.2	19.3	14.8 J	20.2	23.1 J	**48.6 J**	4.65
Potassium	7440-09-7	NS	NS	NS	mg/kg	3,740 B	2,660 B	1,550 J	301	253	1,400 J	5,800	392	3,620	3,370	428	1,100	3,200	961 J	2,430 J	2,470 J	14,700 J	326
Selenium	7782-49-2	3.9	4	180	mg/kg	<2.96 U	<2.93 U	<1.79 U	<1.74 U	0.326 J	<1.89 U	<1.88 U	<1.88 U	0.294 J	<1.75 U	0.632 J	<1.94 U	<1.78 U	<1.71 U	0.311 J	<2.04 U	0.334 J	0.326 J
Silver	7440-22-4	**2**	8.3	180	mg/kg	1	0.904	<0.893 U	<0.871 U	<0.904 U	<0.943 U	<0.941 U	<0.938 U	<0.89 U	<0.877 U	<0.916 U	<0.972 U	<0.889 U	0.248 J	0.315 J	<1.02 U	<0.878 U	<0.88 U
Sodium	7440-23-5	NS	NS	NS	mg/kg	148 B	124 B	1,880	<174 U	50.7 J	273	200	24 J	77.6 J	51.6 J	23 J	33.6 J	106 J	183	62.8 J	<204 U	<176 U	<176 U
Thallium	7440-28-0	NS	NS	NS	mg/kg	<2.96 U	<2.93 U	<1.79 U	<1.74 U	<1.81 U	<1.89 U	<1.88 U	<1.88 U	<1.78 U	<1.75 U	<1.83 U	<1.94 U	<1.78 U	<1.71 UJ	<1.82 U	<2.04 U	<1.76 U	<1.76 U
Vanadium	7440-62-2	NS	NS	NS	mg/kg	38.8	29.6	21.5	11.5	11.7	28.6	38.8	21.2	31.7	46.1	20	21	25.7	19.8 J	22.2	23.4 J	64 J	13.8
Zinc	7440-66-6	**109**	2480	10000	mg/kg	43.6	37.4	**626 J**	15.9	7.8	31.9	51.8	15.4	45.7	40.7	12.5	25.3	36.9	**442 J**	35.5	35.2 J	68.9 J	17
General Chemistry																							
Solids, Percent	SOLID	NS	NS	NS	Percent	84.5	85.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Solids	TSOLID	NS	NS	NS	Percent	NA	NA	84.8	87.7	86.6	83.3	83.3	83.2	88.8	87.8	85.6	80.1	85.2	90.3	84.1	77.2	86.5	90
Perfluorooctanoic acids																							
N-ethyl perfluorooctane- sulfonamidoacetic Acid (NEtFOSAA)	2991-50-6	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	0.00121	<0.00055 UJ	<0.000547 U	<0.000568 U	<0.000561 U	<0.000582 U	<0.000516 U	0.000456 J	<0.000537 U	<0.000606 U	<0.000526 UJ	<0.000519 UJ	<0.000562 U	<0.00061 U	0.000161 J	<0.000499 UJ
N-methyl perfluorooctane- sulfonamidoacetic Acid (NMeFOSA/	2355-31-9	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	<0.000567 U	<0.00055 UJ	<0.000547 U	<0.000568 U	<0.000561 U	<0.000582 U	<0.000516 U	<0.00152 UJ	<0.000537 U	<0.000606 U	<0.000526 U	<0.000519 UJ	<0.000562 U	<0.00061 U	<0.000533 U	<0.000499 U
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	<0.000283 U	<0.000275 U	<0.000274 U	<0.000284 U	<0.00028 U	<0.000291 U	<0.000258 U	<0.000268 UJ	<0.000268 U	<0.000303 U	<0.000263 U	<0.000259 U	<0.000281 U	<0.000305 U	<0.000266 U	<0.00025 U
Perfluorobutanoic acid (PFBA)	375-22-4	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	0.000113 J	<0.00055 U	0.000076 J	0.000102 J	0.000031 J	0.000065 J	0.000032 J	<0.000536 UJ	0.000046 J	<0.000606 U	<0.000526 U	0.000039 J	<0.000562 U	<0.00061 U	<0.000533 U	0.000083 J
Perfluorodecanesulfonic Acid (PFDS)	335-77-3	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	<0.000567 U	<0.00055 U	<0.000547 U	<0.000568 U	<0.000561 U	<0.000582 U	<0.000516 U	<0.000536 U	<0.000537 U	<0.000606 U	<0.000526 U	<0.000519 U	<0.000562 U	<0.00061 U	<0.000533 U	<0.000499 U
Perfluorodecanoic Acid (PFDA)	335-76-2	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	0.00012 J	<0.000275 U	<0.000274 U	<0.000284 U	<0.00028 U	<0.000291 U	<0.000258 UJ	<0.000268 UJ	<0.000268 U	<0.000303 U	<0.000263 U	0.000214 J	<0.000281 U	<0.000305 U	<0.000266 U	0.000082 J
Perfluorododecanoic Acid (PFDoA)	307-55-1	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	<0.000567 U	<0.00055 U	<0.000547 U	<0.000568 U	<0.000561 U	<0.000582 U	<0.000516 U	<0.000536 UJ	<0.000537 U	<0.000606 U	<0.000526 U	0.000097 J	<0.000562 U	<0.00061 U	<0.000533 U	<0.000499 U
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	<0.000567 U	<0.00055 U	<0.000547 U	<0.000568 U	<0.000561 U	<0.000582 U	<0.000516 U	<0.000536 U	<0.000537 U	<0.000606 U	<0.000526 U	<0.000519 U	<0.000562 U	<0.00061 U	<0.000533 U	<0.000499 U
Perfluoroheptanoic acid (PFHpA)	375-85-9	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	0.00015 J	<0.000275 U	0.000053 J	<0.000284 U	<0.00028 U	0.00013 J	<0.000258 U	<0.000268 UJ	<0.000268 U	<0.000303 U	<0.000263 U	<0.000259 U	<0.000281 U	<0.000305 U	<0.000266 U	0.000061 J
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	0.000082 J	<0.000275 U	<0.000274 U	<0.000284 U	<0.00028 U	<0.000291 U	<0.000258 U	<0.000268 UJ	<0.000268 U	<0.000303 U	<0.000263 UJ	<0.000259 UJ	<0.000281 UJ	<0.000305 U	<0.000266 U	<0.00025 U
Perfluorohexanoic Acid (PFHxA)	307-24-4	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	0.000141 J	<0.00055 U	0.000297 J	0.000506 J	0.000152 J	0.000169 J	0.000063 J	<0.000536 UJ	<0.000537 U	<0.000606 U	<0.000526 U	0.000056 J	<0.000562 U	<0.00061 U	<0.000533 U	0.000055 J
Perfluorononanoic Acid (PFNA)	375-95-1	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	<0.000283 U	<0.000275 U	<0.000274 U	<0.000284 U	<0.00028 U	0.000162 J	<0.000258 U	<0.000268 UJ	0.00009 J	<0.000303 U	<0.000263 U	<0.000259 U	<0.000281 U	<0.000305 U	<0.000266 U	<0.00025 U
Perfluorooctanesulfonamide (FOSA)	754-91-6	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	<0.000567 U	<0.00055 U	<0.000547 UJ	<0.000568 UJ	<0.000561 UJ	<0.000582 UJ	<0.000516 UJ	<0.000536 UJ	<0.000537 U	<0.000606 U	<0.000526 U	<0.000519 U	<0.000562 U	<0.00061 U	<0.000533 U	<0.000499 U
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	**0.00088**	0.0037	0.044	mg/kg	<0.000276 U	<0.000286 U	**0.00211**	<0.000275 U	0.000432	0.000159 J	0.000307	**0.00164**	0.00036	<0.000268 UJ	**0.00121**	<0.000303 U	<0.000263 UJ	0.000759	<0.000281 U	<0.000305 U	<0.000266 UJ	**0.00109**
Perfluorooctanoic Acid (PFOA)	335-67-1	**0.00066**	0.0011	0.033	mg/kg	<0.000276 U	<0.000286 U	**0.00111**	<0.000275 U	0.000395	<0.000284 U	<0.00028 U	**0.000678**	0.000493	<0.000268 UJ	0.000168 J	0.000052 J	<0.000263 U	<0.000259 U	<0.000281 U	<0.000305 U	<0.000266 U	0.00018 J
Perfluoropentanoic Acid (PFPeA)	2706-90-3	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	0.000143 J	<0.00055 U	0.000235 J	0.0004 J	0.000123 J	0.000193 J	0.000073 J	<0.000536 UJ	0.000096 J	<0.000606 U	<0.000526 U	0.000089 J	<0.000562 U	<0.00061 U	<0.000533 U	0.000102 J
Perfluorotetradecanoic Acid (PFTA)	376-06-7	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	<0.000567 U	<0.00055 U	<0.000547 U	<0.000568 U	<0.000561 U	<0.000582 U	<0.000516 UJ	<0.00152 UJ	<0.000537 U	<0.000606 UJ	<0.00221 U	0.000062 J	<0.000562 UJ	<0.00061 U	<0.00194 UJ	<0.00172 UJ
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	<0.000567 U	<0.00055 U	<0.000547 U	<0.000568 U	<0.000561 U	<0.000582 U	<0.000516 U	<0.00152 U	<0.000537 U	<0.000606 U	<0.00221 U	<0.000519 U	<0.000562 U	<0.00061 U	<0.00194 U	<0.00172 U
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	<0.000567 U	<0.00055 U	<0.000547 U	<0.000568 U	<0.000561 U	<0.000582 U	<0.000516 U	<0.000536 UJ	<0.000537 U	<0.000606 U	<0.000526 U	0.000085 J	<0.000562 U	<0.00061 U	<0.000533 U	0.000059 J
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2) (8:2FTS)	39108-34-4	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	<0.000567 U	<0.00055 U	<0.000547 U	<0.000568 U	<0.000561 U	<0.000582 U	<0.000516 U	<0.000536 U	<0.000537 U	<0.000606 U	<0.000526 U	<0.000519 U	<0.000562 U	<0.00061 U	<0.000533 U	<0.000499 U
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2) (6:2FTS)	27619-97-2	NS	NS	NS	mg/kg	<0.000276 U	<0.000286 U	<0.000567 U	<0.00055 U	<0.000547 U	<0.000568 U	<0.000561 U	<0.000582 U	<0.000516 U	0.000375 J	<0.000537 U	<0.000606 U	<0.000526 U	<0.000519 U	<0.000562 U	<0.00061 U	<0.000533 U	<0.000499 U
Total PFOA and PFOS	TOTPFOAPFOS	NS	NS	NS	mg/kg	NA	NA	0.00322	<0.000275 U	0.000827	0.000159 J	0.000307	0.00232	0.000853	<0.000268 U	0.00138 J	0.000052 J	<0.000263 U	0.000759	<0.000281 U	<0.000305 U	<0.000266 U	0.00127 J

Table 1
Remedial Action Work Plan
Soil Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use Restricted-Residential SCOs	Location	LSB-21	LSB-21	LSB-21	LSB-22	LSB-22	LSB-22	LSB-23	LSB-23	LSB-23	LSB-26	LSB-27	LSB-29	LSB-30	LSB-30
					Sample Name	LSB-21_13-15	LSB-21_19-21	DUP-2_20220804	LSB-22_9-11	LSB-22_11-13	LSB-22_14.5-16.5	LSB-23_8-10	LSB-23_12-14	LSB-23_15.5-17.5	LSB-26_13-15	LSB-27_14-16	LSB-29_15.5-17.5	LSB-30_16.5-18.5	DUP-1-20220803
					Sample Date	08/04/2022	08/04/2022	08/04/2022	08/01/2022	08/01/2022	08/01/2022	08/01/2022	08/01/2022	08/01/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/03/2022
					Sample Depth (ft bsl)	13-15	19-21	19-21	9-11	11-13	14.5-16.5	8-10	12-14	15.5-17.5	13-15	14-16	15.5-17.5	16.5-18.5	16.5-18.5
					Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatile Organic Compounds																			
1,1,1,2-Tetrachloroethane	630-20-6	NS	NS	NS	mg/kg	<0.00046 U	<0.00047 U	<0.00052 U	<0.00048 U	<0.0005 U	<0.0005 U	<0.00061 U	<0.00043 U	<0.0004 U	<0.0004 U	<0.00044 U	<0.00055 U	<0.00073 U	<0.00051 U
1,1,1-Trichloroethane	71-55-6	0.68	0.68	100	mg/kg	<0.00046 U	<0.00047 U	<0.00052 U	<0.00048 U	<0.0005 U	<0.0005 U	<0.00061 U	<0.00043 U	<0.0004 U	<0.0004 U	<0.00044 U	<0.00055 U	<0.00073 U	<0.00051 U
1,1,2,2-Tetrachloroethane	79-34-5	NS	NS	NS	mg/kg	<0.00046 U	<0.00047 U	<0.00052 U	<0.00048 U	<0.0005 U	<0.0005 U	<0.00061 U	<0.00043 U	<0.0004 U	<0.0004 U	<0.00044 U	<0.00055 U	<0.00073 U	<0.00051 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	79-00-5	NS	NS	NS	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	<0.0011 U	<0.0015 U	<0.001 U
1,1-Dichloroethane	75-34-3	0.27	0.27	26	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	<0.0011 U	<0.0015 U	<0.001 U
1,1-Dichloroethene	75-35-4	0.33	0.33	100	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	<0.0011 U	<0.0015 U	<0.001 U
1,1-Dichloropropene	563-58-6	NS	NS	NS	mg/kg	<0.00046 U	<0.00047 U	<0.00052 U	<0.00048 U	<0.0005 U	<0.0005 U	<0.00061 U	<0.00043 U	<0.0004 U	<0.0004 U	<0.00044 U	<0.00055 U	<0.00073 U	<0.00051 U
1,2,3-Trichlorobenzene	87-61-6	NS	NS	NS	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	<0.0029 U	<0.002 U
1,2,3-Trichloropropane	96-18-4	NS	NS	NS	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	<0.0029 U	<0.002 U
1,2,4,5-Tetramethylbenzene	95-93-2	NS	NS	NS	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	0.0038	0.0011 J	<0.002 U
1,2,4-Trichlorobenzene	120-82-1	NS	NS	NS	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	<0.0029 U	<0.002 U
1,2,4-Trimethylbenzene	95-63-6	3.6	3.6	52	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	0.0013 J	0.001 J	<0.002 U
1,2-Dibromo-3-Chloropropane	96-12-8	NS	NS	NS	mg/kg	<0.0027 U	<0.0028 U	<0.0031 U	<0.0029 U	<0.003 U	<0.003 U	<0.0037 U	<0.0026 U	<0.0024 U	<0.0024 U	<0.0027 U	<0.0033 U	<0.0044 U	<0.0031 U
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	NS	NS	NS	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	<0.0011 U	<0.0015 U	<0.001 U
1,2-Dichlorobenzene	95-50-1	1.1	1.1	100	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	<0.0029 U	<0.002 U
1,2-Dichloroethane	107-06-2	0.02	0.02	3.1	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	<0.0011 U	<0.0015 U	<0.001 U
1,2-Dichloropropane	78-87-5	NS	NS	NS	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	<0.0011 U	<0.0015 U	<0.001 U
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	8.4	8.4	52	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	0.0037	0.0007 J	<0.002 U
1,3-Dichlorobenzene	541-73-1	2.4	2.4	49	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	<0.0029 U	<0.002 U
1,3-Dichloropropane	142-28-9	NS	NS	NS	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	<0.0029 U	<0.002 U
1,4-Dichlorobenzene	106-46-7	1.8	1.8	13	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	<0.0029 U	<0.002 U
1,4-Diethyl Benzene	105-05-5	NS	NS	NS	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	<0.0029 U	<0.002 U
1,4-Dioxane (P-Dioxane)	123-91-1	0.1	0.1	13	mg/kg	<0.073 U	<0.074 U	<0.083 U	<0.077 U	<0.079 U	<0.079 U	<0.098 U	<0.068 U	<0.063 U	<0.065 U	<0.071 U	<0.088 U	<0.12 U	<0.082 U
2,2-Dichloropropane	594-20-7	NS	NS	NS	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	<0.0029 U	<0.002 U
2-Chlorotoluene	95-49-8	NS	NS	NS	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	<0.0029 U	<0.002 U
2-Hexanone (MBK)	591-78-6	NS	NS	NS	mg/kg	<0.0091 U	<0.0093 U	<0.01 U	<0.0097 U	<0.0099 U	<0.0099 U	<0.012 U	<0.0086 U	<0.0079 U	<0.0081 U	<0.0089 U	<0.011 U	<0.015 U	<0.01 U
4-Chlorotoluene	106-43-4	NS	NS	NS	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	<0.0029 U	<0.002 U
4-Ethyltoluene	622-96-8	NS	NS	NS	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	0.0035	0.00078 J	<0.002 U
Acetone	67-64-1	**0.05**	0.05	100	mg/kg	<0.0091 U	<0.0093 U	<0.01 U	<0.0097 U	<0.0099 U	<0.0099 U	<0.012 U	<0.0086 U	<0.0079 U	<0.0081 U	<0.0089 U	0.0059 J	<0.015 U	<0.01 U
Acrolein	107-02-8	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acrylonitrile	107-13-1	NS	NS	NS	mg/kg	<0.0036 U	<0.0037 U	<0.0041 U	<0.0039 U	<0.004 U	<0.004 U	<0.0049 U	<0.0034 U	<0.0032 U	<0.0032 U	<0.0036 U	<0.0044 U	<0.0059 U	<0.0041 U
Benzene	71-43-2	0.06	0.06	4.8	mg/kg	<0.00046 U	<0.00047 U	<0.00052 U	<0.00048 U	<0.0005 U	<0.0005 U	0.00029 J	0.00035 J	0.00025 J	<0.0004 U	<0.00044 U	<0.00055 U	<0.00073 U	0.0004 J
Bromobenzene	108-86-1	NS	NS	NS	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	<0.0029 U	<0.002 U
Bromochloromethane	74-97-5	NS	NS	NS	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	<0.0029 U	<0.002 U
Bromodichloromethane	75-27-4	NS	NS	NS	mg/kg	<0.00046 U	<0.00047 U	<0.00052 U	<0.00048 U	<0.0005 U	<0.0005 U	<0.00061 U	<0.00043 U	<0.0004 U	<0.0004 U	<0.00044 U	<0.00055 U	<0.00073 U	<0.00051 U
Bromoform	75-25-2	NS	NS	NS	mg/kg	<0.0036 U	<0.0037 U	<0.0041 U	<0.0039 U	<0.004 U	<0.004 U	<0.0049 U	<0.0034 U	<0.0032 U	<0.0032 U	<0.0036 U	<0.0044 U	<0.0059 U	<0.0041 U
Bromomethane	74-83-9	NS	NS	NS	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	<0.0029 U	<0.002 U
Carbon Disulfide	75-15-0	NS	NS	NS	mg/kg	<0.0091 U	<0.0093 U	<0.01 U	<0.0097 U	<0.0099 U	<0.0099 U	<0.012 U	<0.0086 U	<0.0079 U	<0.0081 U	<0.0089 U	<0.011 U	<0.015 U	<0.01 U
Carbon Tetrachloride	56-23-5	0.76	0.76	2.4	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	<0.0011 U	<0.0015 U	<0.001 U
Chlorobenzene	108-90-7	1.1	1.1	100	mg/kg	<0.00046 U	<0.00047 U	<0.00052 U	<0.00048 U	<0.0005 U	<0.0005 U	<0.00061 U	<0.00043 U	<0.0004 U	<0.0004 U	<0.00044 U	<0.00055 U	<0.00073 U	<0.00051 U
Chloroethane	75-00-3	NS	NS	NS	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	<0.0029 U	<0.002 U
Chloroform	67-66-3	0.37	0.37	49	mg/kg	<0.0014 U	<0.0014 U	<0.0016 U	<0.0014 U	<0.0015 U	<0.0015 U	<0.0018 U	<0.0013 U	<0.0012 U	<0.0012 U	<0.0013 U	<0.0016 U	<0.0022 U	<0.0015 U
Chloromethane	74-87-3	NS	NS	NS	mg/kg	<0.0036 U	<0.0037 U	<0.0041 U	<0.0039 U	<0.004 U	<0.004 U	<0.0049 U	<0.0034 U	<0.0032 U	<0.0032 U	<0.0036 U	<0.0044 U	<0.0059 U	<0.0041 U
Cis-1,2-Dichloroethene	156-59-2	0.25	0.25	100	mg/kg	<0.00091 U	0.001	0.0021	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	0.00098	<0.00089 U	<0.0011 U	<0.0015 U	<0.001 U
Cis-1,3-Dichloropropene	10061-01-5	NS	NS	NS	mg/kg	<0.00046 U	<0.00047 U	<0.00052 U	<0.00048 U	<0.0005 U	<0.0005 U	<0.00061 U	<0.00043 U	<0.0004 U	<0.0004 U	<0.00044 U	<0.00055 U	<0.00073 U	<0.00051 U
Cyclohexane	110-82-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cymene	99-87-6	NS	NS	NS	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	0.00084 J	<0.0015 U	<0.001 U
Dibromochloromethane	124-48-1	NS	NS	NS	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	<0.0011 U	<0.0015 U	<0.001 U
Dibromomethane	74-95-3	NS	NS	NS	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	<0.0029 U	<0.002 U
Dichlorodifluoromethane	75-71-8	NS	NS	NS	mg/kg	<0.0091 U	<0.0093 U	<0.01 U	<0.0097 U	<0.0099 U	<0.0099 U	<0.012 U	<0.0086 U	<0.0079 U	<0.0081 U	<0.0089 U	<0.011 U	<0.015 U	<0.01 U
Diethyl Ether (Ethyl Ether)	60-29-7	NS	NS	NS	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	<0.0029 U	<0.002 U
Ethylbenzene	100-41-4	1	1	41	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	<0.0011 U	0.00023 J	<0.001 U
Hexachlorobutadiene	87-68-3	NS	NS	NS	mg/kg	<0.0036 U	<0.0037 U	<0.0041 U	<0.0039 U	<0.004 U	<0.004 U	<0.0049 U	<0.0034 U	<0.0032 U	<0.0032 U	<0.0036 U	<0.0044 U	<0.0059 U	<0.0041 U
Isopropylbenzene (Cumene)	98-82-8	NS	NS	NS	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	0.00054 J	<0.0015 U	<0.001 U
M,P-Xylene	179601-23-1	NS	NS	NS	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	0.0011 J	<0.002 U
Methyl Acetate	79-20-9	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl Ethyl Ketone (2-Butanone)	78-93-3	0.12	0.12	100	mg/kg	<0.0091 U	<0.0093 U	<0.01 U	<0.0097 U	<0.0099 U	<0.0099 U	<0.012 U	<0.0086 U	<0.0079 U	<0.0081 U	<0.0089 U	<0.011 U	<0.015 U	<0.01 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	NS	NS	NS	mg/kg	<0.0091 U	<0.0093 U	<0.01 U	<0.0097 U	<0.0099 U	<0.0099 U	<0.012 U	<0.0086 U	<0.0079 U	<0.0081 U	<0.0089 U	<0.011 U	<0.015 U	<0.01 U
Methylcyclohexane	108-87-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	75-09-2	0.05	0.05	100	mg/kg	<0.0046 U	<0.0047 U	<0.0052 U	<0.0048 U	<0.005 U	<0.005 U	<0.0061 U	<0.0043 U	<0.004 U	0.0022 J	<0.0044 U	<0.0055 U	<0.0073 U	<0.0051 U
Naphthalene	91-20-3	12	12	100	mg/kg	<0.0036 U	<0.0037 U	<0.0041 U	<0.0039 U	<0.004 U	<0.004 U	<0.0049 U	<0.0034 U	<0.0032 U	<0.0032 U	<0.0036 U	0.0021 J	<0.0059 U	<0.0041 U
n-Butylbenzene	104-51-8	12	12	100	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	0.00089 J	<0.0015 U	<0.001 U
n-Propylbenzene	103-65-1	3.9	3.9	100	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	0.00081 J	<0.0015 U	<0.001 U
o-Xylene (1,2-Dimethylbenzene)	95-47-6	NS	NS	NS	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	<0.0011 U	<0.0015 U	<0.001 U
p-Cymene (p-Isopropyltoluene)	CYMP	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sec-Butylbenzene	135-98-8	11	11	100	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	0.0011	<0.0015 U	<0.001 U
Styrene	100-42-5	NS	NS	NS	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	<0.0011 U	<0.0015 U	<0.001 U
T-Butylbenzene	98-06-6	5.9	5.9	100	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	0.00017 J	<0.0029 U	<0.002 U
Tert-Butyl Alcohol	75-65-0	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tert-Butyl Methyl Ether	1634-04-4	0.93	0.93	100	mg/kg	<0.0018 U	<0.0019 U	<0.0021 U	<0.0019 U	<0.002 U	<0.002 U	<0.0024 U	<0.0017 U	<0.0016 U	<0.0016 U	<0.0018 U	<0.0022 U	<0.0029 U	<0.002 U
Tetrachloroethene (PCE)	127-18-4	**1.3**	1.3	19	mg/kg	0.00052	0.0065	0.0085	<0.00048 U	<0.0005 U	<0.0005 U	<0.00061 U	<0.00043 U	<0.0004 U	0.022	0.003	0.00037 J	0.001	0.00035 J
Toluene	108-88-3	0.7	0.7	100	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	0.00068 J	0.00047 J	<0.00081 U	<0.00089 U	<0.0011 U	<0.0015 U	<0.001 U
Total 1,2-Dichloroethene (Cis and Trans)	540-59-0	NS	NS	NS	mg/kg	<0.00091 U	0.001	0.0021	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	0.00098	<0.00089 U	<0.0011 U	<0.0015 U	<0.001 U
Total Xylenes	1330-20-7	0.26	1.6	100	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	<0.0011 U	0.0011 J	<0.001 U
Total, 1,3-Dichloropropene (Cis And Trans)	542-75-6	NS	NS	NS	mg/kg	<0.00046 U	<0.00047 U	<0.00052 U	<0.00048 U	<0.0005 U	<0.0005 U	<0.00061 U	<0.00043 U	<0.0004 U	<0.0004 U	<0.00044 U	<0.00055 U	<0.00073 U	<0.00051 U
Trans-1,2-Dichloroethene	156-60-5	0.19	0.19	100	mg/kg	<0.0014 U	<0.0014 U	<0.0016 U	<0.0014 U	<0.0015 U	<0.0015 U	<0.0018 U	<0.0013 U	<0.0012 U	<0.0012 U	<0.0013 U	<0.0016 U	<0.0022 U	<0.0015 U
Trans-1,3-Dichloropropene	10061-02-6	NS	NS	NS	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	<0.0011 U	<0.0015 U	<0.001 U
Trans-1,4-Dichloro-2-Butene	110-57-6	NS	NS	NS	mg/kg	<0.0046 U	<0.0047 U	<0.0052 U	<0.0048 U	<0.005 U	<0.005 U	<0.0061 U	<0.0043 U	<0.004 U	<0.004 U	<0.0044 U	<0.0055 U	<0.0073 U	<0.0051 U
Trichloroethene (TCE)	79-01-6	0.47	0.47	21	mg/kg	<0.00046 U	0.0019	0.0031	<0.00048 U	<0.0005 U	<0.0005 U	<0.00061 U	<0.00043 U	<0.0004 U	0.004	0.00015 J	<0.00055 U	<0.00073 U	<0.00051 U
Trichlorofluoromethane	75-69-4	NS	NS	NS	mg/kg	<0.0036 U	<0.0037 U	<0.0041 U	<0.0039 U	<0.004 U	<0.004 U	<0.0049 U	<0.0034 U	<0.0032 U	<0.0032 U	<0.0036 U	<0.0044 U	<0.0059 U	<0.0041 U
Vinyl Acetate	108-05-4	NS	NS	NS	mg/kg	<0.0091 U	<0.0093 U	<0.01 U	<0.0097 U	<0.0099 U	<0.0099 U	<0.012 U	<0.0086 U	<0.0079 U	<0.0081 U	<0.0089 U	<0.011 U	<0.015 U	<0.01 U
Vinyl Chloride	75-01-4	0.02	0.02	0.9	mg/kg	<0.00091 U	<0.00093 U	<0.001 U	<0.00097 U	<0.00099 U	<0.00099 U	<0.0012 U	<0.00086 U	<0.00079 U	<0.00081 U	<0.00089 U	<0.0011 U	<0.0015 U	<0.001 U

Table 1
Remedial Action Work Plan
Soil Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use Restricted-Residential SCOs	Location	LSB-21	LSB-21	LSB-21	LSB-22	LSB-22	LSB-22	LSB-23	LSB-23	LSB-23	LSB-26	LSB-27	LSB-29	LSB-30	LSB-30
					Sample Name	LSB-21_13-15	LSB-21_19-21	DUP-2_20220804	LSB-22_9-11	LSB-22_11-13	LSB-22_14.5-16.5	LSB-23_8-10	LSB-23_12-14	LSB-23_15.5-17.5	LSB-26_13-15	LSB-27_14-16	LSB-29_15.5-17.5	LSB-30_16.5-18.5	DUP-1-20220803
					Sample Date	08/04/2022	08/04/2022	08/04/2022	08/01/2022	08/01/2022	08/01/2022	08/01/2022	08/01/2022	08/01/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/03/2022
					Sample Depth (ft bsl)	13-15	19-21	19-21	9-11	11-13	14.5-16.5	8-10	12-14	15.5-17.5	13-15	14-16	15.5-17.5	16.5-18.5	16.5-18.5
					Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Semi-Volatile Organic Compounds																			
1,2,4,5-Tetrachlorobenzene	95-94-3	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	120-82-1	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	95-50-1	1.1	1.1	100	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
1,2-Diphenylhydrazine	122-66-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	541-73-1	2.4	2.4	49	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	106-46-7	1.8	1.8	13	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
1,4-Dioxane (P-Dioxane)	123-91-1	0.1	0.1	13	mg/kg	<0.029 U	<0.029 U	<0.031 U	<0.03 UJ	<0.029 UJ	<0.029 UJ	<0.03 UJ	<0.028 UJ	<0.027 UJ	NA	NA	NA	NA	NA
2,3,4,6-Tetrachlorophenol	58-90-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	95-95-4	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	88-06-2	NS	NS	NS	mg/kg	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.11 U	<0.12 U	<0.11 U	<0.11 U	NA	NA	NA	NA	NA
2,4-Dichlorophenol	120-83-2	NS	NS	NS	mg/kg	<0.18 U	<0.17 U	<0.19 U	<0.18 U	<0.18 U	<0.17 U	<0.18 U	<0.17 U	<0.16 U	NA	NA	NA	NA	NA
2,4-Dimethylphenol	105-67-9	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
2,4-Dinitrophenol	51-28-5	NS	NS	NS	mg/kg	<0.93 U	<0.92 U	<0.99 U	<0.96 U	<0.93 U	<0.92 U	<0.95 U	<0.89 U	<0.88 U	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	121-14-2	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	606-20-2	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
2-Chloronaphthalene	91-58-7	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
2-Chlorophenol	95-57-8	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
2-Methylnaphthalene	91-57-6	NS	NS	NS	mg/kg	<0.23 U	<0.23 U	<0.25 U	<0.24 U	<0.23 U	<0.23 U	<0.24 U	<0.22 U	<0.22 U	NA	NA	NA	NA	NA
2-Methylphenol (o-Cresol)	95-48-7	0.33	0.33	100	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
2-Nitroaniline	88-74-4	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
2-Nitrophenol	88-75-5	NS	NS	NS	mg/kg	<0.42 U	<0.41 U	<0.45 U	<0.43 U	<0.42 U	<0.41 U	<0.43 U	<0.4 U	<0.4 U	NA	NA	NA	NA	NA
3 & 4 Methylphenol (m&p Cresol)	65794-96-9	0.33	0.33	100	mg/kg	<0.28 U	<0.28 U	<0.3 U	<0.29 U	<0.28 U	<0.27 U	<0.28 U	<0.27 U	<0.26 U	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	91-94-1	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
3-Nitroaniline	99-09-2	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
4,6-Dinitro-2-Methylphenol	534-52-1	NS	NS	NS	mg/kg	<0.5 U	<0.5 U	<0.54 U	<0.52 U	<0.51 U	<0.5 U	<0.52 U	<0.48 U	<0.48 U	NA	NA	NA	NA	NA
4-Bromophenyl Phenyl Ether	101-55-3	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
4-Chloro-3-Methylphenol	59-50-7	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
4-Chloroaniline	106-47-8	NS	NS	NS	mg/kg	<0.19 U	<0.19 UJ	<0.21 UJ	<0.2 UJ	<0.19 UJ	<0.19 UJ	<0.2 UJ	<0.18 UJ	<0.18 UJ	NA	NA	NA	NA	NA
4-Chlorophenyl Phenyl Ether	7005-72-3	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
4-Nitroaniline	100-01-6	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
4-Nitrophenol	100-02-7	NS	NS	NS	mg/kg	<0.27 U	<0.27 U	<0.29 U	<0.28 U	<0.27 U	<0.27 U	<0.28 U	<0.26 U	<0.26 U	NA	NA	NA	NA	NA
Acenaphthene	83-32-9	20	98	100	mg/kg	<0.16 U	<0.15 U	<0.16 U	<0.16 U	<0.16 U	<0.15 U	<0.16 U	<0.15 U	<0.15 U	NA	NA	NA	NA	NA
Acenaphthylene	208-96-8	100	107	100	mg/kg	<0.16 U	<0.15 U	<0.16 U	<0.16 U	<0.16 U	<0.15 U	<0.16 U	<0.15 U	<0.15 U	NA	NA	NA	NA	NA
Acetophenone	98-86-2	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
Aniline (Phenylamine, Aminobenzene)	62-53-3	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	120-12-7	100	1000	100	mg/kg	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.11 U	<0.12 U	<0.11 U	<0.11 U	NA	NA	NA	NA	NA
Atrazine	1912-24-9	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzaldehyde	100-52-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzidine	92-87-5	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	56-55-3	1	1	1	mg/kg	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.11 U	0.03 J	<0.11 U	<0.11 U	NA	NA	NA	NA	NA
Benzo(a)pyrene	50-32-8	1	22	1	mg/kg	<0.16 U	<0.15 U	<0.16 U	<0.16 U	<0.16 U	<0.15 U	<0.16 U	<0.15 U	<0.15 U	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	205-99-2	1	1.7	1	mg/kg	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.11 U	0.035 J	<0.11 U	<0.11 U	NA	NA	NA	NA	NA
Benzo(g,h,i)Perylene	191-24-2	100	1000	100	mg/kg	<0.16 U	<0.15 U	<0.16 U	<0.16 U	<0.16 U	<0.15 U	<0.16 U	<0.15 U	<0.15 U	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	207-08-9	0.8	1.7	3.9	mg/kg	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.11 U	<0.12 U	<0.11 U	<0.11 U	NA	NA	NA	NA	NA
Benzoic Acid	65-85-0	NS	NS	NS	mg/kg	<0.63 UJ	<0.62 U	<0.67 U	<0.64 U	<0.63 U	<0.62 U	<0.64 U	<0.6 U	<0.59 U	NA	NA	NA	NA	NA
Benzyl Alcohol	100-51-6	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
Benzyl Butyl Phthalate	85-68-7	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
Biphenyl (Diphenyl)	92-52-4	NS	NS	NS	mg/kg	<0.44 U	<0.44 U	<0.47 U	<0.45 U	<0.44 U	<0.44 U	<0.45 U	<0.42 U	<0.42 U	NA	NA	NA	NA	NA
Bis(2-chloroethoxy) methane	111-91-1	NS	NS	NS	mg/kg	<0.21 U	<0.21 U	<0.22 U	<0.22 U	<0.21 U	<0.21 U	<0.21 U	<0.2 U	<0.2 U	NA	NA	NA	NA	NA
Bis(2-chloroethyl) ether (2-chloroethyl ether)	111-44-4	NS	NS	NS	mg/kg	<0.18 U	<0.17 U	<0.19 U	<0.18 U	<0.18 U	<0.17 U	<0.18 U	<0.17 U	<0.16 U	NA	NA	NA	NA	NA
Bis(2-chloroisopropyl) ether	108-60-1	NS	NS	NS	mg/kg	<0.23 U	<0.23 U	<0.25 U	<0.24 U	<0.23 U	<0.23 U	<0.24 U	<0.22 U	<0.22 U	NA	NA	NA	NA	NA
Bis(2-ethylhexyl) phthalate	117-81-7	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
Caprolactam	105-60-2	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	86-74-8	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 UJ	<0.19 UJ	<0.19 UJ	<0.2 UJ	<0.18 UJ	<0.18 UJ	NA	NA	NA	NA	NA
Chrysene	218-01-9	1	1	3.9	mg/kg	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.11 U	0.028 J	<0.11 U	<0.11 U	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	53-70-3	0.33	1000	0.33	mg/kg	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.11 U	<0.12 U	<0.11 U	<0.11 U	NA	NA	NA	NA	NA
Dibenzofuran	132-64-9	7	210	59	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
Dibutyl phthalate	84-74-2	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
Diethyl phthalate	84-66-2	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
Dimethyl phthalate	131-11-3	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
Dioctyl phthalate	117-84-0	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
Fluoranthene	206-44-0	100	1000	100	mg/kg	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.11 U	0.044 J	<0.11 U	<0.11 U	NA	NA	NA	NA	NA
Fluorene	86-73-7	30	386	100	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
Hexachlorobenzene	118-74-1	0.33	3.2	1.2	mg/kg	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.11 U	<0.12 U	<0.11 U	<0.11 U	NA	NA	NA	NA	NA
Hexachlorobutadiene	87-68-3	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	77-47-4	NS	NS	NS	mg/kg	<0.56 U	<0.55 U	<0.59 U	<0.57 UJ	<0.56 UJ	<0.55 UJ	<0.57 UJ	<0.53 UJ	<0.52 UJ	NA	NA	NA	NA	NA
Hexachloroethane	67-72-1	NS	NS	NS	mg/kg	<0.16 U	<0.15 U	<0.16 U	<0.16 U	<0.16 U	<0.15 U	<0.16 U	<0.15 U	<0.15 U	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	8.2	0.5	mg/kg	<0.16 U	<0.15 U	<0.16 U	<0.16 U	<0.16 U	<0.15 U	<0.16 U	<0.15 U	<0.15 U	NA	NA	NA	NA	NA
Isophorone	78-59-1	NS	NS	NS	mg/kg	<0.18 U	<0.17 U	<0.19 U	<0.18 U	<0.18 U	<0.17 U	<0.18 U	<0.17 U	<0.16 U	NA	NA	NA	NA	NA
Naphthalene	91-20-3	12	12	100	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
Nitrobenzene	98-95-3	NS	NS	NS	mg/kg	<0.18 U	<0.17 U	<0.19 U	<0.18 U	<0.18 U	<0.17 U	<0.18 U	<0.17 U	<0.16 U	NA	NA	NA	NA	NA
n-Nitrosodimethylamine	62-75-9	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodi-N-Propylamine	621-64-7	NS	NS	NS	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	86-30-6	NS	NS	NS	mg/kg	<0.16 U	<0.15 U	<0.16 U	<0.16 U	<0.16 U	<0.15 U	<0.16 U	<0.15 U	<0.15 U	NA	NA	NA	NA	NA
Pentachlorophenol	87-86-5	0.8	0.8	6.7	mg/kg	<0.16 U	<0.15 U	<0.16 U	<0.16 U	<0.16 U	<0.15 U	<0.16 U	<0.15 U	<0.15 U	NA	NA	NA	NA	NA
Phenanthrene	85-01-8	100	1000	100	mg/kg	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.11 U	<0.12 U	<0.11 U	<0.11 U	NA	NA	NA	NA	NA
Phenol	108-95-2	0.33	0.33	100	mg/kg	<0.19 U	<0.19 U	<0.21 U	<0.2 U	<0.19 U	<0.19 U	<0.2 U	<0.18 U	<0.18 U	NA	NA	NA	NA	NA
Pyrene	129-00-0	100	1000	100	mg/kg	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.12 U	<0.11 U	0.042 J	<0.11 U	<0.11 U	NA	NA	NA	NA	NA
Pyridine	110-86-1	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 1
Remedial Action Work Plan
Soil Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use Restricted-Residential SCOs	Location	LSB-21	LSB-21	LSB-21	LSB-22	LSB-22	LSB-22	LSB-23	LSB-23	LSB-23	LSB-26	LSB-27	LSB-29	LSB-30	LSB-30
					Sample Name	LSB-21_13-15	LSB-21_19-21	DUP-2_20220804	LSB-22_9-11	LSB-22_11-13	LSB-22_14.5-16.5	LSB-23_8-10	LSB-23_12-14	LSB-23_15.5-17.5	LSB-26_13-15	LSB-27_14-16	LSB-29_15.5-17.5	LSB-30_16.5-18.5	DUP-1-20220803
					Sample Date	08/04/2022	08/04/2022	08/04/2022	08/01/2022	08/01/2022	08/01/2022	08/01/2022	08/01/2022	08/01/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/03/2022
					Sample Depth (ft bsl)	13-15	19-21	19-21	9-11	11-13	14.5-16.5	8-10	12-14	15.5-17.5	13-15	14-16	15.5-17.5	16.5-18.5	16.5-18.5
					Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Pesticides																			
4,4'-DDD	72-54-8	**0.0033**	14	13	mg/kg	<0.00183 U	<0.00178 U	<0.00194 U	<0.0019 U	<0.00179 U	<0.0018 U	<0.00185 U	<0.00177 U	<0.00169 U	NA	NA	NA	NA	NA
4,4'-DDE	72-55-9	**0.0033**	17	8.9	mg/kg	<0.00183 U	<0.00178 U	<0.00194 U	<0.0019 U	<0.00179 U	<0.0018 U	<0.00185 U	<0.00177 U	<0.00169 U	NA	NA	NA	NA	NA
4,4'-DDT	50-29-3	**0.0033**	136	7.9	mg/kg	<0.00183 U	<0.00178 U	<0.00194 U	<0.0019 U	<0.00179 U	<0.0018 U	<0.00185 U	<0.00177 U	<0.00169 U	NA	NA	NA	NA	NA
Aldrin	309-00-2	0.005	0.19	0.097	mg/kg	<0.00183 U	<0.00178 U	<0.00194 U	<0.0019 U	<0.00179 U	<0.0018 U	<0.00185 U	<0.00177 U	<0.00169 U	NA	NA	NA	NA	NA
Alpha BHC (Alpha Hexachlorocyclohexane)	319-84-6	0.02	0.02	0.48	mg/kg	<0.000763 U	<0.00074 U	<0.000807 U	<0.000791 U	<0.000745 U	<0.000748 U	<0.00077 U	<0.00074 U	<0.000704 U	NA	NA	NA	NA	NA
Alpha Chlordane	5103-71-9	0.094	2.9	4.2	mg/kg	<0.00229 U	<0.00222 U	<0.00242 U	<0.00237 U	<0.00224 U	<0.00224 U	<0.00231 U	<0.00222 U	<0.00211 U	NA	NA	NA	NA	NA
Alpha Endosulfan	959-98-8	2.4	102	24	mg/kg	<0.00183 U	<0.00178 U	<0.00194 U	<0.0019 U	<0.00179 U	<0.0018 U	<0.00185 U	<0.00177 U	<0.00169 U	NA	NA	NA	NA	NA
Beta Bhc (Beta Hexachlorocyclohexane)	319-85-7	0.036	0.09	0.36	mg/kg	<0.00183 U	<0.00178 U	<0.00194 U	<0.0019 U	<0.00179 U	<0.0018 U	<0.00185 U	<0.00177 U	<0.00169 U	NA	NA	NA	NA	NA
Beta Endosulfan	33213-65-9	2.4	102	24	mg/kg	<0.00183 U	<0.00178 U	<0.00194 U	<0.0019 U	<0.00179 U	<0.0018 U	<0.00185 U	<0.00177 U	<0.00169 U	NA	NA	NA	NA	NA
Chlordane (alpha and gamma)	57-74-9	NS	NS	NS	mg/kg	<0.0153 U	<0.0148 U	<0.0161 U	<0.0158 U	<0.0149 U	<0.015 U	<0.0154 U	<0.0148 U	<0.0141 U	NA	NA	NA	NA	NA
Delta Bhc (Delta Hexachlorocyclohexane)	319-86-8	0.04	0.25	100	mg/kg	<0.00183 U	<0.00178 U	<0.00194 U	<0.0019 U	<0.00179 U	<0.0018 U	<0.00185 U	<0.00177 U	<0.00169 U	NA	NA	NA	NA	NA
Dieldrin	60-57-1	**0.005**	0.1	0.2	mg/kg	<0.00114 U	<0.00111 U	<0.00121 U	<0.00119 U	<0.00112 U	<0.00112 U	<0.00116 U	<0.00111 U	<0.00106 U	NA	NA	NA	NA	NA
Endosulfan Sulfate	1031-07-8	2.4	1000	24	mg/kg	<0.000763 U	<0.00074 U	<0.000807 U	<0.000791 U	<0.000745 U	<0.000748 U	<0.00077 U	<0.00074 U	<0.000704 U	NA	NA	NA	NA	NA
Endrin	72-20-8	0.014	0.06	11	mg/kg	<0.000763 U	<0.00074 U	<0.000807 U	<0.000791 U	<0.000745 U	<0.000748 U	<0.00077 U	<0.00074 U	<0.000704 U	NA	NA	NA	NA	NA
Endrin Aldehyde	7421-93-4	NS	NS	NS	mg/kg	<0.00229 U	<0.00222 U	<0.00242 U	<0.00237 U	<0.00224 U	<0.00224 U	<0.00231 U	<0.00222 U	<0.00211 U	NA	NA	NA	NA	NA
Endrin Ketone	53494-70-5	NS	NS	NS	mg/kg	<0.00183 U	<0.00178 U	<0.00194 U	<0.0019 U	<0.00179 U	<0.0018 U	<0.00185 U	<0.00177 U	<0.00169 U	NA	NA	NA	NA	NA
Gamma Bhc (Lindane)	58-89-9	0.1	0.1	1.3	mg/kg	<0.000763 U	<0.00074 U	<0.000807 U	<0.000791 U	<0.000745 U	<0.000748 U	<0.00077 U	<0.00074 U	<0.000704 U	NA	NA	NA	NA	NA
Gamma Chlordane (Trans-)	5103-74-2	NS	NS	NS	mg/kg	<0.00229 U	<0.00222 U	<0.00242 U	<0.00237 U	<0.00224 U	<0.00224 U	<0.00231 U	<0.00222 U	<0.00211 U	NA	NA	NA	NA	NA
Gamma-Chlordane	5566-34-7	NS	NS	NS	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	76-44-8	0.042	0.38	2.1	mg/kg	<0.000916 U	<0.000888 U	<0.000969 U	<0.000949 U	<0.000894 U	<0.000898 U	<0.000924 U	<0.000887 U	<0.000845 U	NA	NA	NA	NA	NA
Heptachlor Epoxide	1024-57-3	NS	NS	NS	mg/kg	<0.00344 U	<0.00333 U	<0.00363 U	<0.00356 U	<0.00335 U	<0.00337 U	<0.00347 U	<0.00333 U	<0.00317 U	NA	NA	NA	NA	NA
Methoxychlor	72-43-5	NS	NS	NS	mg/kg	<0.00344 U	<0.00333 U	<0.00363 U	<0.00356 U	<0.00335 U	<0.00337 U	<0.00347 U	<0.00333 U	<0.00317 U	NA	NA	NA	NA	NA
Toxaphene	8001-35-2	NS	NS	NS	mg/kg	<0.0344 U	<0.0333 U	<0.0363 U	<0.0356 U	<0.0335 U	<0.0337 U	<0.0347 U	<0.0333 U	<0.0317 U	NA	NA	NA	NA	NA
Herbicides																			
2,4,5-T (Trichlorophenoxyacetic Acid)	93-76-5	NS	NS	NS	mg/kg	<0.196 U	<0.188 U	<0.205 U	<0.197 U	<0.194 U	<0.191 U	<0.201 U	<0.186 U	<0.18 U	NA	NA	NA	NA	NA
2,4-D (Dichlorophenoxyacetic Acid)	94-75-7	NS	NS	NS	mg/kg	<0.196 U	<0.188 UJ	<0.205 UJ	<0.197 U	<0.194 U	<0.191 U	<0.201 U	<0.186 U	<0.18 U	NA	NA	NA	NA	NA
Silvex (2,4,5-Tp)	93-72-1	3.8	3.8	100	mg/kg	<0.196 U	<0.188 U	<0.205 U	<0.197 U	<0.194 U	<0.191 U	<0.201 U	<0.186 U	<0.18 U	NA	NA	NA	NA	NA
Polychlorinated Biphenyl																			
PCB-1016 (Aroclor 1016)	12674-11-2	NS	NS	NS	mg/kg	<0.0387 U	<0.0368 U	<0.0395 U	<0.0393 U	<0.0382 U	<0.0372 U	<0.0385 U	<0.0369 U	<0.0352 U	NA	NA	NA	NA	NA
PCB-1221 (Aroclor 1221)	11104-28-2	NS	NS	NS	mg/kg	<0.0387 U	<0.0368 U	<0.0395 U	<0.0393 U	<0.0382 U	<0.0372 U	<0.0385 U	<0.0369 U	<0.0352 U	NA	NA	NA	NA	NA
PCB-1232 (Aroclor 1232)	11141-16-5	NS	NS	NS	mg/kg	<0.0387 U	<0.0368 U	<0.0395 U	<0.0393 U	<0.0382 U	<0.0372 U	<0.0385 U	<0.0369 U	<0.0352 U	NA	NA	NA	NA	NA
PCB-1242 (Aroclor 1242)	53469-21-9	NS	NS	NS	mg/kg	<0.0387 U	<0.0368 U	<0.0395 U	<0.0393 U	<0.0382 U	<0.0372 U	<0.0385 U	<0.0369 U	<0.0352 U	NA	NA	NA	NA	NA
PCB-1248 (Aroclor 1248)	12672-29-6	NS	NS	NS	mg/kg	<0.0387 U	<0.0368 U	<0.0395 U	<0.0393 U	<0.0382 U	<0.0372 U	<0.0385 U	<0.0369 U	<0.0352 U	NA	NA	NA	NA	NA
PCB-1254 (Aroclor 1254)	11097-69-1	NS	NS	NS	mg/kg	<0.0387 U	<0.0368 U	<0.0395 U	<0.0393 U	<0.0382 U	<0.0372 U	<0.0385 U	<0.0369 U	<0.0352 U	NA	NA	NA	NA	NA
PCB-1260 (Aroclor 1260)	11096-82-5	NS	NS	NS	mg/kg	<0.0387 U	<0.0368 U	<0.0395 U	<0.0393 U	<0.0382 U	<0.0372 U	<0.0385 U	<0.0369 U	<0.0352 U	NA	NA	NA	NA	NA
PCB-1262 (Aroclor 1262)	37324-23-5	NS	NS	NS	mg/kg	<0.0387 U	<0.0368 U	<0.0395 U	<0.0393 U	<0.0382 U	<0.0372 U	<0.0385 U	<0.0369 U	<0.0352 U	NA	NA	NA	NA	NA
PCB-1268 (Aroclor 1268)	11100-14-4	NS	NS	NS	mg/kg	<0.0387 U	<0.0368 U	<0.0395 U	<0.0393 U	<0.0382 U	<0.0372 U	<0.0385 U	<0.0369 U	<0.0352 U	NA	NA	NA	NA	NA
Total PCBs	1336-36-3	0.1	3.2	1	mg/kg	<0.0387 U	<0.0368 U	<0.0395 U	<0.0393 U	<0.0382 U	<0.0372 U	<0.0385 U	<0.0369 U	<0.0352 U	NA	NA	NA	NA	NA
Metals																			
Aluminum	7429-90-5	NS	NS	NS	mg/kg	8,260 J	4,160 J	16,500 J	7,170	7,060	8,880	7,660	14,800	5,620	NA	NA	NA	NA	NA
Antimony	7440-36-0	NS	NS	NS	mg/kg	<4.63 UJ	<4.49 U	<4.95 U	<4.68 U	<4.56 U	<4.36 U	<4.67 U	<4.35 U	<4.38 U	NA	NA	NA	NA	NA
Arsenic	7440-38-2	13	16	16	mg/kg	1.06	1.44	1.41	6.18	1.69	1.94	3.08	1.23	1.09	NA	NA	NA	NA	NA
Barium	7440-39-3	**350**	820	400	mg/kg	81.8 J	39.8 J	191 J	60	49.2	90.2	63.8	101	62.9	NA	NA	NA	NA	NA
Beryllium	7440-41-7	7.2	47	72	mg/kg	0.214 J	0.206 J	0.287 J	0.346 J	0.283 J	0.296 J	0.308 J	0.556	0.281 J	NA	NA	NA	NA	NA
Cadmium	7440-43-9	2.5	7.5	4.3	mg/kg	<0.925 UJ	0.53 J	1.07	0.786 J	0.365 J	0.653 J	0.374 J	0.704 J	0.491 J	NA	NA	NA	NA	NA
Calcium	7440-70-2	NS	NS	NS	mg/kg	1,400 J	703 J	1,850 J	1,550	1,510	1,090	1,640	1,610	1,080	NA	NA	NA	NA	NA
Chromium, Hexavalent	18540-29-9	1	19	110	mg/kg	<0.949 U	<0.929 U	<1 U	0.46 J	0.434 J	0.311 J	<0.972 U	<0.911 U	<0.887 U	NA	NA	NA	NA	NA
Chromium, Total	7440-47-3	NS	NS	NS	mg/kg	23	14.1 J	54.5 J	11.4	17.4	33.5	13	38	17.6	NA	NA	NA	NA	NA
Cobalt	7440-48-4	NS	NS	NS	mg/kg	8.65 J	7.86 J	17.3 J	1.76 J	4.49	6.79	4.55	11.1	7.9	NA	NA	NA	NA	NA
Copper	7440-50-8	**50**	1720	270	mg/kg	30.1 J	14.2 J	31.8 J	10.4	13.3	30.5	11.8	28.2	26.1	NA	NA	NA	NA	NA
Cyanide	57-12-5	27	40	27	mg/kg	<1.1 U	<1.1 UJ	<1.2 UJ	<1.2 UJ	<1.2 UJ	<1.1 UJ	<1.2 UJ	<1.1 UJ	<1.1 UJ	NA	NA	NA	NA	NA
Iron	7439-89-6	NS	NS	NS	mg/kg	14,000 J	12,400 J	22,000 J	20,900	9,830	17,000	9,840	18,700	13,200	NA	NA	NA	NA	NA
Lead	7439-92-1	**63**	450	400	mg/kg	6.59	4.06 J	17.7 J	8.85	7.1	5.97	45.4	6.96	4.37 J	NA	NA	NA	NA	NA
Magnesium	7439-95-4	NS	NS	NS	mg/kg	4,180 J	1,780 J	9,620 J	673	2,220	4,020	1,400	5,410	3,000	NA	NA	NA	NA	NA
Manganese	7439-96-5	1600	2000	2000	mg/kg	103 J	105 J	184 J	15.8	91	166	94.3	305	96.8	NA	NA	NA	NA	NA
Mercury	7439-97-6	**0.18**	0.73	0.81	mg/kg	<0.075 U	<0.073 U	<0.079 U	<0.077 U	<0.074 U	<0.072 U	**0.35**	<0.071 U	<0.07 U	NA	NA	NA	NA	NA
Nickel	7440-02-0	**30**	130	310	mg/kg	22.4	15.3 J	**36.8 J**	5.3	13	14.8	7.49	17.9	24.5	NA	NA	NA	NA	NA
Potassium	7440-09-7	NS	NS	NS	mg/kg	3,960	1,290 J	10,300 J	332	1,500	4,240	766	5,420	2,870	NA	NA	NA	NA	NA
Selenium	7782-49-2	3.9	4	180	mg/kg	0.363 J	<1.8 U	3.6	0.842 J	<1.82 U	0.314 J	0.308 J	<1.74 U	0.5 J	NA	NA	NA	NA	NA
Silver	7440-22-4	**2**	8.3	180	mg/kg	<0.925 U	<0.898 U	<0.991 U	<0.936 U	<0.912 U	<0.871 U	<0.935 U	<0.869 U	<0.877 U	NA	NA	NA	NA	NA
Sodium	7440-23-5	NS	NS	NS	mg/kg	112 J	<180 U	234	<187 U	<182 U	<174 U	<187 U	<174 U	<175 U	NA	NA	NA	NA	NA
Thallium	7440-28-0	NS	NS	NS	mg/kg	<1.85 U	<1.8 U	<1.98 U	<1.87 U	<1.82 U	<1.74 U	<1.87 U	<1.74 U	<1.75 U	NA	NA	NA	NA	NA
Vanadium	7440-62-2	NS	NS	NS	mg/kg	27.1 J	17.2 J	56.4 J	21.2	17.9	33.8	17	42	24.2	NA	NA	NA	NA	NA
Zinc	7440-66-6	**109**	2480	10000	mg/kg	37.4	23.5 J	80 J	18.3	31.4	35.4	32.5	47.6	31.8	NA	NA	NA	NA	NA
General Chemistry																			
Solids, Percent	SOLID	NS	NS	NS	Percent	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Solids	TSOLID	NS	NS	NS	Percent	84.3	86.1	79.8	82.6	85.3	86.7	82.3	87.8	90.2	85.9	88	78.4	86.8	86
Perfluorooctanoic acids																			
N-ethyl perfluorooctane- sulfonamidoacetic Acid (NEtFOSAA)	2991-50-6	NS	NS	NS	mg/kg	<0.000545 U	<0.000532 U	<0.000584 U	<0.000545 UJ	<0.000513 UJ	<0.00208 UJ	0.000284 J	0.000318 J	<0.00052 U	NA	NA	NA	NA	NA
N-methyl perfluorooctane- sulfonamidoacetic Acid (NMeFOSA/	2355-31-9	NS	NS	NS	mg/kg	<0.000545 U	<0.000532 U	<0.000584 U	<0.000545 UJ	<0.000513 U	<0.00052 UJ	<0.000566 UJ	<0.000537 UJ	<0.00052 U	NA	NA	NA	NA	NA
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	NS	NS	NS	mg/kg	<0.000273 U	<0.000266 U	<0.000292 U	<0.000273 UJ	<0.000256 U	<0.00026 UJ	<0.000283 U	<0.000269 U	<0.00026 U	NA	NA	NA	NA	NA
Perfluorobutanoic acid (PFBA)	375-22-4	NS	NS	NS	mg/kg	<0.000545 U	<0.000532 U	<0.000584 U	0.000026 J	<0.000513 U	<0.00052 UJ	0.000036 J	<0.000537 U	<0.00052 U	NA	NA	NA	NA	NA
Perfluorodecanesulfonic Acid (PFDS)	335-77-3	NS	NS	NS	mg/kg	<0.000545 U	<0.000532 U	<0.000584 U	<0.000545 U	<0.000513 U	<0.00052 U	<0.000566 U	<0.000537 U	<0.00052 U	NA	NA	NA	NA	NA
Perfluorodecanoic Acid (PFDA)	335-76-2	NS	NS	NS	mg/kg	<0.000273 U	<0.000266 U	<0.000292 U	<0.000273 UJ	<0.000256 U	<0.00026 UJ	<0.000283 UJ	<0.000269 UJ	<0.00026 U	NA	NA	NA	NA	NA
Perfluorododecanoic Acid (PFDoA)	307-55-1	NS	NS	NS	mg/kg	<0.000545 U	<0.000532 U	<0.000584 U	<0.000545 U	<0.000513 U	<0.00052 UJ	<0.000566 U	<0.000537 U	<0.00052 U	NA	NA	NA	NA	NA
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	NS	NS	NS	mg/kg	<0.000545 U	<0.000532 U	<0.000584 U	<0.000545 U	<0.000513 U	<0.00052 U	<0.000566 U	<0.000537 U	<0.00052 U	NA	NA	NA	NA	NA
Perfluoroheptanoic acid (PFHpA)	375-85-9	NS	NS	NS	mg/kg	<0.000273 U	<0.000266 U	<0.000292 U	<0.000273 U	<0.000256 U	<0.00026 UJ	<0.000283 U	<0.000269 U	<0.00026 U	NA	NA	NA	NA	NA
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	NS	NS	NS	mg/kg	<0.000273 U	<0.000266 U	<0.000292 U	<0.000273 UJ	<0.000256 U	<0.00026 UJ	<0.000283 U	<0.000269 U	<0.00026 U	NA	NA	NA	NA	NA
Perfluorohexanoic Acid (PFHxA)	307-24-4	NS	NS	NS	mg/kg	<0.000545 U	<0.000532 U	<0.000584 U	0.000059 J	<0.000513 U	<0.00052 UJ	0.000091 J	<0.000537 U	<0.00052 U	NA	NA	NA	NA	NA
Perfluorononanoic Acid (PFNA)	375-95-1	NS	NS	NS	mg/kg	<0.000273 U	<0.000266 U	<0.000292 U	<0.000273 U	<0.000256 U	<0.00026 UJ	0.000243 J	<0.000269 U	<0.00026 U	NA	NA	NA	NA	NA
Perfluorooctanesulfonamide (FOSA)	754-91-6	NS	NS	NS	mg/kg	<0.000545 U	<0.000532 U	<0.000584 U	<0.000545 U	<0.000513 U	<0.00052 U	<0.000566 U	<0.000537 U	<0.00052 U	NA	NA	NA	NA	NA
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	**0.00088**	0.0037	0.044	mg/kg	<0.000273 U	<0.000266 U	<0.000292 U	0.000544 J	<0.000256 UJ	<0.00026 UJ	**0.0018**	0.000271	<0.00026 U	NA	NA	NA	NA	NA
Perfluorooctanoic Acid (PFOA)	335-67-1	**0.00066**	0.0011	0.033	mg/kg	<0.000273 U	<0.000266 U	<0.000292 U	0.00005 J	<0.000256 U	<0.00026 UJ	0.000218 J	0.000066 J	<0.00026 U	NA	NA	NA	NA	NA
Perfluoropentanoic Acid (PFPeA)	2706-90-3	NS	NS	NS	mg/kg	<0.000545 U	<0.000532 U	<0.000584 U	<0.000545 U	<0.000513 U	<0.00052 UJ	0.000086 J	<0.000537 U	<0.00052 U	NA	NA	NA	NA	NA
Perfluorotetradecanoic Acid (PFTA)	376-06-7	NS	NS	NS	mg/kg	<0.000545 U	<0.000532 U	<0.000584 U	<0.000545 UJ	<0.000513 UJ	<0.00208 UJ	<0.000566 U	<0.000537 UJ	<0.00052 U	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8	NS	NS	NS	mg/kg	<0.000545 U	<0.000532 U	<0.000584 U	<0.000545 U	<0.000513 U	<0.00208 U	<0.000566 U	<0.000537 U	<0.00052 U	NA	NA	NA	NA	NA
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	NS	NS	NS	mg/kg	<0.000545 U	<0.000532 U	<0.000584 U	<0.000545 U	<0.000513 U	<0.00052 UJ	0.000122 J	<0.000537 U	<0.00052 U	NA	NA	NA	NA	NA
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2) (8:2FTS)	39108-34-4	NS	NS	NS	mg/kg	<0.000545 U	<0.000532 U	<0.000584 U	<0.000545 U	<0.000513 U	<0.00052 U	<0.000566 U	<0.000537 U	<0.00052 U	NA	NA	NA	NA	NA
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2) (6:2FTS)	27619-97-2	NS	NS	NS	mg/kg	<0.000545 U	<0.000532 U	<0.000584 U	<0.000545 U	<0.000513 U	<0.00052 U	<0.000566 U	<0.000537 U	<0.00052 U	NA	NA	NA	NA	NA
Total PFOA and PFOS	TOTPFOAPFOS	NS	NS	NS	mg/kg	<0.000273 U	<0.000266 U	<0.000292 U	0.000594 J	<0.000256 U	<0.00026 U	0.00202 J	0.000337 J	<0.00026 U	NA	NA	NA	NA	NA

Table 1
Remedial Action Work Plan
Soil Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Notes:

CAS - Chemical Abstract Service
NS - No standard
mg/kg - milligram per kilogram
NA - Not analyzed
RL - Reporting limit
<RL - Not detected
Soil sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 of the Official Compilation of New York Codes, Rules, and Regulations (NYCRR) Part 375 Unrestricted Use, Protection of Groundwater, and Restricted Use Restricted-Residential Soil Cleanup Objectives (SCO).
Soil sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Part 375 Remedial Programs Guidelines for Sampling and Analysis of Per- and Polyfluoroalkyl Substances (PFAS) Unrestricted Use, Restricted Use Restricted-Residential, and Protection of Groundwater Guidance Values (June 2021).
Criterion comparisons for 3- & 4-methylphenol (m&p cresol) are provided for reference. Promulgated SCOs are for 3-methylphenol (m-cresol) and 4-methylphenol (p-cresol).

Qualifiers:

D - The concentration reported is a result of a diluted sample.
B - The analyte was found in the associated analysis batch blank.
J - The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
UJ - The analyte was not detected at a level greater than or equal to the RL; however, the reported RL is approximate and may be inaccurate or imprecise.
U - The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.

Exceedance Summary:

10	- Result exceeds Unrestricted Use SCOs
10	- Result exceeds Protection of Groundwater SCOs
10	- Result exceeds Restricted Use Restricted-Residential SCOs

Table 2
Remedial Action Work Plan
Groundwater Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC SGVs	NYSDEC Guidance Values	Location	MW01	MW02	MW-03	MW-03	MW04	MW05	MW05
				Sample Name	024_MW01_20211110	023_MW02_20211110	020_MW-03_20211110	021_GWDUP_20211110	022_MW04_20211110	050_MW05	051_DUP-3
				Sample Date	11/10/2021	11/10/2021	11/10/2021	11/10/2021	11/10/2021	01/27/2022	01/27/2022
				Unit	Result	Result	Result	Result	Result	Result	Result
Volatile Organic Compounds											
1,1,1,2-Tetrachloroethane	630-20-6	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,1,1-Trichloroethane	71-55-6	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,1,2,2-Tetrachloroethane	79-34-5	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,1,2-Trichloroethane	79-00-5	1	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,1-Dichloroethane	75-34-3	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,1-Dichloroethene	75-35-4	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	0.32 J	0.22 J	0.54
1,1-Dichloropropene	563-58-6	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,2,3-Trichlorobenzene	87-61-6	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,2,3-Trichloropropane	96-18-4	0.04	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,2,4,5-Tetramethylbenzene	95-93-2	5	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	120-82-1	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,2,4-Trimethylbenzene	95-63-6	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.04	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.0006	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,2-Dichlorobenzene	95-50-1	3	NS	ug/l	<0.2 U	0.29 J	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,2-Dichloroethane	107-06-2	0.6	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,2-Dichloropropane	78-87-5	1	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,3-Dichlorobenzene	541-73-1	3	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,3-Dichloropropane	142-28-9	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,4-Dichlorobenzene	106-46-7	3	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
1,4-Diethyl Benzene	105-05-5	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
1,4-Dioxane (P-Dioxane)	123-91-1	NS	1	ug/l	<40 U	<40 U	<40 U	<40 U	<40 U	<40 U	<40 U
2,2-Dichloropropane	594-20-7	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
2-Chlorotoluene	95-49-8	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
2-Hexanone (MBK)	591-78-6	50	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
4-Chlorotoluene	106-43-4	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
4-Ethyltoluene	622-96-8	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Acetone	67-64-1	**50**	NS	ug/l	4.42	5.57	<1 U	1.19 J	1.39 J	3.61	1.52 J
Acrolein	107-02-8	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Acrylonitrile	107-13-1	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Benzene	71-43-2	1	NS	ug/l	<0.2 U	0.38 J	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Bromobenzene	108-86-1	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Bromochloromethane	74-97-5	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Bromodichloromethane	75-27-4	50	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Bromoform	75-25-2	50	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Bromomethane	74-83-9	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Carbon Disulfide	75-15-0	60	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Carbon Tetrachloride	56-23-5	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Chlorobenzene	108-90-7	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Chloroethane	75-00-3	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Chloroform	67-66-3	**7**	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	0.98	<0.2 U
Chloromethane	74-87-3	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Cis-1,2-Dichloroethene	156-59-2	**5**	NS	ug/l	<0.2 U	**9.32**	**6.79**	**6.33**	**61.1**	**43.9**	**101**
Cis-1,3-Dichloropropene	10061-01-5	0.4	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Cyclohexane	110-82-7	NS	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Cymene	99-87-6	5	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	124-48-1	50	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Dibromomethane	74-95-3	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Dichlorodifluoromethane	75-71-8	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Diethyl Ether (Ethyl Ether)	60-29-7	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	100-41-4	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Hexachlorobutadiene	87-68-3	0.5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Isopropylbenzene (Cumene)	98-82-8	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
M,P-Xylene	179601-23-1	5	NS	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Methyl Acetate	79-20-9	NS	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Methyl Ethyl Ketone (2-Butanone)	78-93-3	50	NS	ug/l	0.8	2.37	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	NS	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Methylcyclohexane	108-87-2	NS	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Methylene Chloride	75-09-2	5	NS	ug/l	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
Naphthalene	91-20-3	10	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	104-51-8	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
n-Propylbenzene	103-65-1	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
o-Xylene (1,2-Dimethylbenzene)	95-47-6	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
p-Cymene (p-Isopropyltoluene)	CYMP	NS	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Sec-Butylbenzene	135-98-8	5	NS	ug/l	<0.2 U	0.26 J	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Styrene	100-42-5	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
T-Butylbenzene	98-06-6	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Tert-Butyl Alcohol	75-65-0	NS	NS	ug/l	2.7	3.65	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Tert-Butyl Methyl Ether	1634-04-4	10	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Tetrachloroethene (PCE)	127-18-4	**5**	NS	ug/l	1.48	**2,660 D**	3.87	3.45	**124**	**24.5**	**60**
Toluene	108-88-3	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Total 1,2-Dichloroethene (Cis and Trans)	540-59-0	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	1330-20-7	5	NS	ug/l	<0.6 U	<0.6 U	<0.6 U	<0.6 U	<0.6 U	<0.6 U	<0.6 U
Total, 1,3-Dichloropropene (Cis And Trans)	542-75-6	0.4	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Trans-1,2-Dichloroethene	156-60-5	5	NS	ug/l	<0.2 U	0.21 J	<0.2 U	<0.2 U	0.39 J	0.3 J	0.58
Trans-1,3-Dichloropropene	10061-02-6	0.4	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Trans-1,4-Dichloro-2-Butene	110-57-6	5	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Trichloroethene (TCE)	79-01-6	**5**	NS	ug/l	<0.2 U	**209 D**	3.59	3.24	**60.6**	**47.2**	**112**
Trichlorofluoromethane	75-69-4	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Vinyl Acetate	108-05-4	NS	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Vinyl Chloride	75-01-4	**2**	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	1.03	0.3 J	0.75

Table 2
Remedial Action Work Plan
Groundwater Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC SGVs	NYSDEC Guidance Values	Location	MW01	MW02	MW-03	MW-03	MW04	MW05	MW05
				Sample Name	024_MW01_20211110	023_MW02_20211110	020_MW-03_20211110	021_GWDUP_20211110	022_MW04_20211110	050_MW05	051_DUP-3
				Sample Date	11/10/2021	11/10/2021	11/10/2021	11/10/2021	11/10/2021	01/27/2022	01/27/2022
				Unit	Result	Result	Result	Result	Result	Result	Result
Semi-Volatile Organic Compounds											
1,2,4,5-Tetrachlorobenzene	95-94-3	5	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
1,2,4-Trichlorobenzene	120-82-1	5	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
1,2-Dichlorobenzene	95-50-1	3	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
1,2-Diphenylhydrazine	122-66-7	0	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
1,3-Dichlorobenzene	541-73-1	3	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
1,4-Dichlorobenzene	106-46-7	3	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
1,4-Dioxane (P-Dioxane)	123-91-1	NS	1	ug/l	NA	NA	NA	NA	NA	NA	NA
2,3,4,6-Tetrachlorophenol	58-90-2	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
2,4,5-Trichlorophenol	95-95-4	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
2,4,6-Trichlorophenol	88-06-2	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
2,4-Dichlorophenol	120-83-2	1	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
2,4-Dimethylphenol	105-67-9	1	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
2,4-Dinitrophenol	51-28-5	1	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
2,4-Dinitrotoluene	121-14-2	5	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
2,6-Dinitrotoluene	606-20-2	5	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
2-Chloronaphthalene	91-58-7	10	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
2-Chlorophenol	95-57-8	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
2-Methylnaphthalene	91-57-6	NS	NS	ug/l	NA	NA	<2.76 U	<2.76 U	<2.76 U	<2.7 U	<2.56 U
2-Methylphenol (o-Cresol)	95-48-7	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
2-Nitroaniline	88-74-4	5	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
2-Nitrophenol	88-75-5	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
3 & 4 Methylphenol (m&p Cresol)	65794-96-9	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
3,3'-Dichlorobenzidine	91-94-1	5	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
3-Nitroaniline	99-09-2	5	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
4,6-Dinitro-2-Methylphenol	534-52-1	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
4-Bromophenyl Phenyl Ether	101-55-3	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
4-Chloro-3-Methylphenol	59-50-7	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
4-Chloroaniline	106-47-8	5	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
4-Chlorophenyl Phenyl Ether	7005-72-3	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
4-Nitroaniline	100-01-6	5	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
4-Nitrophenol	100-02-7	NS	NS	ug/l	NA	NA	NA	NA	NA	<5.41 U	<5.13 U
Acenaphthene	83-32-9	20	NS	ug/l	NA	NA	<0.05 U	<0.05 U	<0.05 U	<0.0541 U	<0.0513 U
Acenaphthylene	208-96-8	NS	NS	ug/l	NA	NA	<0.05 U	<0.05 U	<0.05 U	<0.0541 U	<0.0513 U
Acetophenone	98-86-2	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
Aniline (Phenylamine, Aminobenzene)	62-53-3	5	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
Anthracene	120-12-7	50	NS	ug/l	NA	NA	<0.05 U	<0.05 U	<0.05 U	<0.0541 U	<0.0513 U
Atrazine	1912-24-9	7.5	NS	ug/l	NA	NA	NA	NA	NA	<0.541 U	<0.513 U
Benzaldehyde	100-52-7	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
Benzidine	92-87-5	5	NS	ug/l	NA	NA	NA	NA	NA	<5.41 U	<5.13 U
Benzo(a)anthracene	56-55-3	0.002	NS	ug/l	NA	NA	<0.05 U	<0.05 U	<0.05 U	<0.0541 U	<0.0513 U
Benzo(a)pyrene	50-32-8	0	NS	ug/l	NA	NA	<0.05 U	<0.05 U	<0.05 U	<0.0541 U	<0.0513 U
Benzo(b)fluoranthene	205-99-2	0.002	NS	ug/l	NA	NA	<0.05 U	<0.05 U	<0.05 U	<0.0541 U	<0.0513 U
Benzo(g,h,i)Perylene	191-24-2	NS	NS	ug/l	NA	NA	<0.05 U	<0.05 U	<0.05 U	<0.0541 U	<0.0513 U
Benzo(k)fluoranthene	207-08-9	0.002	NS	ug/l	NA	NA	<0.05 U	<0.05 U	<0.05 U	<0.0541 U	<0.0513 U
Benzoic Acid	65-85-0	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	5.28
Benzyl Alcohol	100-51-6	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
Benzyl Butyl Phthalate	85-68-7	50	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
Biphenyl (Diphenyl)	92-52-4	5	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
Bis(2-chloroethoxy) methane	111-91-1	5	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
Bis(2-chloroethyl) ether (2-chloroethyl ether)	111-44-4	1	NS	ug/l	NA	NA	NA	NA	NA	<1.08 U	<1.03 U
Bis(2-chloroisopropyl) ether	108-60-1	5	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
Bis(2-ethylhexyl) phthalate	117-81-7	5	NS	ug/l	NA	NA	NA	NA	NA	<0.541 U	<0.513 U
Caprolactam	105-60-2	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
Carbazole	86-74-8	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
Chrysene	218-01-9	**0.002**	NS	ug/l	NA	NA	<0.05 U	<0.05 U	<0.05 U	<0.0541 U	<0.0513 U
Dibenz(a,h)anthracene	53-70-3	NS	NS	ug/l	NA	NA	<0.05 U	<0.05 U	<0.05 U	<0.0541 U	<0.0513 U
Dibenzofuran	132-64-9	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
Dibutyl phthalate	84-74-2	50	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
Diethyl phthalate	84-66-2	50	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
Dimethyl phthalate	131-11-3	50	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
Dioctyl phthalate	117-84-0	50	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
Fluoranthene	206-44-0	50	NS	ug/l	NA	NA	<0.05 U	<0.05 U	<0.05 U	<0.0541 U	<0.0513 U
Fluorene	86-73-7	50	NS	ug/l	NA	NA	<0.05 U	<0.05 U	<0.05 U	<0.0541 U	0.297
Hexachlorobenzene	118-74-1	0.04	NS	ug/l	NA	NA	NA	NA	NA	<0.0216 U	<0.0205 U
Hexachlorobutadiene	87-68-3	0.5	NS	ug/l	NA	NA	NA	NA	NA	<0.541 U	<0.513 U
Hexachlorocyclopentadiene	77-47-4	5	NS	ug/l	NA	NA	NA	NA	NA	<5.41 U	<5.13 U
Hexachloroethane	67-72-1	5	NS	ug/l	NA	NA	NA	NA	NA	<0.541 U	<0.513 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.002	NS	ug/l	NA	NA	<0.05 U	<0.05 U	<0.05 U	<0.0541 U	<0.0513 U
Isophorone	78-59-1	50	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
Naphthalene	91-20-3	10	NS	ug/l	NA	NA	<0.05 U	<0.05 U	<0.05 U	<0.0541 U	<0.0513 U
Nitrobenzene	98-95-3	0.4	NS	ug/l	NA	NA	NA	NA	NA	<0.27 U	<0.256 U
n-Nitrosodimethylamine	62-75-9	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.541 U	<0.513 U
n-Nitrosodi-N-Propylamine	621-64-7	NS	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
n-Nitrosodiphenylamine	86-30-6	50	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
Pentachlorophenol	87-86-5	1	NS	ug/l	NA	NA	NA	NA	NA	<0.27 U	<0.256 U
Phenanthrene	85-01-8	50	NS	ug/l	NA	NA	<0.05 U	<0.05 U	<0.05 U	<0.0541 U	<0.0513 U
Phenol	108-95-2	**1**	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U
Pyrene	129-00-0	50	NS	ug/l	NA	NA	<0.05 U	<0.05 U	<0.05 U	<0.0541 U	0.0513
Pyridine	110-86-1	50	NS	ug/l	NA	NA	NA	NA	NA	<2.7 U	<2.56 U

Table 2
Remedial Action Work Plan
Groundwater Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC SGVs	NYSDEC Guidance Values	Location	MW01	MW02	MW-03	MW-03	MW04	MW05	MW05
				Sample Name	024_MW01_20211110	023_MW02_20211110	020_MW-03_20211110	021_GWDUP_20211110	022_MW04_20211110	050_MW05	051_DUP-3
				Sample Date	11/10/2021	11/10/2021	11/10/2021	11/10/2021	11/10/2021	01/27/2022	01/27/2022
				Unit	Result	Result	Result	Result	Result	Result	Result
Pesticides											
4,4'-DDD	72-54-8	0.3	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	72-55-9	0.2	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	50-29-3	0.2	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Aldrin	309-00-2	0	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Alpha BHC (Alpha Hexachlorocyclohexane)	319-84-6	0.01	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Alpha Chlordane	5103-71-9	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Alpha Endosulfan	959-98-8	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Beta Bhc (Beta Hexachlorocyclohexane)	319-85-7	0.04	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Beta Endosulfan	33213-65-9	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Chlordane (alpha and gamma)	57-74-9	0.05	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Delta Bhc (Delta Hexachlorocyclohexane)	319-86-8	0.04	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Dieldrin	60-57-1	0.004	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Endosulfan Sulfate	1031-07-8	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Endrin	72-20-8	0	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Endrin Aldehyde	7421-93-4	5	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Endrin Ketone	53494-70-5	5	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Gamma Bhc (Lindane)	58-89-9	0.05	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Gamma Chlordane (Trans-)	5103-74-2	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Heptachlor	76-44-8	0.04	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Heptachlor Epoxide	1024-57-3	0.03	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Methoxychlor	72-43-5	35	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Toxaphene	8001-35-2	0.06	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Herbicides											
2,4,5-T (Trichlorophenoxyacetic Acid)	93-76-5	35	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
2,4-D (Dichlorophenoxyacetic Acid)	94-75-7	50	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Silvex (2,4,5-Tp)	93-72-1	0.26	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyl											
PCB-1016 (Aroclor 1016)	12674-11-2	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
PCB-1221 (Aroclor 1221)	11104-28-2	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
PCB-1232 (Aroclor 1232)	11141-16-5	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
PCB-1242 (Aroclor 1242)	53469-21-9	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
PCB-1248 (Aroclor 1248)	12672-29-6	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
PCB-1254 (Aroclor 1254)	11097-69-1	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
PCB-1260 (Aroclor 1260)	11096-82-5	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
PCB-1262 (Aroclor 1262)	37324-23-5	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
PCB-1268 (Aroclor 1268)	11100-14-4	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Total PCBs	1336-36-3	0.09	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Metals - Dissolved											
Aluminum	7429-90-5	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Antimony	7440-36-0	**3**	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Arsenic	7440-38-2	25	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Barium	7440-39-3	1000	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Beryllium	7440-41-7	3	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Cadmium	7440-43-9	5	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Calcium	7440-70-2	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Chromium, Total	7440-47-3	50	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Cobalt	7440-48-4	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Copper	7440-50-8	200	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Iron	7439-89-6	**300**	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Lead	7439-92-1	25	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Magnesium	7439-95-4	**35000**	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Manganese	7439-96-5	**300**	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Mercury	7439-97-6	0.7	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Nickel	7440-02-0	**100**	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Potassium	7440-09-7	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Selenium	7782-49-2	**10**	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Silver	7440-22-4	50	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Sodium	7440-23-5	**20000**	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Thallium	7440-28-0	0.5	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Vanadium	7440-62-2	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Zinc	7440-66-6	2000	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Metals - Total											
Aluminum	7429-90-5	NS	NS	ug/l	NA	NA	NA	NA	NA	20,100 B	34,600 B
Antimony	7440-36-0	3	NS	ug/l	NA	NA	NA	NA	NA	<1.11 U	<1.11 U
Arsenic	7440-38-2	25	NS	ug/l	1.75	5.54	<1.11 U	<1.11 U	<1.11 U	4.07	6.91
Barium	7440-39-3	1000	NS	ug/l	97.6	137	36.3	35.6	61.5	283	498
Beryllium	7440-41-7	**3**	NS	ug/l	<0.333 U	0.335	<0.333 U	<0.333 U	<0.333 U	0.587	0.975
Cadmium	7440-43-9	5	NS	ug/l	<0.556 U	1.79	<0.556 U	<0.556 U	<0.556 U	<0.556 U	<0.556 U
Calcium	7440-70-2	NS	NS	ug/l	NA	NA	NA	NA	NA	275,000 B	243,000 B
Chromium, Hexavalent	18540-29-9	50	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Chromium, Total	7440-47-3	NS	NS	ug/l	16.9	61.8	1.18	<1.11 U	8.36	79.4	146
Cobalt	7440-48-4	NS	NS	ug/l	NA	NA	NA	NA	NA	34.8	53.1
Copper	7440-50-8	**200**	NS	ug/l	34.4	57.4	5.68	5.06	15.4	83.8	158
Cyanide	57-12-5	200	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Iron	7439-89-6	**300**	NS	ug/l	NA	NA	NA	NA	NA	**34,100**	**61,000**
Lead	7439-92-1	**25**	NS	ug/l	**25.5**	**41**	2.52	2.27	14.5	**25.8 B**	**45.6 B**
Magnesium	7439-95-4	**35000**	NS	ug/l	NA	NA	NA	NA	NA	**96,400**	**104,000**
Manganese	7439-96-5	**300**	NS	ug/l	**1,690 D**	**25,100 D**	**2,950 D**	**2,980 D**	**4,990 D**	**5,650**	**6,060**
Mercury	7439-97-6	0.7	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Nickel	7440-02-0	**100**	NS	ug/l	66.1	**156**	16.4	15.6	**113**	94.5	**146**
Potassium	7440-09-7	NS	NS	ug/l	NA	NA	NA	NA	NA	28,900	34,400
Selenium	7782-49-2	**10**	NS	ug/l	8.17	8.81	2.48	2.59	4	**23.1**	**30.3**
Silver	7440-22-4	50	NS	ug/l	<1.11 U	<1.11 U	<1.11 U	<1.11 U	<1.11 U	<5.56 U	<5.56 U
Sodium	7440-23-5	**20000**	NS	ug/l	NA	NA	NA	NA	NA	**130,000**	**112,000**
Thallium	7440-28-0	0.5	NS	ug/l	NA	NA	NA	NA	NA	<1.11 U	<1.11 U
Vanadium	7440-62-2	NS	NS	ug/l	NA	NA	NA	NA	NA	48.7	90.3
Zinc	7440-66-6	2000	NS	ug/l	89.1	138	27.2	25.5	63.6	204	357

Table 2
Remedial Action Work Plan
Groundwater Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC SGVs	NYSDEC Guidance Values	Location	MW01	MW02	MW-03	MW-03	MW04	MW05	MW05
				Sample Name	024_MW01_20211110	023_MW02_20211110	020_MW-03_20211110	021_GWDUP_20211110	022_MW04_20211110	050_MW05	051_DUP-3
				Sample Date	11/10/2021	11/10/2021	11/10/2021	11/10/2021	11/10/2021	01/27/2022	01/27/2022
				Unit	Result	Result	Result	Result	Result	Result	Result
Perfluorooctanoic acids											
N-ethyl perfluorooctane- sulfonamidoacetic Acid (NEtFOSAA)	2991-50-6	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
N-methyl perfluorooctane- sulfonamidoacetic Acid (NMeFOSAA)	2355-31-9	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Perfluorobutanoic acid (PFBA)	375-22-4	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Perfluorodecanesulfonic Acid (PFDS)	335-77-3	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Perfluorodecanoic Acid (PFDA)	335-76-2	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Perfluorododecanoic Acid (PFDoA)	307-55-1	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Perfluoroheptanoic acid (PFHpA)	375-85-9	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Perfluorohexanoic Acid (PFHxA)	307-24-4	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Perfluorononanoic Acid (PFNA)	375-95-1	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanesulfonamide (FOSA)	754-91-6	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	NS	0.01	ug/l	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic Acid (PFOA)	335-67-1	NS	0.01	ug/l	NA	NA	NA	NA	NA	NA	NA
Perfluoropentanoic Acid (PFPeA)	2706-90-3	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Perfluorotetradecanoic Acid (PFTA)	376-06-7	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2) (8:2FTS)	39108-34-4	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2) (6:2FTS)	27619-97-2	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA
Total PFOA and PFOS	TOTPFOAPFOS	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA

Table 2
Remedial Action Work Plan
Groundwater Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC SGVs	NYSDEC Guidance Values	Location	MW-6	MW-6	MW-7	MW-7	MW-7	LMW-6	LMW-6	LMW-7	LMW-9	LMW-10
				Sample Name	064_MW-6_28	065_MW-6_45	061_MW-7_20	062_MW-7_28	063_DUP-5	LMW-6-20220819	DUP-20220819	LMW-7-20220822	LMW-9-20220822	LMW-10-20220819
				Sample Date	02/02/2022	02/02/2022	02/01/2022	02/02/2022	02/02/2022	08/19/2022	08/19/2022	08/22/2022	08/22/2022	08/19/2022
				Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatile Organic Compounds														
1,1,1,2-Tetrachloroethane	630-20-6	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
1,1,1-Trichloroethane	71-55-6	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
1,1,2,2-Tetrachloroethane	79-34-5	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<50 U	<50 U	<0.5 U	<5 U	<0.5 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	79-00-5	1	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<150 U	<150 U	<1.5 U	<15 U	<1.5 U
1,1-Dichloroethane	75-34-3	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
1,1-Dichloroethene	75-35-4	5	NS	ug/l	0.43 J	0.29 J	<0.2 U	0.37 J	0.39 J	<50 U	<50 U	<0.5 U	<5 U	<0.5 U
1,1-Dichloropropene	563-58-6	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
1,2,3-Trichlorobenzene	87-61-6	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 UJ
1,2,3-Trichloropropane	96-18-4	0.04	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
1,2,4,5-Tetramethylbenzene	95-93-2	5	NS	ug/l	NA	NA	NA	NA	NA	<200 U	<200 U	0.56 J	<20 U	<2 U
1,2,4-Trichlorobenzene	120-82-1	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
1,2,4-Trimethylbenzene	95-63-6	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.04	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	0.0006	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<200 U	<200 U	<2 U	<20 U	<2 U
1,2-Dichlorobenzene	95-50-1	3	NS	ug/l	0.27 J	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
1,2-Dichloroethane	107-06-2	0.6	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<50 U	<50 U	<0.5 U	<5 U	<0.5 U
1,2-Dichloropropane	78-87-5	1	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<100 U	<100 U	<1 U	<10 U	<1 U
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
1,3-Dichlorobenzene	541-73-1	3	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
1,3-Dichloropropane	142-28-9	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
1,4-Dichlorobenzene	106-46-7	3	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
1,4-Diethyl Benzene	105-05-5	NS	NS	ug/l	NA	NA	NA	NA	NA	<200 U	<200 U	0.98 J	<20 U	<2 U
1,4-Dioxane (P-Dioxane)	123-91-1	NS	1	ug/l	<40 U	<40 U	<40 U	<40 U	<40 U	<25,000 U	<25,000 U	<250 U	<2,500 U	<250 U
2,2-Dichloropropane	594-20-7	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
2-Chlorotoluene	95-49-8	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
2-Hexanone (MBK)	591-78-6	50	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<500 U	<500 U	<5 U	<50 U	<5 UJ
4-Chlorotoluene	106-43-4	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
4-Ethyltoluene	622-96-8	NS	NS	ug/l	NA	NA	NA	NA	NA	<200 U	<200 U	<2 U	<20 U	<2 U
Acetone	67-64-1	**50**	NS	ug/l	1.84 J	1.94 J	2.67	2.06	2.27	**15,000 J**	**8,800 J**	1.9 J	<50 U	<5 U
Acrolein	107-02-8	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	NA	NA	NA	NA	NA
Acrylonitrile	107-13-1	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<500 U	<500 U	<5 U	<50 U	<5 U
Benzene	71-43-2	1	NS	ug/l	<0.2 U	<0.2 U	0.6	0.72	0.68	<50 U	<50 U	<0.5 U	<5 U	<0.5 U
Bromobenzene	108-86-1	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Bromochloromethane	74-97-5	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Bromodichloromethane	75-27-4	50	NS	ug/l	<0.2 U	0.27 J	<0.2 U	<0.2 U	<0.2 U	<50 U	<50 U	<0.5 U	<5 U	<0.5 U
Bromoform	75-25-2	50	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<200 U	<200 U	<2 U	<20 U	<2 U
Bromomethane	74-83-9	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Carbon Disulfide	75-15-0	60	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<500 U	<500 U	<5 U	<50 U	<5 U
Carbon Tetrachloride	56-23-5	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<50 U	<50 U	<0.5 U	<5 U	<0.5 U
Chlorobenzene	108-90-7	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Chloroethane	75-00-3	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Chloroform	67-66-3	**7**	NS	ug/l	**11.3**	**15**	**10.5**	**10.2**	**10.1**	<250 U	<250 U	4.9	<25 U	5.5
Chloromethane	74-87-3	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 UJ	<2.5 U	<25 U	<2.5 UJ
Cis-1,2-Dichloroethene	156-59-2	**5**	NS	ug/l	**85**	**59**	**53.7**	**96.8**	**103**	<250 U	<250 U	<2.5 U	**70**	<2.5 U
Cis-1,3-Dichloropropene	10061-01-5	0.4	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<50 U	<50 U	<0.5 U	<5 U	<0.5 U
Cyclohexane	110-82-7	NS	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	NA	NA	NA	NA	NA
Cymene	99-87-6	5	NS	ug/l	NA	NA	NA	NA	NA	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Dibromochloromethane	124-48-1	50	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<50 U	<50 U	<0.5 U	<5 U	<0.5 U
Dibromomethane	74-95-3	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<500 U	<500 U	<5 U	<50 U	<5 U
Dichlorodifluoromethane	75-71-8	5	NS	ug/l	0.74	0.74	<0.2 U	<0.2 U	<0.2 U	<500 U	<500 U	<5 U	<50 U	<5 U
Diethyl Ether (Ethyl Ether)	60-29-7	NS	NS	ug/l	NA	NA	NA	NA	NA	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Ethylbenzene	100-41-4	5	NS	ug/l	0.23 J	<0.2 U	0.41 J	0.55	0.56	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Hexachlorobutadiene	87-68-3	0.5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Isopropylbenzene (Cumene)	98-82-8	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
M,P-Xylene	179601-23-1	5	NS	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Methyl Acetate	79-20-9	NS	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	NA	NA	NA	NA	NA
Methyl Ethyl Ketone (2-Butanone)	78-93-3	50	NS	ug/l	10.4	7.18	6.48	<0.2 U	12.5	<500 U	<500 U	<5 U	<50 U	<5 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	NS	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<500 U	<500 U	<5 U	<50 U	<5 U
Methylcyclohexane	108-87-2	NS	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	NA	NA	NA	NA	NA
Methylene Chloride	75-09-2	5	NS	ug/l	<1 U	1.01 J	1.76 J	1.92 J	1.73 J	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Naphthalene	91-20-3	10	NS	ug/l	NA	NA	NA	NA	NA	<250 U	<250 UJ	<2.5 U	<25 U	<2.5 UJ
n-Butylbenzene	104-51-8	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
n-Propylbenzene	103-65-1	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
o-Xylene (1,2-Dimethylbenzene)	95-47-6	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
p-Cymene (p-Isopropyltoluene)	CYMP	NS	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	NA	NA	NA	NA	NA
Sec-Butylbenzene	135-98-8	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Styrene	100-42-5	5	NS	ug/l	0.27 J	<0.2 U	0.51	0.71	0.76	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
T-Butylbenzene	98-06-6	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Tert-Butyl Alcohol	75-65-0	NS	NS	ug/l	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA	NA	NA
Tert-Butyl Methyl Ether	1634-04-4	10	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Tetrachloroethene (PCE)	127-18-4	**5**	NS	ug/l	**425 D**	**232 D**	**24.9**	**65.3**	**67.1**	<50 U	<50 U	2.3	**1,500**	0.18 J
Toluene	108-88-3	5	NS	ug/l	0.67	0.69	0.77	0.69	0.7	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Total 1,2-Dichloroethene (Cis and Trans)	540-59-0	NS	NS	ug/l	NA	NA	NA	NA	NA	<250 U	<250 U	<2.5 U	70	<2.5 U
Total Xylenes	1330-20-7	5	NS	ug/l	<0.6 U	<0.6 U	<0.6 U	<0.6 U	<0.6 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Total, 1,3-Dichloropropene (Cis And Trans)	542-75-6	0.4	NS	ug/l	NA	NA	NA	NA	NA	<50 U	<50 U	<0.5 U	<5 U	<0.5 U
Trans-1,2-Dichloroethene	156-60-5	5	NS	ug/l	0.56	0.36 J	0.48 J	0.85	0.9	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Trans-1,3-Dichloropropene	10061-02-6	0.4	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<50 U	<50 U	<0.5 U	<5 U	<0.5 U
Trans-1,4-Dichloro-2-Butene	110-57-6	5	NS	ug/l	NA	NA	NA	NA	NA	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Trichloroethene (TCE)	79-01-6	**5**	NS	ug/l	**151**	**96.9**	**54.1**	**94.6**	**99.2**	<50 U	<50 U	0.18 J	**170**	<0.5 U
Trichlorofluoromethane	75-69-4	5	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<250 U	<250 U	<2.5 U	<25 U	<2.5 U
Vinyl Acetate	108-05-4	NS	NS	ug/l	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<500 U	<500 U	<5 U	<50 U	<5 U
Vinyl Chloride	75-01-4	**2**	NS	ug/l	1.94	1.34	0.41 J	0.76	0.8	<100 U	<100 U	<1 U	**8.3 J**	<1 U

Table 2
Remedial Action Work Plan
Groundwater Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC SGVs	NYSDEC Guidance Values	Location	MW-6	MW-6	MW-7	MW-7	MW-7	LMW-6	LMW-6	LMW-7	LMW-9	LMW-10
				Sample Name	064_MW-6_28	065_MW-6_45	061_MW-7_20	062_MW-7_28	063_DUP-5	LMW-6-20220819	DUP-20220819	LMW-7-20220822	LMW-9-20220822	LMW-10-20220819
				Sample Date	02/02/2022	02/02/2022	02/01/2022	02/02/2022	02/02/2022	08/19/2022	08/19/2022	08/22/2022	08/22/2022	08/19/2022
				Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Semi-Volatile Organic Compounds														
1,2,4,5-Tetrachlorobenzene	95-94-3	5	NS	ug/l	NA	NA	NA	NA	NA	<10 U	<10 U	<10 U	<10 U	<10 U
1,2,4-Trichlorobenzene	120-82-1	5	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
1,2-Dichlorobenzene	95-50-1	3	NS	ug/l	NA	NA	NA	NA	NA	<2 U	<2 U	<2 U	<2 U	<2 U
1,2-Diphenylhydrazine	122-66-7	0	NS	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	541-73-1	3	NS	ug/l	NA	NA	NA	NA	NA	<2 U	<2 U	<2 U	<2 U	<2 U
1,4-Dichlorobenzene	106-46-7	3	NS	ug/l	NA	NA	NA	NA	NA	<2 U	<2 U	<2 U	<2 U	<2 U
1,4-Dioxane (P-Dioxane)	123-91-1	NS	1	ug/l	NA	NA	NA	NA	NA	<0.134 U	<0.144 U	<0.15 U	<0.144 U	<0.139 U
2,3,4,6-Tetrachlorophenol	58-90-2	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	95-95-4	NS	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
2,4,6-Trichlorophenol	88-06-2	NS	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
2,4-Dichlorophenol	120-83-2	1	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
2,4-Dimethylphenol	105-67-9	1	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
2,4-Dinitrophenol	51-28-5	1	NS	ug/l	NA	NA	NA	NA	NA	<20 U	<20 U	<20 U	<20 U	<20 U
2,4-Dinitrotoluene	121-14-2	5	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
2,6-Dinitrotoluene	606-20-2	5	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
2-Chloronaphthalene	91-58-7	10	NS	ug/l	NA	NA	NA	NA	NA	<0.2 U	<0.2 U	<1 U	<0.2 U	<0.2 U
2-Chlorophenol	95-57-8	NS	NS	ug/l	NA	NA	NA	NA	NA	<2 U	<2 U	<2 U	<2 U	<2 U
2-Methylnaphthalene	91-57-6	NS	NS	ug/l	NA	NA	NA	NA	NA	0.07 J	<0.1 U	1.6	0.24	<0.1 U
2-Methylphenol (o-Cresol)	95-48-7	NS	NS	ug/l	NA	NA	NA	NA	NA	1.5 J	1.7 J	<5 U	<5 U	<5 U
2-Nitroaniline	88-74-4	5	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
2-Nitrophenol	88-75-5	NS	NS	ug/l	NA	NA	NA	NA	NA	<10 U	<10 U	<10 U	<10 U	<10 U
3 & 4 Methylphenol (m&p Cresol)	65794-96-9	NS	NS	ug/l	NA	NA	NA	NA	NA	2 J	3.1 J	<5 U	<5 U	<5 U
3,3'-Dichlorobenzidine	91-94-1	5	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
3-Nitroaniline	99-09-2	5	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
4,6-Dinitro-2-Methylphenol	534-52-1	NS	NS	ug/l	NA	NA	NA	NA	NA	<10 U	<10 U	<10 U	<10 U	<10 U
4-Bromophenyl Phenyl Ether	101-55-3	NS	NS	ug/l	NA	NA	NA	NA	NA	<2 U	<2 U	<2 U	<2 U	<2 U
4-Chloro-3-Methylphenol	59-50-7	NS	NS	ug/l	NA	NA	NA	NA	NA	<2 U	<2 U	<2 U	<2 U	<2 U
4-Chloroaniline	106-47-8	5	NS	ug/l	NA	NA	NA	NA	NA	<5 UJ	<5 UJ	<5 UJ	<5 UJ	<5 UJ
4-Chlorophenyl Phenyl Ether	7005-72-3	NS	NS	ug/l	NA	NA	NA	NA	NA	<2 U	<2 U	<2 U	<2 U	<2 U
4-Nitroaniline	100-01-6	5	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
4-Nitrophenol	100-02-7	NS	NS	ug/l	NA	NA	NA	NA	NA	<10 U	<10 U	<10 U	<10 U	<10 U
Acenaphthene	83-32-9	20	NS	ug/l	NA	NA	NA	NA	NA	<0.1 U	<0.1 U	0.44 J	0.7	<0.1 U
Acenaphthylene	208-96-8	NS	NS	ug/l	NA	NA	NA	NA	NA	0.35	0.26	<0.5 U	<0.1 U	<0.1 U
Acetophenone	98-86-2	NS	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
Aniline (Phenylamine, Aminobenzene)	62-53-3	5	NS	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	120-12-7	50	NS	ug/l	NA	NA	NA	NA	NA	0.03 J	0.05 J	<0.5 U	0.21	<0.1 U
Atrazine	1912-24-9	7.5	NS	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzaldehyde	100-52-7	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzidine	92-87-5	5	NS	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	56-55-3	0.002	NS	ug/l	NA	NA	NA	NA	NA	<0.1 U	<0.1 U	<0.5 U	<0.1 U	<0.1 U
Benzo(a)pyrene	50-32-8	0	NS	ug/l	NA	NA	NA	NA	NA	<0.1 U	<0.1 U	<0.5 U	<0.1 U	<0.1 U
Benzo(b)fluoranthene	205-99-2	0.002	NS	ug/l	NA	NA	NA	NA	NA	<0.1 U	<0.1 U	<0.5 U	<0.1 U	<0.1 U
Benzo(g,h,i)Perylene	191-24-2	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.1 U	<0.1 U	<0.5 U	<0.1 U	<0.1 U
Benzo(k)fluoranthene	207-08-9	0.002	NS	ug/l	NA	NA	NA	NA	NA	<0.1 U	<0.1 U	<0.5 U	<0.1 U	<0.1 U
Benzoic Acid	65-85-0	NS	NS	ug/l	NA	NA	NA	NA	NA	14 J	15 J	<50 U	<50 U	<50 U
Benzyl Alcohol	100-51-6	NS	NS	ug/l	NA	NA	NA	NA	NA	2	2.5	<2 U	<2 U	<2 U
Benzyl Butyl Phthalate	85-68-7	50	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
Biphenyl (Diphenyl)	92-52-4	5	NS	ug/l	NA	NA	NA	NA	NA	<2 U	<2 U	<2 U	<2 U	<2 U
Bis(2-chloroethoxy) methane	111-91-1	5	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
Bis(2-chloroethyl) ether (2-chloroethyl ether)	111-44-4	1	NS	ug/l	NA	NA	NA	NA	NA	<2 U	<2 U	<2 U	<2 U	<2 U
Bis(2-chloroisopropyl) ether	108-60-1	5	NS	ug/l	NA	NA	NA	NA	NA	<2 UJ	<2 UJ	<2 UJ	<2 UJ	<2 UJ
Bis(2-ethylhexyl) phthalate	117-81-7	5	NS	ug/l	NA	NA	NA	NA	NA	<3 U	<3 U	<3 U	<3 U	<3 U
Caprolactam	105-60-2	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	86-74-8	NS	NS	ug/l	NA	NA	NA	NA	NA	<2 U	<2 U	<2 U	<2 U	<2 U
Chrysene	218-01-9	**0.002**	NS	ug/l	NA	NA	NA	NA	NA	<0.1 U	<0.1 U	<0.5 U	**0.02 J**	<0.1 U
Dibenz(a,h)anthracene	53-70-3	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.1 U	<0.1 U	<0.5 U	<0.1 U	<0.1 U
Dibenzofuran	132-64-9	NS	NS	ug/l	NA	NA	NA	NA	NA	12 J	<2 UJ	<2 U	<2 U	<2 U
Dibutyl phthalate	84-74-2	50	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
Diethyl phthalate	84-66-2	50	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
Dimethyl phthalate	131-11-3	50	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
Dioctyl phthalate	117-84-0	50	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
Fluoranthene	206-44-0	50	NS	ug/l	NA	NA	NA	NA	NA	<0.1 U	<0.1 U	<0.5 U	0.12 J	<0.1 U
Fluorene	86-73-7	50	NS	ug/l	NA	NA	NA	NA	NA	0.04 J	0.04 J	0.53	0.36	<0.1 U
Hexachlorobenzene	118-74-1	0.04	NS	ug/l	NA	NA	NA	NA	NA	<0.8 U	<0.8 U	<4 U	<0.8 U	<0.8 U
Hexachlorobutadiene	87-68-3	0.5	NS	ug/l	NA	NA	NA	NA	NA	<0.5 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U
Hexachlorocyclopentadiene	77-47-4	5	NS	ug/l	NA	NA	NA	NA	NA	<20 U	<20 U	<20 U	<20 U	<20 U
Hexachloroethane	67-72-1	5	NS	ug/l	NA	NA	NA	NA	NA	<0.8 U	<0.8 U	<4 U	<0.8 U	<0.8 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.002	NS	ug/l	NA	NA	NA	NA	NA	<0.1 U	<0.1 U	<0.5 U	<0.1 U	<0.1 U
Isophorone	78-59-1	50	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
Naphthalene	91-20-3	10	NS	ug/l	NA	NA	NA	NA	NA	0.09 J	0.05 J	<0.5 U	<0.1 U	0.05 J
Nitrobenzene	98-95-3	0.4	NS	ug/l	NA	NA	NA	NA	NA	<2 U	<2 U	<2 U	<2 U	<2 U
n-Nitrosodimethylamine	62-75-9	NS	NS	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodi-N-Propylamine	621-64-7	NS	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<5 U	<5 U	<5 U	<5 U
n-Nitrosodiphenylamine	86-30-6	50	NS	ug/l	NA	NA	NA	NA	NA	<2 U	<2 U	<2 U	<2 U	<2 U
Pentachlorophenol	87-86-5	1	NS	ug/l	NA	NA	NA	NA	NA	<0.8 UJ	<0.8 UJ	<4 U	<0.8 UJ	<0.8 UJ
Phenanthrene	85-01-8	50	NS	ug/l	NA	NA	NA	NA	NA	<0.1 U	<0.1 U	0.54	0.59	<0.1 U
Phenol	108-95-2	**1**	NS	ug/l	NA	NA	NA	NA	NA	**5.5**	**3.6 J**	<5 U	<5 U	<5 U
Pyrene	129-00-0	50	NS	ug/l	NA	NA	NA	NA	NA	<0.1 U	<0.1 U	0.16 J	0.21	<0.1 U
Pyridine	110-86-1	50	NS	ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 2
Remedial Action Work Plan
Groundwater Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC SGVs	NYSDEC Guidance Values	Location	MW-6	MW-6	MW-7	MW-7	MW-7	LMW-6	LMW-6	LMW-7	LMW-9	LMW-10
				Sample Name	064_MW-6_28	065_MW-6_45	061_MW-7_20	062_MW-7_28	063_DUP-5	LMW-6-20220819	DUP-20220819	LMW-7-20220822	LMW-9-20220822	LMW-10-20220819
				Sample Date	02/02/2022	02/02/2022	02/01/2022	02/02/2022	02/02/2022	08/19/2022	08/19/2022	08/22/2022	08/22/2022	08/19/2022
				Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Pesticides														
4,4'-DDD	72-54-8	0.3	NS	ug/l	NA	NA	NA	NA	NA	<0.029 U	<0.029 U	<0.029 U	<0.029 U	<0.029 U
4,4'-DDE	72-55-9	0.2	NS	ug/l	NA	NA	NA	NA	NA	<0.029 U	<0.029 U	<0.029 U	<0.029 U	<0.029 U
4,4'-DDT	50-29-3	0.2	NS	ug/l	NA	NA	NA	NA	NA	<0.029 U	<0.029 U	<0.029 U	<0.029 U	<0.029 U
Aldrin	309-00-2	0	NS	ug/l	NA	NA	NA	NA	NA	<0.014 U	<0.014 U	<0.014 U	<0.014 U	<0.014 U
Alpha BHC (Alpha Hexachlorocyclohexane)	319-84-6	0.01	NS	ug/l	NA	NA	NA	NA	NA	<0.014 U	<0.014 U	<0.014 U	<0.014 U	<0.014 U
Alpha Chlordane	5103-71-9	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.014 U	<0.014 U	<0.014 U	<0.014 U	<0.014 U
Alpha Endosulfan	959-98-8	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.014 U	<0.014 U	<0.014 U	<0.014 U	<0.014 U
Beta Bhc (Beta Hexachlorocyclohexane)	319-85-7	0.04	NS	ug/l	NA	NA	NA	NA	NA	<0.014 U	<0.014 U	<0.014 U	<0.014 U	<0.014 U
Beta Endosulfan	33213-65-9	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.029 U	<0.029 U	<0.029 U	<0.029 U	<0.029 U
Chlordane (alpha and gamma)	57-74-9	0.05	NS	ug/l	NA	NA	NA	NA	NA	<0.143 U	<0.143 U	<0.143 U	<0.143 U	<0.143 U
Delta Bhc (Delta Hexachlorocyclohexane)	319-86-8	0.04	NS	ug/l	NA	NA	NA	NA	NA	<0.014 U	<0.014 U	<0.014 U	<0.014 U	<0.014 U
Dieldrin	60-57-1	0.004	NS	ug/l	NA	NA	NA	NA	NA	<0.029 U	<0.029 U	<0.029 U	<0.029 U	<0.029 U
Endosulfan Sulfate	1031-07-8	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.029 U	<0.029 U	<0.029 U	<0.029 U	<0.029 U
Endrin	72-20-8	0	NS	ug/l	NA	NA	NA	NA	NA	<0.029 U	<0.029 U	<0.029 U	<0.029 U	<0.029 U
Endrin Aldehyde	7421-93-4	5	NS	ug/l	NA	NA	NA	NA	NA	<0.029 U	<0.029 U	<0.029 U	<0.029 U	<0.029 U
Endrin Ketone	53494-70-5	5	NS	ug/l	NA	NA	NA	NA	NA	<0.029 U	<0.029 U	<0.029 U	<0.029 U	<0.029 U
Gamma Bhc (Lindane)	58-89-9	0.05	NS	ug/l	NA	NA	NA	NA	NA	<0.014 U	<0.014 U	<0.014 U	<0.014 U	<0.014 U
Gamma Chlordane (Trans-)	5103-74-2	NS	NS	ug/l	NA	NA	NA	NA	NA	0.043 J	0.056 J	<0.014 U	<0.014 U	<0.014 U
Heptachlor	76-44-8	0.04	NS	ug/l	NA	NA	NA	NA	NA	<0.014 U	<0.014 U	<0.014 U	<0.014 U	<0.014 U
Heptachlor Epoxide	1024-57-3	0.03	NS	ug/l	NA	NA	NA	NA	NA	<0.014 U	<0.014 U	<0.014 U	0.004 J	<0.014 U
Methoxychlor	72-43-5	35	NS	ug/l	NA	NA	NA	NA	NA	<0.143 U	<0.143 U	<0.143 U	<0.143 U	<0.143 U
Toxaphene	8001-35-2	0.06	NS	ug/l	NA	NA	NA	NA	NA	<0.143 U	<0.143 U	<0.143 U	<0.143 U	<0.143 U
Herbicides														
2,4,5-T (Trichlorophenoxyacetic Acid)	93-76-5	35	NS	ug/l	NA	NA	NA	NA	NA	<2 U	<2 U	<2 U	<2 U	<2 U
2,4-D (Dichlorophenoxyacetic Acid)	94-75-7	50	NS	ug/l	NA	NA	NA	NA	NA	<10 U	<10 U	<10 U	<10 U	<10 U
Silvex (2,4,5-Tp)	93-72-1	0.26	NS	ug/l	NA	NA	NA	NA	NA	<2 U	<2 U	<2 U	<2 U	<2 U
Polychlorinated Biphenyl														
PCB-1016 (Aroclor 1016)	12674-11-2	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.071 U	<0.071 U	<0.071 U	<0.071 U	<0.071 U
PCB-1221 (Aroclor 1221)	11104-28-2	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.071 U	<0.071 U	<0.071 U	<0.071 U	<0.071 U
PCB-1232 (Aroclor 1232)	11141-16-5	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.071 U	<0.071 U	<0.071 U	<0.071 U	<0.071 U
PCB-1242 (Aroclor 1242)	53469-21-9	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.071 U	<0.071 U	<0.071 U	<0.071 U	<0.071 U
PCB-1248 (Aroclor 1248)	12672-29-6	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.071 U	<0.071 U	<0.071 U	<0.071 U	<0.071 U
PCB-1254 (Aroclor 1254)	11097-69-1	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.071 U	<0.071 U	<0.071 U	<0.071 U	<0.071 U
PCB-1260 (Aroclor 1260)	11096-82-5	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.071 U	<0.071 U	<0.071 U	<0.071 U	<0.071 U
PCB-1262 (Aroclor 1262)	37324-23-5	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.071 U	<0.071 U	<0.071 U	<0.071 U	<0.071 U
PCB-1268 (Aroclor 1268)	11100-14-4	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.071 U	<0.071 U	<0.071 U	<0.071 U	<0.071 U
Total PCBs	1336-36-3	0.09	NS	ug/l	NA	NA	NA	NA	NA	<0.071 U	<0.071 U	<0.071 U	<0.071 U	<0.071 U
Metals - Dissolved														
Aluminum	7429-90-5	NS	NS	ug/l	NA	NA	NA	NA	NA	<50 U	13.3	5.99 J	4.5 J	15.1 J
Antimony	7440-36-0	**3**	NS	ug/l	NA	NA	NA	NA	NA	**3.21 J**	1.65 J	<4 U	<4 U	1.27 J
Arsenic	7440-38-2	25	NS	ug/l	NA	NA	NA	NA	NA	1.2 J	1.45	0.51	0.24 J	0.28 J
Barium	7440-39-3	1000	NS	ug/l	NA	NA	NA	NA	NA	138.2	108.5	43.4	51.99	74.85
Beryllium	7440-41-7	3	NS	ug/l	NA	NA	NA	NA	NA	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Cadmium	7440-43-9	5	NS	ug/l	NA	NA	NA	NA	NA	<1 U	<0.2 U	<0.2 U	0.57	0.12 J
Calcium	7440-70-2	NS	NS	ug/l	NA	NA	NA	NA	NA	280,000	244,000	421,000	581,000	231,000
Chromium, Total	7440-47-3	50	NS	ug/l	NA	NA	NA	NA	NA	<5 U	0.62 J	<1 U	<1 U	0.31 J
Cobalt	7440-48-4	NS	NS	ug/l	NA	NA	NA	NA	NA	238.4 J	122.3 J	4.87	39.4	1.44 J
Copper	7440-50-8	200	NS	ug/l	NA	NA	NA	NA	NA	<5 U	0.77 J	3.56	2.06	10.37
Iron	7439-89-6	**300**	NS	ug/l	NA	NA	NA	NA	NA	**1,540**	**2,040**	22 J	27.7 J	<50 U
Lead	7439-92-1	25	NS	ug/l	NA	NA	NA	NA	NA	<5 U	0.37 J	<1 U	<1 U	<1 U
Magnesium	7439-95-4	**35000**	NS	ug/l	NA	NA	NA	NA	NA	**168,000**	**137,000**	**158,000**	**198,000**	31,700
Manganese	7439-96-5	**300**	NS	ug/l	NA	NA	NA	NA	NA	**30,740**	**24,640**	**1,490**	**12,190**	**370.7 J**
Mercury	7439-97-6	0.7	NS	ug/l	NA	NA	NA	NA	NA	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Nickel	7440-02-0	**100**	NS	ug/l	NA	NA	NA	NA	NA	**173.9 J**	**100.5 J**	6.81	73.05	18.81
Potassium	7440-09-7	NS	NS	ug/l	NA	NA	NA	NA	NA	27,000	24,100	20,700	21,000	14,000
Selenium	7782-49-2	**10**	NS	ug/l	NA	NA	NA	NA	NA	<25 U	<5 U	5.34	9.1	**10.7**
Silver	7440-22-4	50	NS	ug/l	NA	NA	NA	NA	NA	<2 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
Sodium	7440-23-5	**20000**	NS	ug/l	NA	NA	NA	NA	NA	**33,100**	**31,900**	**126,000**	**199,000**	**56,400**
Thallium	7440-28-0	0.5	NS	ug/l	NA	NA	NA	NA	NA	<5 U	<1 U	<1 U	<1 U	<1 U
Vanadium	7440-62-2	NS	NS	ug/l	NA	NA	NA	NA	NA	<25 U	3.06 J	<5 U	<5 U	<5 U
Zinc	7440-66-6	2000	NS	ug/l	NA	NA	NA	NA	NA	<50 U	<10 U	<10 U	13.19	3.86 J
Metals - Total														
Aluminum	7429-90-5	NS	NS	ug/l	NA	NA	NA	NA	NA	293 J	9,730 J	47,000	15,200	9,910
Antimony	7440-36-0	3	NS	ug/l	NA	NA	NA	NA	NA	2.8 J	1.96 J	1.17 J	0.56 J	1 J
Arsenic	7440-38-2	25	NS	ug/l	NA	NA	NA	NA	NA	1.41 J	3.49 J	19.84	4.67	2.28
Barium	7440-39-3	1000	NS	ug/l	NA	NA	NA	NA	NA	144.1 J	250.1 J	751	215.6	193.8
Beryllium	7440-41-7	**3**	NS	ug/l	NA	NA	NA	NA	NA	<0.5 U	0.41 J	**4.22**	0.88	0.69
Cadmium	7440-43-9	5	NS	ug/l	NA	NA	NA	NA	NA	0.12 J	0.33 J	3.84	1.26	0.29
Calcium	7440-70-2	NS	NS	ug/l	NA	NA	NA	NA	NA	268,000	224,000	1,450,000	649,000	212,000
Chromium, Hexavalent	18540-29-9	50	NS	ug/l	NA	NA	NA	NA	NA	4 J	5 J	<10 U	<10 U	<10 U
Chromium, Total	7440-47-3	NS	NS	ug/l	NA	NA	NA	NA	NA	1.22 J	28.57 J	97.86	42.86	32.84
Cobalt	7440-48-4	NS	NS	ug/l	NA	NA	NA	NA	NA	241.3 J	139.4 J	231.1	86.29	14.33
Copper	7440-50-8	**200**	NS	ug/l	NA	NA	NA	NA	NA	13.28 J	48.35 J	**242.4**	94.62	61.29
Cyanide	57-12-5	200	NS	ug/l	NA	NA	NA	NA	NA	3 J	4 J	11	10	<5 U
Iron	7439-89-6	**300**	NS	ug/l	NA	NA	NA	NA	NA	**3,360 J**	**18,700 J**	**54,600**	**26,700**	**18,900**
Lead	7439-92-1	**25**	NS	ug/l	NA	NA	NA	NA	NA	1.83 J	**32.78 J**	**1,496**	**339.6**	**36.9**
Magnesium	7439-95-4	**35000**	NS	ug/l	NA	NA	NA	NA	NA	**146,000**	**131,000**	**244,000**	**204,000**	34,700
Manganese	7439-96-5	**300**	NS	ug/l	NA	NA	NA	NA	NA	**28,740**	**23,130**	**12,390**	**13,070**	**1,159**
Mercury	7439-97-6	0.7	NS	ug/l	NA	NA	NA	NA	NA	<0.2 U	<0.2 U	0.59	0.22	0.11 J
Nickel	7440-02-0	**100**	NS	ug/l	NA	NA	NA	NA	NA	**169.8**	**133.1**	**163.9**	**123.6**	54.37
Potassium	7440-09-7	NS	NS	ug/l	NA	NA	NA	NA	NA	26,500	26,200	34,200	26,600	17,800
Selenium	7782-49-2	**10**	NS	ug/l	NA	NA	NA	NA	NA	<5 U	2.56 J	**25.7**	**10.3**	**10.4**
Silver	7440-22-4	50	NS	ug/l	NA	NA	NA	NA	NA	<0.4 U	<0.4 U	1.09	0.66	3.49
Sodium	7440-23-5	**20000**	NS	ug/l	NA	NA	NA	NA	NA	**29,900**	**28,900**	**130,000**	**198,000**	**52,800**
Thallium	7440-28-0	0.5	NS	ug/l	NA	NA	NA	NA	NA	<1 U	0.3 J	<1 U	<1 U	0.5 J
Vanadium	7440-62-2	NS	NS	ug/l	NA	NA	NA	NA	NA	2.91 J	33.29 J	151.4	49.13	30.14
Zinc	7440-66-6	2000	NS	ug/l	NA	NA	NA	NA	NA	13.41 J	71.97 J	927.9	232.4	83.83

Table 2
Remedial Action Work Plan
Groundwater Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDEC SGVs	NYSDEC Guidance Values	Location	MW-6	MW-6	MW-7	MW-7	MW-7	LMW-6	LMW-6	LMW-7	LMW-9	LMW-10
				Sample Name	064_MW-6_28	065_MW-6_45	061_MW-7_20	062_MW-7_28	063_DUP-5	LMW-6-20220819	DUP-20220819	LMW-7-20220822	LMW-9-20220822	LMW-10-20220819
				Sample Date	02/02/2022	02/02/2022	02/01/2022	02/02/2022	02/02/2022	08/19/2022	08/19/2022	08/22/2022	08/22/2022	08/19/2022
				Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Perfluorooctanoic acids														
N-ethyl perfluorooctane- sulfonamidoacetic Acid (NEtFOSAA)	2991-50-6	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.00186 UJ	<0.00189 U	0.00192 J	0.00148 J	0.0211
N-methyl perfluorooctane- sulfonamidoacetic Acid (NMeFOSAA)	2355-31-9	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.00186 UJ	0.000948 J	0.00071 J	<0.00183 U	0.000837 J
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	NS	NS	ug/l	NA	NA	NA	NA	NA	0.0106	0.0108	0.035	0.139	0.03
Perfluorobutanoic acid (PFBA)	375-22-4	NS	NS	ug/l	NA	NA	NA	NA	NA	0.0579	0.0637	0.057	0.154	0.0737
Perfluorodecanesulfonic Acid (PFDS)	335-77-3	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.00186 U	<0.00189 U	<0.002 U	<0.00183 U	0.00466
Perfluorodecanoic Acid (PFDA)	335-76-2	NS	NS	ug/l	NA	NA	NA	NA	NA	0.00658 J	0.00982 J	0.00445	0.00315	0.00222
Perfluorododecanoic Acid (PFDoA)	307-55-1	NS	NS	ug/l	NA	NA	NA	NA	NA	0.00132 J	0.00176 J	0.000742 J	0.000436 J	<0.00197 U
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	NS	NS	ug/l	NA	NA	NA	NA	NA	0.00116 J	0.00171 J	0.00278	0.0022	0.00336
Perfluoroheptanoic acid (PFHpA)	375-85-9	NS	NS	ug/l	NA	NA	NA	NA	NA	0.0351	0.0388	0.0372	0.113	0.0598
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	NS	NS	ug/l	NA	NA	NA	NA	NA	0.00571	0.00654 J	0.0173	0.0693	0.0482
Perfluorohexanoic Acid (PFHxA)	307-24-4	NS	NS	ug/l	NA	NA	NA	NA	NA	0.0413	0.0466 J	0.0426	0.15	0.0879
Perfluorononanoic Acid (PFNA)	375-95-1	NS	NS	ug/l	NA	NA	NA	NA	NA	0.0126	0.0139	0.00778	0.006	0.0338
Perfluorooctanesulfonamide (FOSA)	754-91-6	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.00186 U	<0.00189 U	<0.002 U	<0.00183 U	<0.00197 UJ
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	NS	0.01	ug/l	NA	NA	NA	NA	NA	0.089	0.0989	0.127	0.0624	0.123
Perfluorooctanoic Acid (PFOA)	335-67-1	NS	0.01	ug/l	NA	NA	NA	NA	NA	0.081	0.0934	0.136	0.239	0.151
Perfluoropentanoic Acid (PFPeA)	2706-90-3	NS	NS	ug/l	NA	NA	NA	NA	NA	0.0766	0.088	0.0569	0.155	0.124
Perfluorotetradecanoic Acid (PFTA)	376-06-7	NS	NS	ug/l	NA	NA	NA	NA	NA	0.000391 J	0.00054 J	0.000485 J	<0.00183 U	<0.00197 U
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8	NS	NS	ug/l	NA	NA	NA	NA	NA	0.0007 J	0.00164 J	0.000602 J	<0.00183 U	0.0006 J
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	NS	NS	ug/l	NA	NA	NA	NA	NA	0.0023	0.00237	0.00122 J	0.000846 J	0.00169 J
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2) (8:2FTS)	39108-34-4	NS	NS	ug/l	NA	NA	NA	NA	NA	<0.00186 UJ	<0.00189 UJ	<0.002 UJ	<0.00183 U	<0.00197 UJ
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2) (6:2FTS)	27619-97-2	NS	NS	ug/l	NA	NA	NA	NA	NA	0.00171 J	0.00164 J	<0.002 UJ	0.00141 J	0.0314 J
Total PFOA and PFOS	TOTPFOAPFOS	NS	NS	ug/l	NA	NA	NA	NA	NA	0.17	0.192	0.263	0.301	0.274

Table 2
Remedial Action Work Plan
Groundwater Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Notes:

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

Groundwater sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 of the Official Compilation of New York Codes, Rules, and Regulations (NYCRR) Part 703.5 and the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA Water (herein collectively referenced as "NYSDEC SGVs").

Groundwater sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Part 375 Remedial Programs Guidelines for Sampling and Analysis of Per- and Polyfluoroalkyl Substances (PFAS) (June 2021) and the 1,4-Dioxane value reflects the drinking water maximum contaminant level (MCL) adopted by New York State for public water systems (July 2020). Pursuant to Part 375-1.7(f)(2), the NYSDEC will treat the MCL as relevant and appropriate and will consider this value in remedy selection.

Qualifiers:

D - The concentration reported is a result of a diluted sample.
B - The analyte was found in the associated analysis batch blank.
J - The analyte was positively identified and the associated numerical value is the approximate concentration of
UJ - The analyte was not detected at a level greater than or equal to the RL; however, the reported RL is
U - The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.

Exceedance Summary:

10	- Result exceeds NYSDEC SGVs
10	- Result exceeds NYSDEC Guidance Values

Table 3
Remedial Action Work Plan
Soil Vapor Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDOH Decision Matrices Minimum Concentrations	Location	AA	AA	AA	SV-01	SV-01	SV-02	SV-03	SV-04	SV-5	SV-6	SV-6
			Sample Name	AA_080922	AA_20220826	AA_012523	027_SV-01_20211110	026_SVDUP_20211110	025_SV-02_20211110	028_SV-03_20211110	029_SV-04_20211110	033_SV-5	034_SV-6	SV-6_080922
			Sample Date	08/09/2022	08/26/2022	01/25/2023	11/10/2021	11/10/2021	11/10/2021	11/10/2021	11/10/2021	01/25/2022	01/25/2022	08/09/2022
			Sample Type	AA	AA	AA	SV	SV	SV	SV	SV	SV	SV	SV
			Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatile Organic Compounds														
1,1,1,2-Tetrachloroethane	630-20-6	NS	ug/m3	NA	NA	NA	<1.21 U	<1 U	<12.4 U	<1.32 U	<4.16 U	NA	NA	NA
1,1,1-Trichloroethane	71-55-6	100	ug/m3	<1.09 U	<1.09 U	<1.09 U	<0.961 U	<0.796 U	<9.85 U	<1.05 U	<3.31 U	<1.09 U	<1.09 U	<1.09 UJ
1,1,2,2-Tetrachloroethane	79-34-5	NS	ug/m3	<1.37 U	<1.37 U	<1.37 U	<1.21 U	<1 U	<12.4 U	<1.32 U	<4.16 U	<1.37 U	<1.37 U	<1.37 UJ
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	NS	ug/m3	<1.53 U	<1.53 U	<1.53 U	<1.35 U	<1.12 U	<13.8 U	<1.48 U	<4.65 U	<1.53 U	<1.53 U	<1.53 UJ
1,1,2-Trichloroethane	79-00-5	NS	ug/m3	<1.09 U	<1.09 U	<1.09 U	<0.961 U	<0.796 U	<9.85 U	<1.05 U	<3.31 U	<1.09 U	<1.09 U	<1.09 UJ
1,1-Dichloroethane	75-34-3	NS	ug/m3	<0.809 U	<0.809 U	<0.809 U	<0.713 U	<0.59 U	<7.31 U	<0.781 U	<2.45 U	<0.809 U	<0.809 U	<0.809 UJ
1,1-Dichloroethene	75-35-4	**6**	ug/m3	<0.793 U	<0.793 U	<0.793 U	<0.349 U	<0.289 U	<3.58 U	<0.382 U	<1.2 U	<0.793 U	<0.793 U	<0.793 UJ
1,2,4-Trichlorobenzene	120-82-1	NS	ug/m3	<1.48 U	<1.48 U	<1.48 U	<1.31 U	<1.08 U	<13.4 U	<1.43 U	<4.5 U	<1.48 U	<1.48 U	<1.48 UJ
1,2,4-Trimethylbenzene	95-63-6	NS	ug/m3	1.51	<0.983 U	<0.983 U	13.8 D	12.5 D	18.6 D	21.9 D	16.7 D	20.6	10.9	<0.983 UJ
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	NS	ug/m3	<1.54 U	<1.54 U	<1.54 U	<1.35 U	<1.12 U	<13.9 U	<1.48 U	<4.66 U	<1.54 U	<1.54 U	<1.54 UJ
1,2-Dichlorobenzene	95-50-1	NS	ug/m3	<1.2 U	<1.2 U	<1.2 U	<1.06 U	<0.877 U	<10.9 U	<1.16 U	<3.65 U	<1.2 U	<1.2 U	<1.2 UJ
1,2-Dichloroethane	107-06-2	NS	ug/m3	<0.809 U	<0.809 U	<0.809 U	<0.713 U	<0.59 U	<7.31 U	<0.781 U	<2.45 U	<0.809 U	<0.809 U	<0.809 UJ
1,2-Dichloropropane	78-87-5	NS	ug/m3	<0.924 U	<0.924 U	<0.924 U	<0.814 U	<0.674 U	<8.35 U	<0.891 U	<2.8 U	<0.924 U	<0.924 U	<0.924 UJ
1,2-Dichlorotetrafluoroethane	76-14-2	NS	ug/m3	<1.4 U	<1.4 U	<1.4 U	<1.23 U	<1.02 U	<12.6 U	<1.35 U	<4.24 U	<1.4 U	<1.4 U	<1.4 UJ
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	NS	ug/m3	<0.983 U	<0.983 U	<0.983 U	1.65 D	3.01 D	<8.88 U	5.12 D	<2.98 U	5.6	2.68	<0.983 UJ
1,3-Butadiene	106-99-0	NS	ug/m3	<0.442 U	<0.442 U	<0.442 U	<1.17 U	<0.968 U	<12 U	<1.28 U	<4.02 U	0.509	<0.442 U	<0.442 UJ
1,3-Dichlorobenzene	541-73-1	NS	ug/m3	<1.2 U	<1.2 U	<1.2 U	<1.06 U	<0.877 U	<10.9 U	<1.16 U	<3.65 U	<1.2 U	<1.2 U	<1.2 UJ
1,3-Dichloropropane	142-28-9	NS	ug/m3	NA	NA	NA	<0.814 U	<0.674 U	<8.35 U	<0.891 U	<2.8 U	NA	NA	NA
1,4-Dichlorobenzene	106-46-7	NS	ug/m3	<1.2 U	<1.2 U	<1.2 U	<1.06 U	<0.877 U	<10.9 U	<1.16 U	<3.65 U	<1.2 U	<1.2 U	<1.2 UJ
1,4-Dioxane (P-Dioxane)	123-91-1	NS	ug/m3	<0.721 U	<0.721 U	<0.721 U	<1.27 U	<1.05 U	<13 U	<1.39 U	<4.37 U	<0.721 U	<0.721 U	<0.721 UJ
2,2,4-Trimethylpentane	540-84-1	NS	ug/m3	7.33	<0.934 U	<0.934 U	NA	NA	NA	NA	NA	9.72	1.51	<0.934 UJ
2-Hexanone (MBK)	591-78-6	NS	ug/m3	<0.82 U	<0.82 U	<0.82 U	<1.44 U	<1.19 U	<14.8 U	<1.58 U	<4.97 U	9.71	<0.82 U	<0.82 UJ
4-Ethyltoluene	622-96-8	NS	ug/m3	<0.983 U	<0.983 U	<0.983 U	12.2 D	11.5 D	17.8 D	20 D	14.6 D	6.19	3.17	<0.983 UJ
Acetone	67-64-1	NS	ug/m3	118	22.4	5.37	69.8 D	68.6 D	23.6 D	109 D	63.2 D	87.7	57	<2.38 UJ
Acrylonitrile	107-13-1	NS	ug/m3	NA	NA	NA	<0.382 U	<0.316 U	<3.92 U	<0.419 U	<1.32 U	NA	NA	NA
Allyl Chloride (3-Chloropropene)	107-05-1	NS	ug/m3	<0.626 U	<0.626 U	<0.626 U	<2.76 U	<2.28 U	<28.3 U	<3.02 U	<9.49 U	<0.626 U	<0.626 U	<0.626 UJ
Benzene	71-43-2	NS	ug/m3	4.34	0.783	1.17	2.76 D	2.65 D	<5.77 U	1.79 D	2.13 D	14.8	1.63	<0.639 UJ
Benzyl Chloride	100-44-7	NS	ug/m3	<1.04 U	<1.04 U	<1.04 U	<0.912 U	<0.755 U	<9.35 U	<0.999 U	<3.14 U	<1.04 U	<1.04 U	<1.04 UJ
Bromodichloromethane	75-27-4	NS	ug/m3	<1.34 U	<1.34 U	<1.34 U	<1.18 U	<0.977 U	<12.1 U	<1.29 U	<4.06 U	<1.34 U	<1.34 U	<1.34 UJ
Bromoethene	593-60-2	NS	ug/m3	<0.874 U	<0.874 U	<0.874 U	<0.771 U	<0.638 U	<7.9 U	<0.844 U	<2.65 U	<0.874 U	<0.874 U	<0.874 UJ
Bromoform	75-25-2	NS	ug/m3	<2.07 U	<2.07 U	<2.07 U	<1.82 U	<1.51 U	<18.7 U	<1.99 U	<6.27 U	<2.07 U	<2.07 U	<2.07 UJ
Bromomethane	74-83-9	NS	ug/m3	<0.777 U	<0.777 U	<0.777 U	<0.684 U	<0.566 U	<7.01 U	<0.749 U	<2.35 U	<0.777 U	<0.777 U	<0.777 UJ
Carbon Disulfide	75-15-0	NS	ug/m3	<0.623 U	<0.623 U	<0.623 U	48.6 D	49.2 D	<5.62 U	25.4 D	4.72 D	6.38	7.79	2.23 J
Carbon Tetrachloride	56-23-5	6	ug/m3	<1.26 U	<1.26 U	<1.26 U	0.443 D	0.367 D	<2.84 U	0.364 D	<0.954 U	<1.26 U	<1.26 U	<1.26 UJ
Chlorobenzene	108-90-7	NS	ug/m3	<0.921 U	<0.921 U	<0.921 U	<0.811 U	<0.671 U	<8.31 U	<0.888 U	<2.79 U	<0.921 U	<0.921 U	<0.921 UJ
Chloroethane	75-00-3	NS	ug/m3	<0.528 U	<0.528 U	<0.528 U	<0.465 U	<0.385 U	<4.77 U	<0.509 U	<1.6 U	<0.528 U	<0.528 U	<0.528 UJ
Chloroform	67-66-3	NS	ug/m3	<0.977 U	<0.977 U	<0.977 U	1.81 D	1.71 D	<8.82 U	4.24 D	2.96 D	1.04	12.2	17.7 J
Chloromethane	74-87-3	NS	ug/m3	1.39	1.25	0.948	<0.364 U	<0.301 U	<3.73 U	<0.398 U	<1.25 U	<0.413 U	<0.413 U	<0.413 UJ
Cis-1,2-Dichloroethene	156-59-2	**6**	ug/m3	<0.793 U	<0.793 U	<0.793 U	<0.349 U	<0.289 U	**6.44 D**	<0.382 U	<1.2 U	<0.793 U	<0.793 U	<0.793 UJ
Cis-1,3-Dichloropropene	10061-01-5	NS	ug/m3	<0.908 U	<0.908 U	<0.908 U	<0.8 U	<0.662 U	<8.2 U	<0.876 U	<2.75 U	<0.908 U	<0.908 U	<0.908 UJ
Cyclohexane	110-82-7	NS	ug/m3	3.24	<0.688 U	<0.688 U	0.667 D	0.703 D	33.6 D	4.45 D	<2.09 U	4.89	<0.688 U	<0.688 UJ
Dibromochloromethane	124-48-1	NS	ug/m3	<1.7 U	<1.7 U	<1.7 U	<1.5 U	<1.24 U	<15.4 U	<1.64 U	<5.17 U	<1.7 U	<1.7 U	<1.7 UJ
Dichlorodifluoromethane	75-71-8	NS	ug/m3	2.59	2.75	2.11	54.6 D	52.9 D	34.8 D	85.7 D	1,180 D	2.59	2.54	2.66 J
Ethanol	64-17-5	NS	ug/m3	66.5	23.6	15.6	NA	NA	NA	NA	NA	41.1	<9.42 U	<9.42 UJ
Ethyl Acetate	141-78-6	NS	ug/m3	<1.8 U	<1.8 U	<1.8 U	<1.27 U	<1.05 U	<13 U	<1.39 U	<4.37 U	<1.8 U	<1.8 U	<1.8 UJ
Ethylbenzene	100-41-4	NS	ug/m3	1.88	<0.869 U	<0.869 U	7.96 D	7.47 D	13.3 D	12.8 D	10.3 D	12.3	7.12	<0.869 UJ
Hexachlorobutadiene	87-68-3	NS	ug/m3	<2.13 U	<2.13 U	<2.13 U	<1.88 U	<1.55 U	<19.3 U	<2.06 U	<6.47 U	<2.13 U	<2.13 U	<2.13 UJ
Isopropanol	67-63-0	NS	ug/m3	4.79	9.86	2.01	2.17 D	1.97 D	<8.88 U	1.09 D	<2.98 U	29.7	4.92	<1.23 UJ
M,P-Xylene	179601-23-1	NS	ug/m3	6.56	<1.74 U	<1.74 U	43.1 D	40.1 D	69.8 D	70 D	56.9 D	45.6	28.6	<1.74 UJ
Methyl Ethyl Ketone (2-Butanone)	78-93-3	NS	ug/m3	3.1	<1.47 U	<1.47 U	8.47 D	8.21 D	<5.33 U	11.5 D	3.58 D	36.6	5.66	<1.47 UJ
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	NS	ug/m3	<2.05 U	<2.05 U	<2.05 U	<0.722 U	<0.597 U	<7.4 U	<0.79 U	<2.48 U	<2.05 U	<2.05 U	<2.05 UJ
Methyl Methacrylate	80-62-6	NS	ug/m3	NA	NA	NA	0.721 D	<0.597 U	<7.39 U	<0.79 U	<2.48 U	NA	NA	NA
Methylene Chloride	75-09-2	100	ug/m3	<1.74 U	<1.74 U	<1.74 U	<1.22 U	2.43 D	<12.5 U	2.95 D	<4.21 U	<1.74 U	<1.74 U	<1.74 UJ
Naphthalene	91-20-3	NS	ug/m3	NA	NA	NA	<1.85 U	<1.53 U	<18.9 U	<2.02 U	<6.36 U	NA	NA	NA
n-Heptane	142-82-5	NS	ug/m3	4.26	<0.82 U	<0.82 U	2.53 D	2.57 D	<7.4 U	3.16 D	<2.49 U	11.7	13.5	<0.82 UJ
n-Hexane	110-54-3	NS	ug/m3	78.9	0.945	2.53	6.65 D	6.73 D	<6.37 U	6.66 D	2.99 D	14	9.97	<0.705 UJ
o-Xylene (1,2-Dimethylbenzene)	95-47-6	NS	ug/m3	2.46	<0.869 U	<0.869 U	12.5 D	11.7 D	23.5 D	20.5 D	15.8 D	15.7	9.51	<0.869 UJ
Propylene	115-07-1	NS	ug/m3	NA	NA	NA	32.1 D	31.3 D	<3.11 U	<0.332 U	16.4 D	NA	NA	NA
Styrene	100-42-5	NS	ug/m3	<0.852 U	<0.852 U	<0.852 U	<0.751 U	<0.621 U	<7.69 U	<0.822 U	<2.58 U	1.68	1.15	<0.852 UJ
Tert-Butyl Alcohol	75-65-0	NS	ug/m3	<1.52 U	<1.52 U	<1.52 U	NA	NA	NA	NA	NA	1.53	<1.52 U	<1.52 UJ
Tert-Butyl Methyl Ether	1634-04-4	NS	ug/m3	<0.721 U	<0.721 U	<0.721 U	<0.635 U	<0.526 U	<6.51 U	<0.695 U	<2.19 U	<0.721 U	<0.721 U	<0.721 UJ
Tetrachloroethene (PCE)	127-18-4	**100**	ug/m3	<1.36 U	<1.36 U	<1.36 U	4.78 D	4.65 D	**8,610 D**	8.5 D	13.2 D	3.68	2.62	12.2 J
Tetrahydrofuran	109-99-9	NS	ug/m3	<1.47 U	<1.47 U	<1.47 U	<1.04 U	<0.86 U	<10.7 U	<1.14 U	<3.58 U	2.31	<1.47 U	<1.47 UJ
Toluene	108-88-3	NS	ug/m3	11.3	2.36	2.31	27.9 D	25.7 D	45.6 D	39.5 D	35.6 D	45.6	21	<0.754 UJ
Total 1,2-Dichloroethene (Cis and Trans)	540-59-0	NS	ug/m3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	1330-20-7	NS	ug/m3	9.03	NA	NA	NA	NA	NA	NA	NA	61.2	38.1	<0.869 UJ
Trans-1,2-Dichloroethene	156-60-5	NS	ug/m3	<0.793 U	<0.793 U	<0.793 U	<0.699 U	<0.578 U	<7.16 U	<0.765 U	<2.4 U	<0.793 U	<0.793 U	<0.793 UJ
Trans-1,3-Dichloropropene	10061-02-6	NS	ug/m3	<0.908 U	<0.908 U	<0.908 U	<0.8 U	<0.662 U	<8.2 U	<0.876 U	<2.75 U	<0.908 U	<0.908 U	<0.908 UJ
Trichloroethene (TCE)	79-01-6	**6**	ug/m3	<1.07 U	<1.07 U	<1.07 U	0.663 D	0.627 D	**489 D**	0.518 D	<0.815 U	<1.07 U	<1.07 U	<1.07 UJ
Trichlorofluoromethane	75-69-4	NS	ug/m3	1.14	1.35	<1.12 U	1.68 D	1.56 D	<10.1 U	1.84 D	<3.41 U	1.31	1.25	1.78 J
Vinyl Acetate	108-05-4	NS	ug/m3	NA	NA	NA	<0.62 U	<0.513 U	<6.36 U	<0.679 U	<2.14 U	NA	NA	NA
Vinyl Chloride	75-01-4	6	ug/m3	<0.511 U	<0.511 U	<0.511 U	<0.225 U	<0.186 U	<2.31 U	<0.247 U	<0.775 U	<0.511 U	<0.511 U	<0.511 UJ

Table 3
Remedial Action Work Plan
Soil Vapor Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	NYSDOH Decision Matrices Minimum Concentrations	Location	SV-7	SV-7	LSV-8	LSV-10	LSV-11	LSV-11	LSV-12	LSV-13	LSV-14	LSV-15	LSV-16
			Sample Name	035_SV-7	036_DUP-2	LSV-8_20220826	LSV-10_20220826	LSV-11_080922	DUP_080922	LSV-12_080922	LSV-13_080922	LSV-14_012523	LSV-15_012523	LSV-16_012523
			Sample Date	01/25/2022	01/25/2022	08/26/2022	08/26/2022	08/09/2022	08/09/2022	08/09/2022	08/09/2022	01/25/2023	01/25/2023	01/25/2023
			Sample Type	SV	SV	SV	SV	SV	SV	SV	SV	SV	SV	SV
			Unit	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatile Organic Compounds														
1,1,1,2-Tetrachloroethane	630-20-6	NS	ug/m3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	71-55-6	100	ug/m3	<1.09 U	<1.09 U	<3.84 U	1.92	<1.09 U	<1.09 U	<1.09 U	<1.09 U	<1.09 U	<1.09 U	1.17
1,1,2,2-Tetrachloroethane	79-34-5	NS	ug/m3	<1.37 U	<1.37 U	<48.3 U	<1.37 U	<1.37 U	<1.37 U	<1.37 U	<1.37 U	<1.37 U	<1.37 U	<1.37 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	NS	ug/m3	<1.53 U	<1.53 U	<54 U	<1.53 U	<1.53 U	<1.53 U	<1.53 U	<1.53 U	<1.53 U	<1.53 U	<1.53 U
1,1,2-Trichloroethane	79-00-5	NS	ug/m3	<1.09 U	<1.09 U	<38.4 U	<1.09 U	<1.09 U	<1.09 U	<1.09 U	<1.09 U	<1.09 U	<1.09 U	<1.09 U
1,1-Dichloroethane	75-34-3	NS	ug/m3	<0.809 U	<0.809 U	<28.5 U	<0.809 U	<0.809 U	<0.809 U	<0.809 U	<0.809 U	<0.809 U	<0.809 U	<0.809 U
1,1-Dichloroethene	75-35-4	6	ug/m3	<0.793 U	<0.793 U	**7.97**	<0.793 U	<0.793 U	<0.793 U	<0.793 U	<0.793 U	<0.793 U	<0.793 U	<0.793 U
1,2,4-Trichlorobenzene	120-82-1	NS	ug/m3	<1.48 U	<1.48 U	<52.3 U	<1.48 U	<1.48 U	<1.48 U	<1.48 U	<1.48 U	<1.48 U	<1.48 U	<1.48 U
1,2,4-Trimethylbenzene	95-63-6	NS	ug/m3	6.05	7.57	71.3	18.3	6.59	7.77	13.5	9.93	5.56	6.93	8.9
1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	NS	ug/m3	<1.54 U	<1.54 U	<54.1 U	<1.54 U	<1.54 U	<1.54 U	<1.54 U	<1.54 U	<1.54 U	<1.54 U	<1.54 U
1,2-Dichlorobenzene	95-50-1	NS	ug/m3	<1.2 U	<1.2 U	<42.3 U	<1.2 U	<1.2 U	<1.2 U	<1.2 U	<1.2 U	<1.2 U	<1.2 U	<1.2 U
1,2-Dichloroethane	107-06-2	NS	ug/m3	<0.809 U	<0.809 U	<28.5 U	<0.809 U	<0.809 U	<0.809 U	<0.809 U	<0.809 U	<0.809 U	<0.809 U	<0.809 U
1,2-Dichloropropane	78-87-5	NS	ug/m3	<0.924 U	<0.924 U	<32.5 U	<0.924 U	<0.924 U	<0.924 U	<0.924 U	<0.924 U	<0.924 U	<0.924 U	<0.924 U
1,2-Dichlorotetrafluoroethane	76-14-2	NS	ug/m3	<1.4 U	<1.4 U	<49.2 U	<1.4 U	<1.4 U	<1.4 U	<1.4 U	<1.4 U	<1.4 U	<1.4 U	<1.4 U
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	NS	ug/m3	1.6	1.93	86	5.11	2.63	3.12	4.74	4.34	1.62	1.66	1.93
1,3-Butadiene	106-99-0	NS	ug/m3	0.611	0.58	<15.6 U	0.562	<0.442 U	<0.442 U	<0.442 U	<0.442 U	3.85	<0.442 U	4.87
1,3-Dichlorobenzene	541-73-1	NS	ug/m3	<1.2 U	<1.2 U	<42.3 U	<1.2 U	<1.2 U	<1.2 U	<1.2 U	<1.2 U	<1.2 U	<1.2 U	<1.2 U
1,3-Dichloropropane	142-28-9	NS	ug/m3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	106-46-7	NS	ug/m3	<1.2 U	<1.2 U	<42.3 U	<1.2 U	<1.2 U	<1.2 U	<1.2 U	<1.2 U	<1.2 U	<1.2 U	<1.2 U
1,4-Dioxane (P-Dioxane)	123-91-1	NS	ug/m3	<0.721 U	<0.721 U	<25.4 U	<0.721 U	<0.721 U	<0.721 U	<0.721 U	<0.721 U	<0.721 U	<0.721 U	<0.721 U
2,2,4-Trimethylpentane	540-84-1	NS	ug/m3	2.82	2.68	<32.9 U	<0.934 U	<0.934 U	<0.934 U	<0.934 U	0.948	2.37	<0.934 U	<0.934 U
2-Hexanone (MBK)	591-78-6	NS	ug/m3	<0.82 U	<0.82 U	<28.9 U	<0.82 U	<0.82 U	<0.82 U	2.32	1.36	<0.82 U	<0.82 U	<0.82 U
4-Ethyltoluene	622-96-8	NS	ug/m3	1.96	2.56	65.9	<0.983 U	1.99	2.32	4.07	3.54	2.99	4.54	4.88
Acetone	67-64-1	NS	ug/m3	173	161	<83.6 U	153	5.04	3.47	33.5	23.8	43	115	46.3
Acrylonitrile	107-13-1	NS	ug/m3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Allyl Chloride (3-Chloropropene)	107-05-1	NS	ug/m3	<0.626 U	<0.626 U	<22 U	<0.626 U	<0.626 U	<0.626 U	<0.626 U	<0.626 U	<0.626 U	<0.626 U	<0.626 U
Benzene	71-43-2	NS	ug/m3	3.45	3.35	122	9.94	0.738	0.799	0.783	5.02	5.88	2.05	3.9
Benzyl Chloride	100-44-7	NS	ug/m3	<1.04 U	<1.04 U	<36.5 U	<1.04 U	<1.04 U	<1.04 U	<1.04 U	<1.04 U	<1.04 U	<1.04 U	<1.04 U
Bromodichloromethane	75-27-4	NS	ug/m3	10.5	10.7	<47.2 U	<1.34 U	<1.34 U	<1.34 U	<1.34 U	<1.34 U	<1.34 U	<1.34 U	<1.34 U
Bromoethene	593-60-2	NS	ug/m3	<0.874 U	<0.874 U	<30.8 U	<0.874 U	<0.874 U	<0.874 U	<0.874 U	<0.874 U	<0.874 U	<0.874 U	<0.874 U
Bromoform	75-25-2	NS	ug/m3	<2.07 U	<2.07 U	<72.8 U	<2.07 U	<2.07 U	<2.07 U	<2.07 U	<2.07 U	<2.07 U	<2.07 U	<2.07 U
Bromomethane	74-83-9	NS	ug/m3	<0.777 U	<0.777 U	<27.3 U	<0.777 U	<0.777 U	<0.777 U	<0.777 U	<0.777 U	<0.777 U	<0.777 U	<0.777 U
Carbon Disulfide	75-15-0	NS	ug/m3	6.79	6.48	111	41.7	72.2 J	47.3 J	8.41	14.4	8.16	0.984	19.9
Carbon Tetrachloride	56-23-5	6	ug/m3	<1.26 U	<1.26 U	<4.43 U	<1.26 U	<1.26 U	<1.26 U	<1.26 U	<1.26 U	<1.26 U	<1.26 U	<1.26 U
Chlorobenzene	108-90-7	NS	ug/m3	<0.921 U	<0.921 U	<32.4 U	<0.921 U	<0.921 U	<0.921 U	<0.921 U	<0.921 U	<0.921 U	<0.921 U	<0.921 U
Chloroethane	75-00-3	NS	ug/m3	<0.528 U	<0.528 U	<18.6 U	<0.528 U	<0.528 U	<0.528 U	<0.528 U	<0.528 U	<0.528 U	<0.528 U	<0.528 U
Chloroform	67-66-3	NS	ug/m3	249	241	<34.4 U	14.9	1.61	1.73	69.3	18.6	4.93	1.25	3.81
Chloromethane	74-87-3	NS	ug/m3	0.981	1.07	<14.5 U	<0.413 U	<0.413 U	<0.413 U	<0.413 U	0.419	<0.413 U	<0.413 U	<0.413 U
Cis-1,2-Dichloroethene	156-59-2	6	ug/m3	<0.793 U	<0.793 U	**40.8**	<0.793 U	<0.793 U	<0.793 U	<0.793 U	<0.793 U	<0.793 U	<0.793 U	<0.793 U
Cis-1,3-Dichloropropene	10061-01-5	NS	ug/m3	<0.908 U	<0.908 U	<32 U	<0.908 U	<0.908 U	<0.908 U	<0.908 U	<0.908 U	<0.908 U	<0.908 U	<0.908 U
Cyclohexane	110-82-7	NS	ug/m3	2.25	2.03	5,130	3.22	<0.688 U	0.716	<0.688 U	1.22	5.92	0.85	5.16
Dibromochloromethane	124-48-1	NS	ug/m3	<1.7 U	<1.7 U	<60 U	<1.7 U	<1.7 U	<1.7 U	<1.7 U	<1.7 U	<1.7 U	<1.7 U	<1.7 U
Dichlorodifluoromethane	75-71-8	NS	ug/m3	2.51	2.65	40.9	2.96	2.49	2.62	2.65	2.82	2.24	2.68	4.65
Ethanol	64-17-5	NS	ug/m3	11.2	10.6	<332 U	15.3	<9.42 U	<9.42 U	<9.42 U	<9.42 U	<9.42 U	10.7	16.1
Ethyl Acetate	141-78-6	NS	ug/m3	<1.8 U	<1.8 U	<63.4 U	<1.8 U	<1.8 U	<1.8 U	<1.8 U	<1.8 U	<1.8 U	<1.8 U	<1.8 U
Ethylbenzene	100-41-4	NS	ug/m3	6.34	6.82	730	9.9	3.56	3.77	3.98	5.69	14.7	11.8	11.3
Hexachlorobutadiene	87-68-3	NS	ug/m3	<2.13 U	<2.13 U	<75.1 U	<2.13 U	<2.13 U	<2.13 U	<2.13 U	<2.13 U	<2.13 U	<2.13 U	<2.13 U
Isopropanol	67-63-0	NS	ug/m3	32.2	25.6	<43.3 U	6.93	<1.23 U	<1.23 U	<1.23 U	12.6	2.07	3.29	1.75
M,P-Xylene	179601-23-1	NS	ug/m3	24.5	27.1	1,550	25.5	14	15.4	17.8	22.2	61.7	61.2	59.9
Methyl Ethyl Ketone (2-Butanone)	78-93-3	NS	ug/m3	6.4	5.66	<51.9 U	15	1.61	<1.47 U	16.3	5.81	24.9	34.5	24.3
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	NS	ug/m3	<2.05 U	<2.05 U	<72.1 U	2.69	<2.05 U	<2.05 U	<2.05 U	<2.05 U	<2.05 U	<2.05 U	<2.05 U
Methyl Methacrylate	80-62-6	NS	ug/m3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	75-09-2	100	ug/m3	2.34	2.71	<61.1 U	<1.74 U	<1.74 U	<1.74 U	1.98	<1.74 U	<1.74 U	<1.74 U	<1.74 U
Naphthalene	91-20-3	NS	ug/m3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Heptane	142-82-5	NS	ug/m3	3.83	3.66	6,800	7.21	2.21	2.3	1.68	2.75	48.4	4.39	5.66
n-Hexane	110-54-3	NS	ug/m3	4.86	4.97	149	23.3	2.31	2.33	1.93	2.56	306	10.6	9.83
o-Xylene (1,2-Dimethylbenzene)	95-47-6	NS	ug/m3	8.17	9.03	634	12.6	6.47	7.25	7.47	10.3	18.2	13.9	12.9
Propylene	115-07-1	NS	ug/m3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	100-42-5	NS	ug/m3	0.984	1.06	<30 U	3.64	1.62	1.78	1.61	1.69	<0.852 U	0.86	<0.852 U
Tert-Butyl Alcohol	75-65-0	NS	ug/m3	2.09	<1.52 U	<53.4 U	22.3	1.63	1.76	11.5	1.94	5.34	4.79	2.29
Tert-Butyl Methyl Ether	1634-04-4	NS	ug/m3	<0.721 U	<0.721 U	<25.4 U	<0.721 U	<0.721 U	<0.721 U	<0.721 U	<0.721 U	<0.721 U	<0.721 U	<0.721 U
Tetrachloroethene (PCE)	127-18-4	100	ug/m3	1.95	1.95	**339**	10.2	54.2	64.4	15.6	39.7	**466**	61.3	**292**
Tetrahydrofuran	109-99-9	NS	ug/m3	1.57	<1.47 U	<51.9 U	<1.47 U	1.56	2.25	5.54	2.54	40.4	36.6	36.3
Toluene	108-88-3	NS	ug/m3	24	23.3	283	24.8	10.6	11.9	8.89	17.3	32	34.5	35.1
Total 1,2-Dichloroethene (Cis and Trans)	540-59-0	NS	ug/m3	NA	NA	40.8	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	1330-20-7	NS	ug/m3	32.7	36.1	NA	NA	20.5	22.7	25.3	32.5	NA	NA	NA
Trans-1,2-Dichloroethene	156-60-5	NS	ug/m3	<0.793 U	<0.793 U	<27.9 U	<0.793 U	<0.793 U	<0.793 U	<0.793 U	<0.793 U	<0.793 U	<0.793 U	<0.793 U
Trans-1,3-Dichloropropene	10061-02-6	NS	ug/m3	<0.908 U	<0.908 U	<32 U	<0.908 U	<0.908 U	<0.908 U	<0.908 U	<0.908 U	<0.908 U	<0.908 U	<0.908 U
Trichloroethene (TCE)	79-01-6	6	ug/m3	<1.07 U	<1.07 U	**169**	<1.07 U	<1.07 U	<1.07 U	<1.07 U	<1.07 U	2.32	<1.07 U	1.68
Trichlorofluoromethane	75-69-4	NS	ug/m3	1.25	1.33	<39.6 U	1.66	1.47	1.44	1.91	4.37	103	35	181
Vinyl Acetate	108-05-4	NS	ug/m3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	75-01-4	6	ug/m3	<0.511 U	<0.511 U	1.89	<0.511 U	<0.511 U	<0.511 U	<0.511 U	<0.511 U	<0.511 U	<0.511 U	<0.511 U

Table 3
Remedial Action Work Plan
Soil Vapor Sample Analytical Results

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Notes:

AA - Ambient Air
SV - Soil Vapor
CAS - Chemical Abstract Service
NS - No standard
ug/m3 - microgram per cubic meter
NA - Not analyzed
RL - Reporting limit
<RL - Not detected
Soil vapor sample analytical results are compared to the minimum soil vapor concentrations at which mitigation is recommended as set forth in the New York State Department of Health (NYSDOH) October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York Decision Matrices for Sub-Slab Vapor and Indoor Air and subsequent updates (2017).
Ambient air sample analytical results are shown for reference only.

Qualifiers:

D - The concentration reported is a result of a diluted sample.
J - The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
UJ - The analyte was not detected at a level greater than or equal to the RL; however, the reported RL is approximate and may be inaccurate or imprecise.
U - The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.

Exceedance Summary:

10 - Result exceeds minimum soil vapor concentrations recommending mitigation

Table 4
Remedial Action Work Plan
Soil Cleanup Objectives

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	Track 1 NYSDEC Part 375 Unrestricted Use SCOs	Track 2 NYSDEC Part 375 Restricted Use Restricted-Residential SCOs
Volatile Organic Compounds (mg/kg)			
1,1,1-Trichloroethane	71-55-6	0.68	100
1,1-Dichloroethane	75-34-3	0.27	26
1,1-Dichloroethene	75-35-4	0.33	100
1,2,4-Trimethylbenzene	95-63-6	3.6	52
1,2-Dichlorobenzene	95-50-1	1.1	100
1,2-Dichloroethane	107-06-2	0.02	3.1
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	8.4	52
1,3-Dichlorobenzene	541-73-1	2.4	49
1,4-Dichlorobenzene	106-46-7	1.8	13
1,4-Dioxane (P-Dioxane)	123-91-1	0.1	13
Acetone	67-64-1	0.05	100
Benzene	71-43-2	0.06	4.8
Carbon Tetrachloride	56-23-5	0.76	2.4
Chlorobenzene	108-90-7	1.1	100
Chloroform	67-66-3	0.37	49
Cis-1,2-Dichloroethene	156-59-2	0.25	100
Ethylbenzene	100-41-4	1	41
Hexachlorobenzene	118-74-1	0.33	1.2
Methyl Ethyl Ketone (2-Butanone)	78-93-3	0.12	100
Methylene Chloride	75-09-2	0.05	100
Naphthalene	91-20-3	12	100
n-Butylbenzene	104-51-8	12	100
n-Propylbenzene	103-65-1	3.9	100
Sec-Butylbenzene	135-98-8	11	100
T-Butylbenzene	98-06-6	5.9	100
Tert-Butyl Methyl Ether	1634-04-4	0.93	100
Tetrachloroethene (PCE)	127-18-4	1.3	19
Toluene	108-88-3	0.7	100
Total Xylenes	1330-20-7	0.26	100
Trans-1,2-Dichloroethene	156-60-5	0.19	100
Trichloroethene (TCE)	79-01-6	0.47	21
Vinyl Chloride	75-01-4	0.02	0.9
Semivolatile Organic Compounds (mg/kg)			
1,2-Dichlorobenzene	95-50-1	1.1	100
1,3-Dichlorobenzene	541-73-1	2.4	49
1,4-Dichlorobenzene	106-46-7	1.8	13
1,4-Dioxane (P-Dioxane)	123-91-1	0.1	13
2-Methylphenol (o-Cresol)	95-48-7	0.33	100
3 & 4 Methylphenol (m&p Cresol)	65794-96-9	0.33	100
Acenaphthene	83-32-9	20	100
Acenaphthylene	208-96-8	100	100
Anthracene	120-12-7	100	100
Benzo(a)anthracene	56-55-3	1	1
Benzo(a)pyrene	50-32-8	1	1
Benzo(b)fluoranthene	205-99-2	1	1
Benzo(g,h,i)Perylene	191-24-2	100	100
Benzo(k)fluoranthene	207-08-9	0.8	3.9
Chrysene	218-01-9	1	3.9
Dibenz(a,h)anthracene	53-70-3	0.33	0.33
Dibenzofuran	132-64-9	7	59
Fluoranthene	206-44-0	100	100
Fluorene	86-73-7	30	100
Hexachlorobenzene	118-74-1	0.33	1.2
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	0.5
Naphthalene	91-20-3	12	100
Pentachlorophenol	87-86-5	0.8	6.7
Phenanthrene	85-01-8	100	100
Phenol	108-95-2	0.33	100
Pyrene	129-00-0	100	100

Table 4
Remedial Action Work Plan
Soil Cleanup Objectives

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

Analyte	CAS Number	Track 1 NYSDEC Part 375 Unrestricted Use SCOs	Track 2 NYSDEC Part 375 Restricted Use Restricted-Residential SCOs
Pesticides (mg/kg)			
4,4'-DDD	72-54-8	0.0033	13
4,4'-DDE	72-55-9	0.0033	8.9
4,4'-DDT	50-29-3	0.0033	7.9
Aldrin	309-00-2	0.005	0.097
Alpha BHC (Alpha Hexachlorocyclohexane	319-84-6	0.02	0.48
Alpha Chlordane	5103-71-9	0.094	4.2
Alpha Endosulfan	959-98-8	2.4	24
Beta Bhc (Beta Hexachlorocyclohexane)	319-85-7	0.036	0.36
Beta Endosulfan	33213-65-9	2.4	24
Delta Bhc (Delta Hexachlorocyclohexane)	319-86-8	0.04	100
Dibenzofuran	132-64-9	7	59
Dieldrin	60-57-1	0.005	0.2
Endosulfan Sulfate	1031-07-8	2.4	24
Endrin	72-20-8	0.014	11
Gamma Bhc (Lindane)	58-89-9	0.1	1.3
Heptachlor	76-44-8	0.042	2.1
Herbicides (mg/kg)			
Silvex (2,4,5-Tp)	93-72-1	3.8	100
Polychlorinated Biphenyls (mg/kg)			
Total PCBs	1336-36-3	0.1	1
Inorganics (mg/kg)			
Arsenic	7440-38-2	13	16
Barium	7440-39-3	350	400
Beryllium	7440-41-7	7.2	72
Cadmium	7440-43-9	2.5	4.3
Chromium, Hexavalent	18540-29-9	1	110
Chromium, Trivalent	16065-83-1	30	180
Copper	7440-50-8	50	270
Total Cyanide	~	27	27
Lead	7439-92-1	63	400
Manganese	7439-96-5	1,600	2,000
Mercury	7439-97-6	0.18	0.81
Nickel	7440-02-0	30	310
Selenium	7782-49-2	3.9	180
Silver	7440-22-4	2	180
Zinc	7440-66-6	109	10,000

Notes:
1. Soil cleanup objectives taken from New York State Department of Environmental Conservation (NYSDEC) Title 6 of the Official Compilation of New York Codes, Rules, and Regulations (NYCRR) Part 375 Unrestricted Use and Restricted Use Restricted-Residential Soil Cleanup Objectives (SCOs).
2. Criterion comparisons for 3- & 4-methylphenol (m&p cresol) are provided for reference. Promulgated SCOs are for 3-methylphenol (m-cresol) and
3. ~ = Regulatory limit for this analyte does not exist
4. mg/kg = milligrams per kilogram

Table 5
Remedial Action Work Plan
Track 1 Remedial Cost Estimate

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT COST	SITE PREPARATION COST
CONTRACTOR FEES					
1	Remediation Facilities, Mobilization, Demobilization, and Site Maintenance - Remediation and decontamination facilities, site fencing, trailer, truck cleaning facilities, etc.		Allowance		$ 100,000.00
2	Excavation Dewatering		Allowance		$ 100,000.00
3	Management and Handling of Contaminated Material (Remedial Excavation)	3,180	CY	$ 30.00	$ 95,400.00
4	Perimeter Support of Excavation (SOE) - assumes 19-foot length around the Site perimeter	7,600	SF	$ 125.00	$ 950,000.00
5	Off-Site Transport and Disposal of Non-hazardous Contaminated Fill Material and Soil	4,403	Ton	$ 50.00	$ 220,166.67
6	Off-Site Transport and Disposal of VOC-Impacted Soil	367	Ton	$ 60.00	$ 22,000.00
7	Dust, Odor, and Vapor Control	1	Months	$ 2,000.00	$ 2,000.00
8	Underground Storage Tank Removal	2	Each	$ 25,000.00	$ 50,000.00
9	Import of approved material for remedial excavation backfill and to raise Site grade	500	CY	$ 40.00	$ 20,000.00
				CONTRACTOR FEE ESTIMATED SUBTOTAL:	*$ 1,559,566.67*
				(15% CONTINGENCY OF CONTRACTOR FEE ESTIMATED SUBTOTAL):	*$ 233,935.00*
ENGINEERING FEES					
1	Construction Administration	6	Months	$ 10,000.00	$ 60,000.00
2	SOE Design		Allowance		$ 89,000.00
3	Construction Environmental Monitoring (includes community air monitoring program [CAMP] equipment rental)	4	Months	$ 38,000.00	$ 152,000.00
4	Special Inspection - Includes engineering special inspections for SOE installation and foundation construction	8	Months	$ 35,000.00	$ 280,000.00
5	Post-Excavation Confirmation Endpoint Sampling	15	Samples	$ 1,810.00	$ 27,150.00
6	Legal Fees		Allowance		$ 100,000.00
7	Remedial Investigation, Remedial Investigation Report, Remedial Action Work Plan (including CHASP)		Allowance		$ 435,000.00
8	Regulatory Agency Required Reporting (monthly progress reports, Final Engineering Report [FER], Data Validation & EQuIS Submittals, CPP and fact sheets)		Allowance		$ 100,000.00
				ENGINEERING FEE ESTIMATED SUBTOTAL:	*$ 1,243,150.00*
				(15% CONTINGENCY OF ENGINEERING FEE ESTIMATED SUBTOTAL):	*$ 186,472.50*
				ESTIMATED REMEDIATION COST - ALTERNATIVE I:	**$ 3,230,000.00**

General Assumptions and Conditions:

1. The density used for conversion from cubic yards to tons was 1.5 tons per cubic yard.
2. Excavation depths were estimated using Remedial Investigation observations and soil sample results.
3. A 6 month period is assumed for remediation and soil handling.
4. This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site investigation and the anticipated scope of the remedial alternative. Changes in cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This cost estimate is expected to be within -30% to +50% of the actual fee. Utilization of this fee estimate information beyond the stated purpose is not recommended. Langan is not licensed to provide financial or legal consulting services; as such, this cost estimate information is not intended to be utilized for complying with financial reporting requirements associated with liability services.
5. Remediation costs noted above do not include the costs associated with the ongoing remedial injections being completed in accordance with the IRMWP, which is estimates to be approximately $600,000.

Contractor Cost Assumptions:

-RAWP Item No. 2 - Discharge fees are excluded from the excavation dewatering costs.
-RAWP Item No. 4 - The perimeter SOE is generally expected to include the installation of drilled soldier piles with lagging and tieback anchors and secant pile walls.
-RAWP Item No. 5 - The unit rate provided reflects average disposal facility fees and may vary depending on time of year and facility.
-RAWP Item No. 6 - Cost estimate includes application of vapor/odor suppressing foam to open excavations and soil loaded into trucks. Labor provided by excavation, handling, and disposal contractor provided above; this line item estimate reflects material, freight, and equipment fees.
-RAWP Item No. 8 - Cost estimate includes the removal of one known underground storage tank (UST) from within the basement of the northwestern building as well as the removal of up to one undocumented tank, if encountered.
-RAWP Item No. 9 - Cost estimate includes up to 500 cubic yards of imported material based on typical construction needs.
-Costs provided above exclude limited profit, insurance, bonding, and general conditions.

Engineering Fee Assumptions:

-Engineering Item No. 4 - Special inspections as required by the New York City Department of Building.
-Engineering Item No. 5 - The cost assumes collection of 12 samples plus quality assurance/quality control samples. Sample analysis will be for Part 375 VOCs, SVOCs, PCBs, pesticides, cyanide, metals including hexavalent and trivalent chromium, PFAS, and 1,4-dioxane. Fee includes subcontracted laboratory analysis by a NYSDOH ELAP-certified laboratory and ASP Category B deliverables.

Table 6
Remedial Action Work Plan
Track 2 Remedial Cost Estimate

1487 First Avenue
New York, New York
NYSDEC BCP Site No.: C231152
Langan Project No.: 100963701

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT COST	SITE PREPARATION COST
CONTRACTOR FEES					
1	Remediation Facilities, Mobilization, Demobilization, and Site Maintenance - Remediation and decontamination facilities, site fencing, trailer, truck cleaning facilities, etc.		Allowance		$ 100,000.00
2	Excavation Dewatering		Allowance		$ 100,000.00
3	Management and Handling of Contaminated Material (Remedial Excavation)	3,510	CY	$ 30.00	$ 105,300.00
4	Perimeter Support of Excavation (SOE) - assumes 15-foot length around the Site perimeter	6,000	SF	$ 125.00	$ 750,000.00
5	Off-Site Transport and Disposal of Non-hazardous Contaminated Fill Material and Soil	4,898	Ton	$ 50.00	$ 244,916.67
6	Off-Site Transport and Disposal of VOC-Impacted Soil	367	Ton	$ 60.00	$ 22,000.00
7	Dust, Odor, and Vapor Control	1	Months	$ 2,000.00	$ 2,000.00
8	Underground Storage Tank Removal	2	Each	$ 25,000.00	$ 50,000.00
9	Import of approved material.	500	CY	$ 40.00	$ 20,000.00
				CONTRACTOR FEE ESTIMATED SUBTOTAL:	*$ 1,394,216.67*
				(15% CONTINGENCY OF CONTRACTOR FEE ESTIMATED SUBTOTAL):	*$ 209,132.50*
ENGINEERING FEES					
1	Construction Administration	6	Months	$ 10,000.00	$ 60,000.00
2	SOE Design		Allowance		$ 89,000.00
3	Construction Environmental Monitoring (includes community air monitoring program [CAMP] equipment rental)	4	Months	$ 38,000.00	$ 152,000.00
4	Special Inspection - Includes engineering special inspections for SOE installation and foundation construction	8	Months	$ 35,000.00	$ 280,000.00
5	Post-Excavation Documentation Endpoint Sampling	15	Samples	$ 1,810.00	$ 27,150.00
6	Legal Fees		Allowance		$ 100,000.00
7	Remedial Investigation, Remedial Investigation Report, Remedial Action Work Plan (including CHASP)		Allowance		$ 435,000.00
8	Regulatory Agency Required Reporting (monthly, progress reports, Final Engineering Report [FER], Data Validation & EQuIS Submittals, CPP and fact sheets)		Allowance		$ 100,000.00
9	Operation and Maintenance - as required for inspection of IC implementation	10	years	4,000	$ 40,000.00
10	Institutional Control Certification - Accounts for fees associated with preparation and submission of annual Periodic Review Reports for ten years.	10	years	4,000	$ 40,000.00
				ENGINEERING FEE ESTIMATED SUBTOTAL:	*$ 1,323,150.00*
				(15% CONTINGENCY OF ENGINEERING FEE ESTIMATED SUBTOTAL):	*$ 198,472.50*
				ESTIMATED REMEDIATION COST - ALTERNATIVE II:	**$ 3,130,000.00**

General Assumptions and Conditions:

1. The density used for conversion from cubic yards to tons was 1.5 tons per cubic yard.
2. Excavation depths were estimated using Remedial Investigation soil sample results.
3. A 4 month period is assumed for remediation and soil handling.
4. This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site investigation and the anticipated scope of the remedial alternative. Changes in cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This cost estimate is expected to be within -30% to +50% of the actual fee. Utilization of this fee estimate information beyond the stated purpose is not recommended. Langan is not licensed to provide financial or legal consulting services; as such, this cost estimate information is not intended to be utilized for complying with financial reporting requirements associated with liability services.
5. Remediation costs noted above do not include the costs associated with the ongoing remedial injections being completed in accordance with the IRMWP, which is estimates to be approximately $600,000.

Contractor Cost Assumptions:

-RAWP Item No. 2 - Discharge fees are excluded from the excavation dewatering costs.
-RAWP Item No. 4 - The perimeter SOE is generally expected to include the installation of drilled soldier piles with lagging and tieback anchors.
-RAWP Item No. 5 - The unit rate provided reflects average disposal facility fees and may vary depending on time of year and facility.
-RAWP Item No. 6 - Cost estimate includes application of vapor/odor suppressing foam to open excavations and soil loaded into trucks. Labor provided by excavation, handling, and disposal contractor provided above; this line item estimate reflects material, freight, and equipment fees.
-RAWP Item No. 8 - Cost estimate includes the removal of one known underground storage tank (UST) from within the basement of the northwestern building as well as the removal of up to one undocumented tank, if encountered.
-RAWP Item No. 9 - Cost estimate includes up to 500 cubic yards of imported material based on typical construction needs.
-Costs provided above exclude limited profit, insurance, bonding, and general conditions.

Engineering Fee Assumptions:

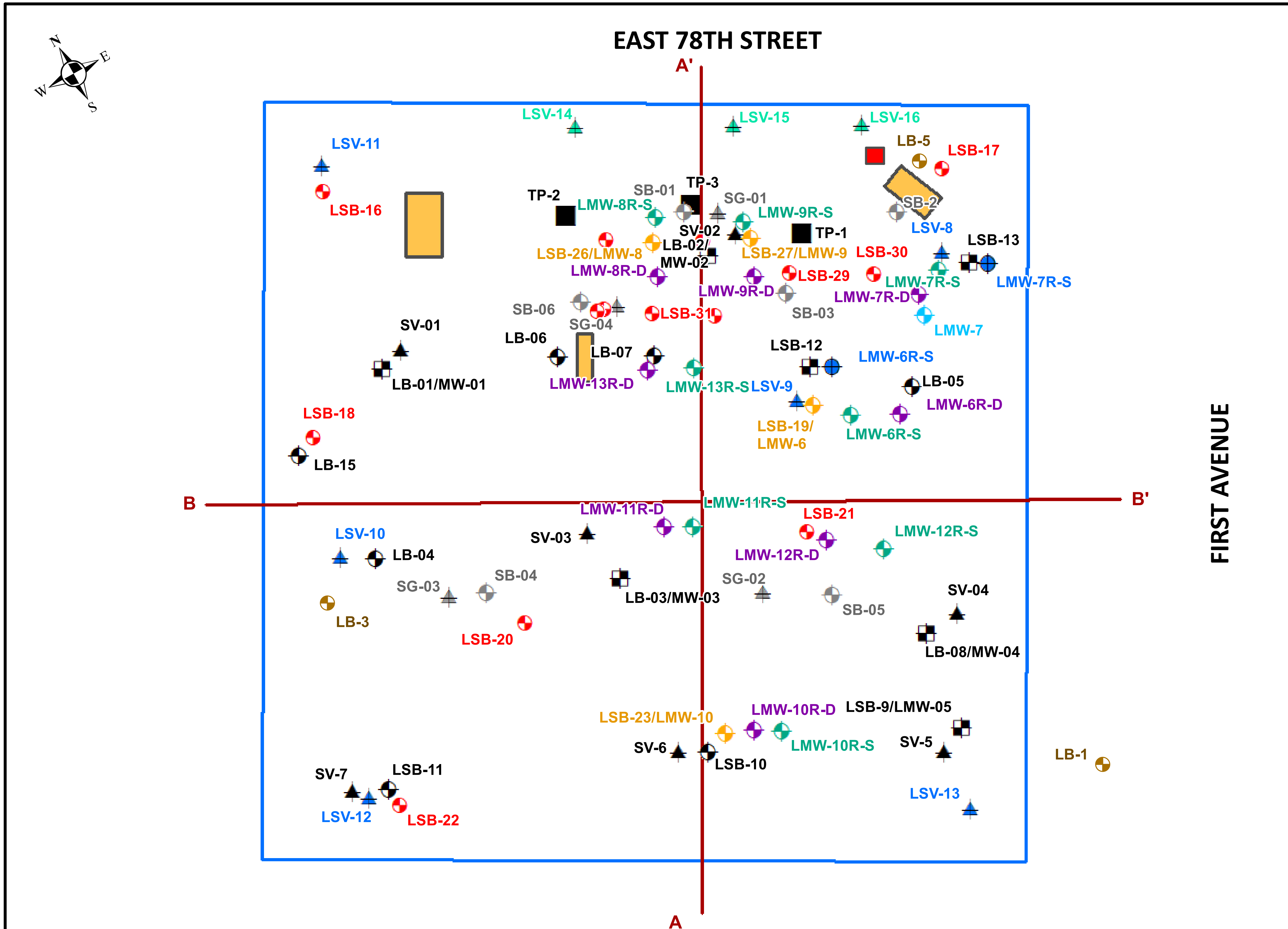
-Engineering Item No. 4 - Special inspections as required by the New York City Department of Building.
-Engineering Item No. 5 - The cost assumes collection of 12 samples plus quality assurance/quality control samples. Sample analysis will be for Part 375 VOCs, SVOCs, PCBs, pesticides, cyanide, metals including hexavalent and trivalent chromium, PFAS, and 1,4-dioxane. Fee includes subcontracted laboratory analysis by a NYSDOH ELAP-certified laboratory and ASP Category B deliverables.
-Engineering Item No. 10 - This task will be completed annually until such a time that the Environmental Easement is extinguished.

FIGURES

Notes:
Topographic basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online © 2011 National Geographic Society, i-cubed.

LANGAN 300 Kimball Drive Parsippany, NJ 07054 T: 973.560.4900 F: 973.560.4901 www.langan.com Langan Engineering & Environmental Services, Inc. Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. Langan International LLC Collectively known as Langan	Project **1487 FIRST AVENUE** BLOCK No. 1452, LOT No.27, 28, 29 & 30 MANHATTAN NEW YORK NEW YORK	Drawing Title **SITE LOCATION MAP**	Project No. 100963701 Date 12/3/2021 Scale 1"=2,000' Drawn By JF Submission Date	Figure 1

Path: \\langan.com\data\PAR\data7\100963701\Project Data\ArcGIS\APRX\100963701\100963701.aprx Date: 12/3/2021 User: Jfraser Time: 10:33 AM



LEGEND

- SITE BOUNDARY
- AOC-1: FORMER SOLVENT TANK
- AOC-2: FUEL OIL ASTs
- AOC-3: HISTORICAL SITE USES
- PETROLEUM IMPACTED SOIL LOCATION FROM AST REMOVAL
- CROSS SECTION A-A '
- 2022 RI SOIL BORING LOCATION
- 2022 RI SOIL BORING/ OVERBURDEN MONITORING WELL LOCATION
- 2022 RI OVERBURDEN MONITORING WELL LOCATION
- 2022 RI SHALLOW BEDROCK MONITORING WELL LOCATION
- 2022 RI DEEP BEDROCK MONITORING WELL LOCATION
- 2022 RI SOIL VAPOR SAMPLE LOCATION
- 2023 SUPPLEMENTAL SOIL VAPOR SAMPLE LOCATION
- 2021/2022 PHASE II BEDROCK MONITORING WELL LOCATION
- 2021/2022 PHASE II SOIL BORING LOCATION (LANGAN)
- 2021/2022 PHASE II SOIL BORING AND MONITORING WELL LOCATION (LANGAN)
- 2021/2022 PHASE II SOIL VAPOR SAMPLE LOCATION (LANGAN)
- 2016 SOIL BORING LOCATION (CIDER)
- 2016 SOIL GAS LOCATION (CIDER)
- 2022 ENVIRONMENTAL TEST PIT LOCATION
- 2021/2022 GEOTECHNICAL SOIL BORING LOCATION

NOTES:
1. SAMPLING LOCATIONS FOR THE MONITORING WELLS INSTALLED AS PART OF THE 2022 RI ARE BASED ON THE WELL AS-BUILT SURVEY PREPARED BY TRUE NORTH SURVEYORS, INC. DATED 21 OCTOBER 2022.
2. VERTICAL ELEVATION DATUM: NATIONAL VERTICAL DATUM OF 1988 (NAVD88)
3. 2016 SOIL BORING AND SOIL GAS LOCATIONS SAMPLED DURING THE CIDER PHASE II ESA.
4. 2021/2022 SAMPLES LOCATIONS AS PRESENTED IN THE 2022 LANGAN PHASE II EI REPORT.
5. AOC-4 CONSISTS OF HISTORIC FILL, WHICH IS PRESENT THROUGHOUT THE SITE.

15 0 15
SCALE IN FEET

LANGAN

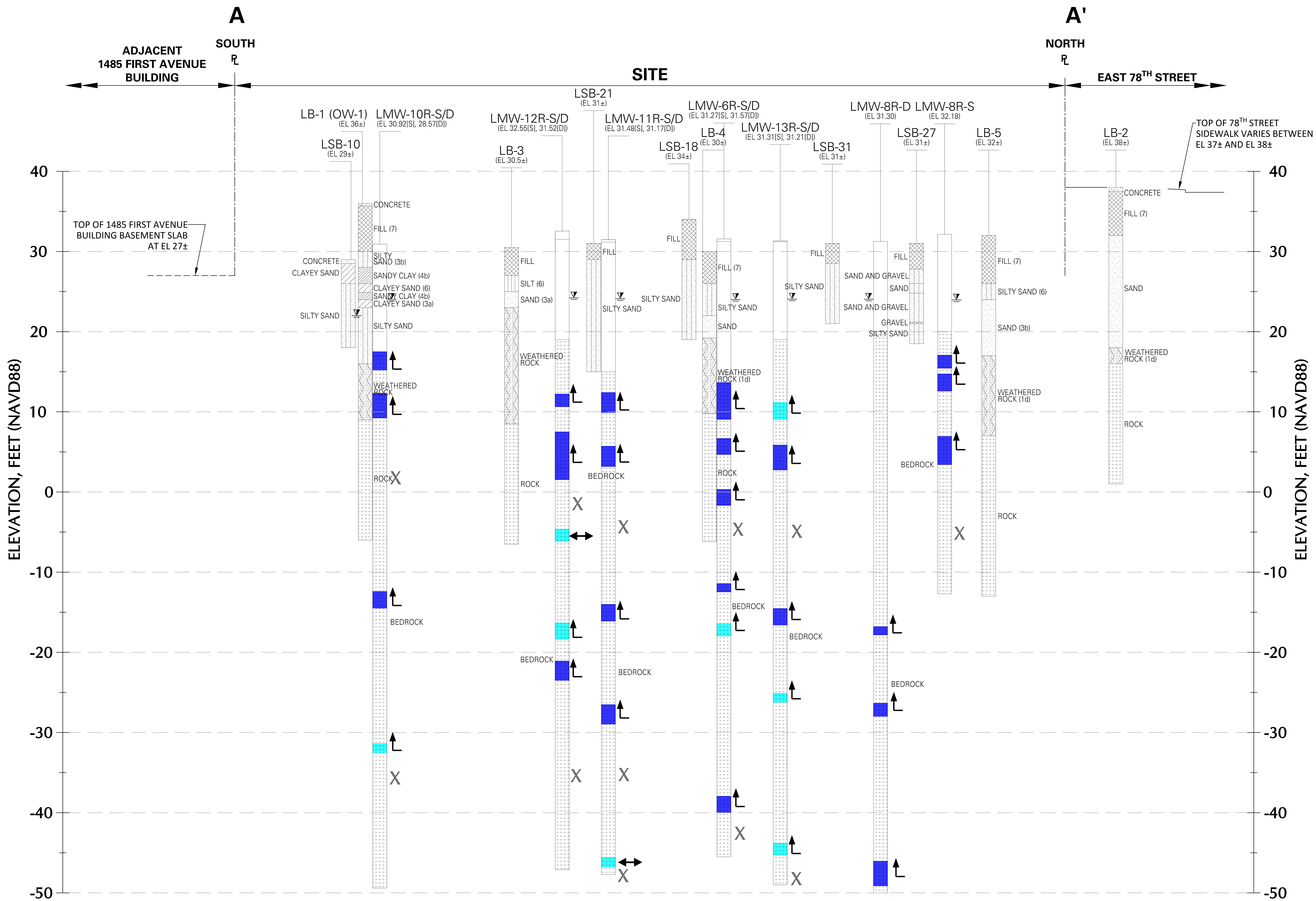
300 Kimball Drive
Parsippany, NJ 07054
T: 973.560.4900 F: 973.560.4901 www.langan.com

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

NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project	Drawing Title	Project No.	Figure
1487 FIRST AVENUE REDEVELOPMENT SITE BLOCK No. 1452, LOT No. 27 MANHATTAN NEW YORK NEW YORK	SITE PLAN	100963701	2
		Date: 3/28/2023	
		Scale: 1 " = 15 '	
		Drawn By: IHB	

Path: \\langan.com\data\PAR\data7\100963701\Project Data\ArcGIS\MXD\Environmental_Figures\2022-11 RAWP\Figure 2 - Site Plan.mxd Date: 3/28/2023 User: ibaker Time: 2:07:40 PM



SECTION A-A'

VERTICAL SCALE: 1" = 6'
HORIZONTAL SCALE: N.T.S.

6 0 3 6
VERTICAL SCALE: 1 INCH = 6 FEET

BORING KEY:

LB-X (OW-X)
(EL XX±)
XX (XX)

LEGEND:

LB-X (OW-X)	DRILLED BORING AND TEMPORARY GROUNDWATER LEVEL OBSERVATION WELL IDENTIFICATION
EL XX±	APPROXIMATE GROUND SURFACE ELEVATION AT THE TIME OF THE BORING (NAVD88)
XX (XX)	GENERAL SOIL/ROCK DESCRIPTION (MAY INCLUDE2014 NYCBC CLASSIFICATION)
▼	GROUNDWATER LEVEL OBSERVED IN WELL DURING GAUGING COMPLETED ON 14 SEPTEMBER 2022

NOTES:

1. THIS PROFILE SHOWS GENERALIZED SUBSURFACE CONDITIONS AT THE RESPECTIVE BORING LOCATIONS. VARIATIONS IN SUBSURFACE CONDITIONS SHOULD BE EXPECTED BETWEEN BORINGS. FOR A DETAILED DESCRIPTION OF CONDITIONS ENCOUNTERED IN THE DRILLED BORINGS, SEE BORING LOGS INCLUDED IN APPENDIX A.
2. THE ELEVATIONS FOR BORINGS LB-1(OW-1), LB-2, LB-3, LB-4, LB-5, LSB-10, LSB-18, LSB-21, LSB-27, AND LSB-31 ARE APPROXIMATE AND ARE INFERRED FROM A 22 FEBRUARY (REVISED 10 MARCH) 2022 SURVEY PREPARED BY TRUE NORTH SURVEYORS, PC. THE ELEVATIONS FOR BORINGS LMW-6R-S/D, LMW-8R-S, LMW-8R-D, LMW-10R-S/D, LMW-11R-S/D, LMW-12R-S/D, LMW-13R-S/D ARE BASED ON WELL AS-BUILT SURVEY PREAPRED BY TRUE NORTH SURVEYORS, INC. DATED 21 OCTOBER 2022.
3. ALL ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988, NAVD88, WHICH IS 1.1 FEET ABOVE THE NATIONAL GEODETIC VERTICAL DATUM OF 1929, NGVD29, PER THE UNITED STATES GEOLOGIC SURVEY, USGS.
4. BORINGS LB-1 THROUGH LB-5 WERE INSTALLED AS PART OF THE INVESTIGATION DOCUMENTED IN THE APRIL 2022 GEOTECHNICAL INVESTIGATION REPORT. BORING LSB-10 WAS INSTALLED AS PART OF THE NOVEMBER 2021 AND JANUARY/FEBRUARY 2022 PHASE II ESI. BORINGS LSB-18, LSB-21, LSB-27, LSB-31, LMW-6R-S/D, LMW-8R-S/D, AND LMW-10R-S/D THROUGH LMW-13R-S/D WERE INSTALLED AS PART OF THE AUGUST 2022 RI.
5. BOREHOLE FLOW AND WATER PRODUCING LOGGING INTERVALS DERIVED FROM THE BOREHOLE GEOPHYSICAL LOGGING DATA REPORT PREPARED BY HAGER-RIGHTER GEOSCIENCE, INC. DATED NOVEMBER 2022.

FLOW UNDER PUMPING CONDITIONS WITHIN BOREHOLE:

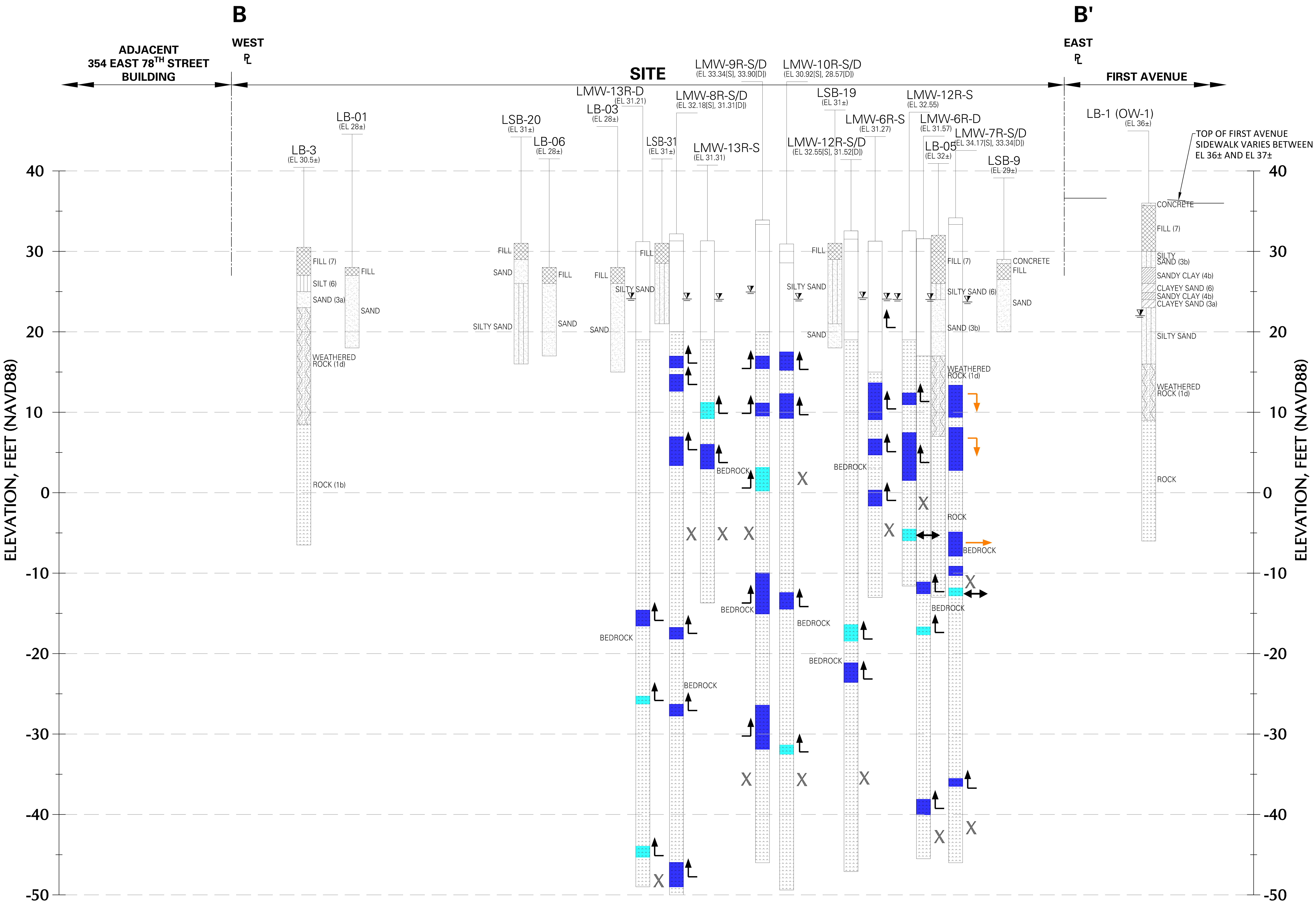
- FLOW INTO & UP BOREHOLE
- ↔ POSSIBLE FLOW IN OR OUT OF BOREHOLE
- X NO FLOW DETECTED
- GROUNDWATER PRODUCING INTERVAL
- MINOR GROUNDWATER PRODUCING INTERVAL

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

LANGAN Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. 300 Kimball Drive Parsippany, NJ 07054 T: 973.560.4900 F: 973.560.4901 www.langan.com NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400	Project PROPOSED 1487 FIRST AVENUE DEVELOPMENT MANHATTAN NEW YORK	Drawing Title BORING PROFILE A-A'	Project No. 100963701 Date 11/17/2022 Drawn By AC Checked By CR	Drawing No. 3A

PROJECT NO. 100963701

Filename: C:\Users\Aruane\Documents\Project Work\WorkFromHome-Covid\100963701\CAD\FG06-100963701-0201-BI201-0101.dwg Date: 11/17/2022 Time: 15:00 User: aruane Style Table: Langan.stb Layout: A-A

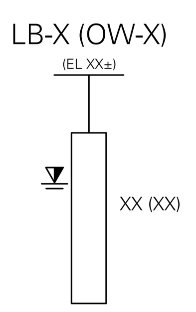


SECTION B-B'

VERTICAL SCALE: 1" = 6'
HORIZONTAL SCALE: N.T.S.

VERTICAL SCALE: 1 INCH = 6 FEET

BORING KEY:



LEGEND:

LB-X (OW-X)	DRILLED BORING AND TEMPORARY GROUNDWATER LEVEL OBSERVATION WELL IDENTIFICATION
EL XX±	APPROXIMATE GROUND SURFACE ELEVATION AT THE TIME OF THE BORING (NAVD88)
XX (XX)	GENERAL SOIL/ROCK DESCRIPTION (MAY INCLUDE2014 NYCBC CLASSIFICATION)
▼	GROUNDWATER LEVEL OBSERVED IN WELL DURING GAUGING COMPLETED ON 14 SEPTEMBER 2022

NOTES:

1. THIS PROFILE SHOWS GENERALIZED SUBSURFACE CONDITIONS AT THE RESPECTIVE BORING LOCATIONS. VARIATIONS IN SUBSURFACE CONDITIONS SHOULD BE EXPECTED BETWEEN BORINGS. FOR A DETAILED DESCRIPTION OF CONDITIONS ENCOUNTERED IN THE DRILLED BORINGS, SEE BORING LOGS INCLUDED IN APPENDIX A.
2. THE ELEVATIONS FOR BORINGS LB-1(OW-1), LB-2, LB-3, LB-4, LB-5, LSB-10, LSB-18, LSB-21, LSB-27, AND LSB-31 ARE APPROXIMATE AND ARE INFERRED FROM A 22 FEBRUARY (REVISED 10 MARCH) 2022 SURVEY PREPARED BY TRUE NORTH SURVEYORS, PC. THE ELEVATIONS FOR BORINGS LMW-6R-S/D, LMW-8R-D, LMW-10R-S/D, LMW-11R-S/D, LMW-12R-S/D, AND LMW-13R-S/D ARE BASED ON THE WELL AS-BUILT SURVEY PREPARED BY TRUE NORTH SURVEYORS, INC. DATED 21 OCTOBER 2022.
3. ALL ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988, NAVD88, WHICH IS 1.1 FEET ABOVE THE NATIONAL GEODETIC VERTICAL DATUM OF 1929, NGVD29, PER THE UNITED STATES GEOLOGIC SURVEY, USGS.
4. BORINGS LB-1, LB-3, AND LB-5 WERE INSTALLED AS PART OF THE INVESTIGATION DOCUMENTED IN THE APRIL 2022 GEOTECHNICAL INVESTIGATION REPORT. BORINGS LB-01/LMW-1, LB-03/LMW-3, LB-06, AND LSB-9/MW-05 WERE INSTALLED AS PART OF THE NOVEMBER 2021 AND JANUARY/FEBRUARY 2022 PHASE II ESI. BORINGS LSB-19/LMW-6, LSB-20, LSB-31, LMW-6R-S/D, LMW-8R-S/D, LMW-9R-S/D, LMW-10R-S/D, LMW-11R-D, LMW-12R-S/D, LMW-13R-S, AND LMW-13R-D WERE INSTALLED AS PART OF THE AUGUST 2022 RI.
5. BOREHOLE FLOW AND WATER PRODUCING LOGGING INTERVALS DERIVED FROM THE BOREHOLE GEOPHYSICAL LOGGING DATA REPORT PREPARED BY HAGER-RIGHTER GEOSCIENCE, INC. DATED NOVEMBER 2022.

FLOW UNDER PUMPING CONDITIONS WITHIN BOREHOLE:

- FLOW INTO & UP BOREHOLE
- ↔ POSSIBLE FLOW IN OR OUT OF BOREHOLE
- X NO FLOW DETECTED
- GROUNDWATER PRODUCING INTERVAL
- MINOR GROUNDWATER PRODUCING INTERVAL

FLOW UNDER AMBIENT (NON-PUMPING) CONDITIONS WITHIN BOREHOLE:

- FLOW INTO & DOWN BOREHOLE
- → FLOW OUT OF BOREHOLE

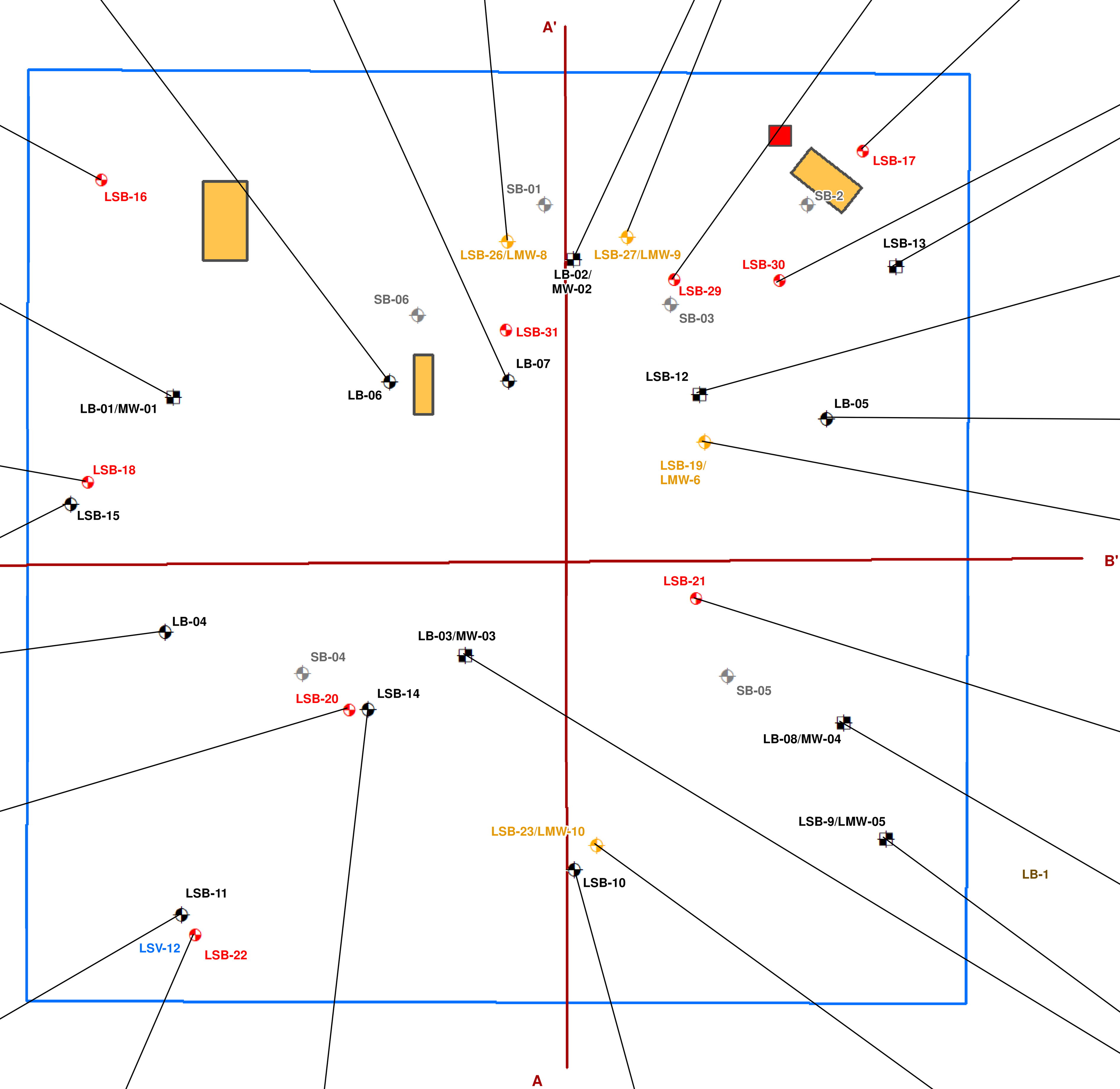
*NO FLOW WAS DETECTED UNDER AMBIENT CONDITIONS AT ANY WELL EXCEPT LMW-7R-S

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
300 Kimball Drive
Parsippany, NJ 07054
T: 973.560.4900 F: 973.560.4901 www.langan.com
NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project	Drawing Title	Project No.	Drawing No.
PROPOSED 1487 FIRST AVENUE DEVELOPMENT	BORING PROFILE B-B'	100963701	3B
MANHATTAN NEW YORK		Date: 11/17/2022	
		Drawn By: AC	
		Checked By: CR	

Legend

- SITE BOUNDARY
- AOC-2: FUEL OIL AST LOCATION
- PETROLEUM IMPACTED SOIL LOCATION FROM AST REMOVAL
- CROSS SECTION A-A'
- 2022 RI SOIL BORING LOCATION
- 2022 RI SOIL BORING/ OVERBURDEN MONITORING WELL LOCATION
- 2021/2022 PHASE II SOIL BORING LOCATION (LANGAN)
- 2021/2022 PHASE II SOIL BORING AND MONITORING WELL LOCATION (LANGAN)
- 2016 SOIL BORING LOCATION (CIDER)



0 10 20
SCALE IN FEET

Location	LSB-16	LSB-16
Sample Name	LSB-16_8-10	LSB-16_12-14
Sample Date	8/2/2022	8/2/2022
Sample Depth (ft bsl)	8-10	12-14
VOCs		
Tetrachloroethene (PCE)	<0.00021 U	<0.00019 U
Pesticides		
4,4'-DDD	**0.0044**	<0.00177 U
4,4'-DDE	**0.0416**	<0.00177 U
4,4'-DDT	**0.133**	<0.00177 U
Dieldrin	**0.00541**	<0.00111 U
Metals		
Barium	82.7 J	39.7
Copper	**441 J**	5.74
Lead	**277 J**	6.05
Mercury	**0.355**	<0.084 U
Nickel	17	5.91
Silver	<0.893 U	<0.871 U
Zinc	**626 J**	15.9
PFAS		
Perfluorooctanesulfonic Acid (PFOS)	**0.00211**	<0.000275 U
Perfluorooctanoic Acid (PFOA)	**0.00111**	<0.000275 U

Location	LB-01	LB-01
Sample Name	009_LB-01_0-1	010_LB-01_6.5-8.5
Sample Date	11/9/2021	11/9/2021
Sample Depth (ft bsl)	9.5-10.5	16-18
VOCs		
Tetrachloroethene (PCE)	<0.0031 U	<0.0022 U
Metals		
Barium	332	149
Copper	**81.8**	42.7
Lead	**421**	9.17
Mercury	<0.0364 U	<0.0374 U
Nickel	**35.2**	**39.8**
Silver	0.633	1.31
Zinc	**383**	59.9

Location	LB-06	LB-06
Sample Name	011_LB-06_0-2	012_LB-06_6-8
Sample Date	11/9/2021	11/9/2021
Sample Depth (ft bsl)	9.5-11.5	15.5-17.5
VOCs		
Tetrachloroethene (PCE)	<0.0027 U	<0.0022 U
Metals		
Barium	194	144
Copper	48.5	48.1
Lead	**345**	13.2
Mercury	<0.0375 U	<0.0373 U
Nickel	24.4	**47.3**
Silver	0.825	0.928
Zinc	**156**	71.3

Location	LB-07	LB-07
Sample Name	015_LB-07_0-2	014_LB-07_5-7
Sample Date	11/10/2021	11/10/2021
Sample Depth (ft bsl)	9.5-11.5	14.5-16.5
VOCs		
Tetrachloroethene (PCE)	<0.002 U	<0.0023 U
Metals		
Barium	145	46.3
Copper	25.5	11.8
Lead	**206**	3.67
Mercury	<0.0381 U	<0.0361 U
Nickel	26.8	13.1
Silver	<0.577 U	<0.548 U
Zinc	**366**	29.8

Location	LSB-26
Sample Name	LSB-26_13-15
Sample Date	8/2/2022
Sample Depth (ft bsl)	13-15
VOCs	
Tetrachloroethene (PCE)	0.022

Location	LB-02	LB-02
Sample Name	007_LB-02_6-8	008_LB-02_8-10
Sample Date	11/9/2021	11/9/2021
Sample Depth (ft bsl)	14.5-16.5	16.5-18.5
VOCs		
Tetrachloroethene (PCE)	**1.6 D**	0.59 D
Metals		
Barium	140	104
Copper	47.6	25.2
Lead	8.9	6.92
Mercury	<0.0382 U	<0.0365 U
Nickel	**55.8**	27
Silver	1.34	1.01
Zinc	73.2	53.4

Location	LSB-27
Sample Name	LSB-27_14-16
Sample Date	8/2/2022
Sample Depth (ft bsl)	14-16
VOCs	
Tetrachloroethene (PCE)	0.003

Location	LSB-29
Sample Name	LSB-29_15.5-17.5
Sample Date	8/2/2022
Sample Depth (ft bsl)	15.5-17.5
VOCs	
Tetrachloroethene (PCE)	0.00037 J

Location	LSB-17	LSB-17	LSB-17
Sample Name	LSB-17_8-10	LSB-17_13-15	LSB-17_17-19
Sample Date	8/3/2022	8/3/2022	8/3/2022
Sample Depth (ft bsl)	8-10	13-15	17-19
VOCs			
Tetrachloroethene (PCE)	0.00031 J	0.0041	0.00052
Pesticides			
4,4'-DDE	<0.00178 U	0.000446 J	<0.00184 U
4,4'-DDT	<0.00178 U	**0.00527**	**0.00344**
Dieldrin	<0.00111 U	0.000997 J	<0.00115 U
Metals			
Barium	41.7	56.4	122
Copper	4.68	17.4	31.3
Lead	6.12	10.8	8.86
Mercury	<0.077 U	<0.087 U	<0.082 U
Nickel	2.35	10.4	30
Silver	<0.904 U	<0.943 U	<0.941 U
Zinc	7.8	31.9	51.8
PFAS			
Perfluorooctanesulfonic Acid (PFOS)	0.000432	0.000159 J	0.000307
Perfluorooctanoic Acid (PFOA)	0.000395	<0.000284 U	<0.00028 U

Location	LSB-30	LSB-30
Sample Name	LSB-30_16.5-18.5	DUP-1-20220803
Sample Date	8/2/2022	8/3/2022
Sample Depth (ft bsl)	16.5-18.5	16.5-18.5
VOCs		
Tetrachloroethene (PCE)	0.001	0.00035 J

Location	LSB-13
Sample Name	055_LSB-13_15-17
Sample Date	1/28/2022
Sample Depth (ft bsl)	15-17
VOCs	
Tetrachloroethene (PCE)	<0.0022 U
Metals	
Barium	333
Copper	42.6
Lead	43.8
Mercury	<0.0345 U
Nickel	**43.8**
Silver	**4.57**
Zinc	107
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	<0.000275 U
Perfluorooctanoic Acid (PFOA)	<0.000275 U

Location	LSB-12	LSB-12
Sample Name	046_LSB-12_15-17	047_LSB-12_18-20
Sample Date	1/26/2022	1/26/2022
Sample Depth (ft bsl)	15-17	18-20
VOCs		
Tetrachloroethene (PCE)	<0.0027 U	0.035
Metals		
Barium	132	93
Copper	33.9	20
Lead	17.4	25.9
Mercury	<0.034 U	<0.0362 U
Nickel	27.8	16.8
Silver	1.33	1.05
Zinc	68.5	48.7
PFAS		
Perfluorooctanesulfonic Acid (PFOS)	<0.000266 U	<0.000252 U
Perfluorooctanoic Acid (PFOA)	<0.000266 U	<0.000252 U

Location	LB-05	LB-05
Sample Name	018_LB-05_6.5-8	019_LB-05_8-9
Sample Date	11/10/2021	11/10/2021
Sample Depth (ft bsl)	16-17.5	17.5-18.5
VOCs		
Tetrachloroethene (PCE)	<0.0015 U	<0.0021 U
Metals		
Barium	116	**451**
Copper	38.4	**50.7**
Lead	32	18
Mercury	<0.0371 U	<0.0385 U
Nickel	**44.4**	**65.1**
Silver	<0.562 U	**3.19**
Zinc	69.4	**136**

Location	LSB-19	LSB-19	LSB-19
Sample Name	LSB-19_8-10	LSB-19_12.5-14.5	LSB-19_16-18
Sample Date	8/2/2022	8/2/2022	8/2/2022
Sample Depth (ft bsl)	8-10	12.5-14.5	16-18
VOCs			
Tetrachloroethene (PCE)	<0.00046 U	<0.00049 U	0.0006
Metals			
Barium	47.3	39.4	67.7
Copper	6.94	11.6	18.4
Lead	6.72	4.92	8.3
Mercury	<0.073 U	<0.079 U	<0.074 U
Nickel	4.27	11.2	19.3
Silver	<0.916 U	<0.972 U	<0.889 U
Zinc	12.5	25.3	36.9
PFAS			
Perfluorooctanesulfonic Acid (PFOS)	**0.00121**	<0.000303 U	<0.000263 UJ
Perfluorooctanoic Acid (PFOA)	0.000168 J	0.000052 J	<0.000263 U

Location	LSB-18	LSB-18	LSB-18
Sample Name	LSB-18_8-10	LSB-18_13-15	LSB-18_16-18
Sample Date	8/3/2022	8/3/2022	8/3/2022
Sample Depth (ft bsl)	8-10	13-15	16-18
VOCs			
Tetrachloroethene (PCE)	<0.00051 U	<0.00052 U	<0.00044 U
Metals			
Barium	31.7	77.2	77.9
Copper	6.78	28.9	9.91
Lead	8.09	16.9	4.68
Mercury	<0.085 U	<0.077 U	<0.079 U
Nickel	5.38	29.6	12.5
Silver	<0.938 U	<0.89 U	<0.877 U
Zinc	15.4	45.7	40.7
PFAS			
Perfluorooctanesulfonic Acid (PFOS)	**0.00164**	0.00036	<0.000268 UJ
Perfluorooctanoic Acid (PFOA)	**0.000678**	0.000493	<0.000268 UJ

Location	LSB-15	LSB-15
Sample Name	058_LSB-15_15-17	057_DUP_4
Sample Date	2/1/2022	2/1/2022
Sample Depth (ft bsl)	15-17	15-17
VOCs		
Tetrachloroethene (PCE)	<0.0019 U	<0.002 U
Metals		
Barium	91.6	70.9
Copper	24	19.7
Lead	8.21	9.46
Mercury	<0.0355 U	<0.0352 U
Nickel	29	25.7
Silver	1	0.904
Zinc	43.6	37.4
PFAS		
Perfluorooctanesulfonic Acid (PFOS)	<0.000276 U	<0.000286 U
Perfluorooctanoic Acid (PFOA)	<0.000276 U	<0.000286 U

Location	LB-04	LB-04
Sample Name	016_LB-04_0-2	017_LB-04_6.5-7.5
Sample Date	11/10/2021	11/10/2021
Sample Depth (ft bsl)	9.5-11.5	16-17
VOCs		
Tetrachloroethene (PCE)	<0.0026 U	<0.0023 U
Metals		
Barium	128	68.3
Copper	25.6	22
Lead	33	6.64
Mercury	<0.0398 U	<0.0378 U
Nickel	20.8	**44.4**
Silver	0.757	<0.573 U
Zinc	43.7	59.3

Location	LSB-20	LSB-20	LSB-20	LSB-20
Sample Name	LSB-20_8-10	LSB-20_13-15	LSB-20_18-20	DUP-1_20220804
Sample Date	8/4/2022	8/4/2022	8/4/2022	8/4/2022
Sample Depth (ft bsl)	8-10	13-15	18-20	18-20
VOCs				
Tetrachloroethene (PCE)	<0.00044 U	<0.00047 U	<0.00049 U	<0.00046 U
Pesticides				
4,4'-DDD	**0.0281**	<0.00185 U	<0.00202 U	<0.00184 U
4,4'-DDE	**0.0188**	<0.00185 U	<0.00202 U	0.000557 J
4,4'-DDT	**0.0419**	<0.00185 U	<0.00202 U	0.0016 J
Dieldrin	0.00456 J	<0.00116 U	<0.00126 U	<0.00115 U
Metals				
Barium	103 J	58.7 J	54.4 J	177 J
Copper	**62.2 J**	24.3 J	21.2	31.4
Lead	**259 J**	6.8	7.62	9.06
Mercury	**0.915**	<0.077 U	<0.082 U	<0.074 U
Nickel	14.8 J	20.2	23.1 J	**48.6 J**
Silver	0.248 J	0.315 J	<1.02 U	<0.878 U
Zinc	**442 J**	35.5	35.2 J	68.9 J
PFAS				
Perfluorooctanesulfonic Acid (PFOS)	0.000759	<0.000281 U	<0.000305 U	<0.000266 UJ
Perfluorooctanoic Acid (PFOA)	<0.000259 U	<0.000281 U	<0.000305 U	<0.000266 U

Location	LSB-21	LSB-21	LSB-21	LSB-21
Sample Name	LSB-21_8-10	LSB-21_13-15	LSB-21_19-21	DUP-2_20220804
Sample Date	8/4/2022	8/4/2022	8/4/2022	8/4/2022
Sample Depth (ft bsl)	8-10	13-15	19-21	19-21
VOCs				
Tetrachloroethene (PCE)	<0.00048 U	0.00052	0.0065	0.0085
Metals				
Barium	45.4	81.8 J	39.8 J	191 J
Copper	5.12	30.1 J	14.2 J	31.8 J
Lead	10.4	6.59	4.06 J	17.7 J
Mercury	<0.07 U	<0.075 U	<0.073 U	<0.079 U
Nickel	4.65	22.4	15.3 J	**36.8 J**
Silver	<0.88 U	<0.925 U	<0.898 U	<0.991 U
Zinc	17	37.4	23.5 J	80 J
PFAS				
Perfluorooctanesulfonic Acid (PFOS)	**0.00109**	<0.000273 U	<0.000266 U	<0.000292 U
Perfluorooctanoic Acid (PFOA)	0.00018 J	<0.000273 U	<0.000266 U	<0.000292 U

Analyte	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use Restricted-Residential SCOs
VOCs			
Acetone	0.05	0.05	100
Tetrachloroethene (PCE)	1.3	1.3	19
Pesticides			
4,4'-DDD	0.0033	14	13
4,4'-DDE	0.0033	17	8.9
4,4'-DDT	0.0033	136	7.9
Dieldrin	0.005	0.1	0.2
Metals			
Barium	350	820	400
Copper	50	1720	270
Lead	63	450	400
Mercury	0.18	0.73	0.81
Nickel	30	130	310
Silver	2	8.3	180
Zinc	109	2480	10000
PFAS			
Perfluorooctanesulfonic Acid (PFOS)	0.00088	0.0037	0.044
Perfluorooctanoic Acid (PFOA)	0.00066	0.0011	0.033

Exceedance Summary:

10 - Result exceeds Unrestricted Use SCOs
10 - Result exceeds Protection of Groundwater SCOs
10 - Result exceeds Restricted Use Restricted-Residential SCOs

Location	LB-08	LB-08	LB-08
Sample Name	001_LB-08_0-2	002_LB-08_7.5-9.5	003_DUP-1
Sample Date	11/9/2021	11/9/2021	11/9/2021
Sample Depth (ft bsl)	9.5-11.5	17-19	17-19
VOCs			
Tetrachloroethene (PCE)	<0.0029 U	<0.0023 U	<0.0023 U
Metals			
Barium	228	111	116
Copper	29.4	29.8	28.2
Lead	**474**	8.78	8.43
Mercury	<0.0364 U	<0.0377 U	<0.0383 U
Nickel	20.2	**32.6**	**35.3**
Silver	0.617	1.2	1.08
Zinc	**247**	62.5	62.4

Location	LSB-9	LSB-9
Sample Name	037_LSB-9_0-2	038_LSB-9_4-6
Sample Date	1/25/2022	1/25/2022
Sample Depth (ft bsl)	8-10	12-14
VOCs		
Tetrachloroethene (PCE)	<0.0024 U	<0.0021 U
Metals		
Barium	161	89.5
Copper	38.5	27.7
Lead	15.3	7.3
Mercury	<0.0378 U	<0.0343 U
Nickel	**36.2**	**34.8**
Silver	0.944	<0.571 U
Zinc	72.5	49.5

Location	LSB-11	LSB-11
Sample Name	042_LSB-11_0-2	043_LSB-11_2-4
Sample Date	1/25/2022	1/25/2022
Sample Depth (ft bsl)	8-10	10-12
VOCs		
Acetone	<0.0038 U	**0.085**
Tetrachloroethene (PCE)	<0.0019 U	<0.0023 U
Metals		
Barium	50.3	48.9
Copper	20.8	17.3
Lead	9.54	8.44
Mercury	<0.0343 U	0.0932
Nickel	20.7	16.6
Silver	<0.572 U	<0.621 U
Zinc	33.3	26.5

Location	LSB-22	LSB-22	LSB-22
Sample Name	LSB-22_9-11	LSB-22_11-13	LSB-22_14.5-16.5
Sample Date	8/1/2022	8/1/2022	8/1/2022
Sample Depth (ft bsl)	9-11	11-13	14.5-16.5
VOCs			
Tetrachloroethene (PCE)	<0.00048 U	<0.0005 U	<0.0005 U
Metals			
Barium	60	49.2	90.2
Copper	10.4	13.3	30.5
Lead	8.85	7.1	5.97
Mercury	<0.077 U	<0.074 U	<0.072 U
Nickel	5.3	13	14.8
Silver	<0.936 U	<0.912 U	<0.871 U
Zinc	18.3	31.4	35.4
PFAS			
Perfluorooctanesulfonic Acid (PFOS)	0.000544 J	<0.000256 UJ	<0.00026 UJ
Perfluorooctanoic Acid (PFOA)	0.00005 J	<0.000256 U	<0.00026 UJ

Location	LSB-14
Sample Name	056_LSB-14_15-17
Sample Date	2/1/2022
Sample Depth (ft bsl)	15-17
VOCs	
Tetrachloroethene (PCE)	<0.002 U
Metals	
Barium	131
Copper	35.6
Lead	10.1
Mercury	<0.0345 U
Nickel	**36.7**
Silver	1.79
Zinc	60.9
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	<0.00028 U
Perfluorooctanoic Acid (PFOA)	<0.00028 U

Location	LSB-10	LSB-10	LSB-10
Sample Name	039_LSB-10_0-2	040_DUP-1	041_LSB-10_4-6
Sample Date	1/25/2022	1/25/2022	1/25/2022
Sample Depth (ft bsl)	8-10	8-10	12-14
VOCs			
Tetrachloroethene (PCE)	<0.0022 U	<0.0024 U	<0.002 U
Metals			
Barium	68.8	82.9	50.3
Copper	13	12.2	28
Lead	37	41.4	7.33
Mercury	<0.0351 U	**0.269**	<0.0337 U
Nickel	12.1	11.1	25.3
Silver	<0.585 U	<0.614 U	<0.561 U
Zinc	35.5	47.7	35.6

Location	LSB-23	LSB-23	LSB-23
Sample Name	LSB-23_8-10	LSB-23_12-14	LSB-23_15.5-17.5
Sample Date	8/1/2022	8/1/2022	8/1/2022
Sample Depth (ft bsl)	8-10	12-14	15.5-17.5
VOCs			
Tetrachloroethene (PCE)	<0.00061 U	<0.00043 U	<0.0004 U
Metals			
Barium	63.8	101	62.9
Copper	11.8	28.2	26.1
Lead	45.4	6.96	4.37 J
Mercury	**0.35**	<0.071 U	<0.07 U
Nickel	7.49	17.9	24.5
Silver	<0.935 U	<0.869 U	<0.877 U
Zinc	32.5	47.6	31.8
PFAS			
Perfluorooctanesulfonic Acid (PFOS)	**0.0018**	0.000271	<0.00026 U
Perfluorooctanoic Acid (PFOA)	0.000218 J	0.000066 J	<0.00026 U

Location	LB-3	LB-3
Sample Name	004_LB-3_0-2	005_LB-3_7-9
Sample Date	11/9/2021	11/9/2021
Sample Depth (ft bsl)	9.5-11.5	16.5-18.5
VOCs		
Tetrachloroethene (PCE)	<0.0026 U	<0.0023 U
Metals		
Barium	166	60.2
Copper	**53.8**	20.3
Lead	**303**	32.6
Mercury	0.101	<0.0381 U
Nickel	26.8	18.4
Silver	0.862	<0.577 U
Zinc	**287**	42.5

Notes:
CAS - Chemical Abstract Service
NS - No standard
mg/kg - milligram per kilogram
NA - Not analyzed
RL - Reporting limit
<RL - Not detected
ft bsl - feet below sidewalk level
Soil sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 of the Official Compilation of New York Codes, Rules, and Regulations (NYCRR) Part 375 Unrestricted Use, Protection of Groundwater, and Restricted Use Restricted-Residential Soil Cleanup Objectives (SCO).
Soil sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Part 375 Remedial Programs Guidelines for Sampling and Analysis of Per- and Polyfluoroalkyl Substances (PFAS) Unrestricted Use, Restricted Use Restricted-Residential, and Protection of Groundwater Guidance Values (June 2021).
Criterion comparisons for 3- & 4-methylphenol (m&p cresol) are provided for reference. Promulgated SCOs are for 3-methylphenol (m-cresol) and 4-methylphenol (p-cresol).

Qualifiers:
D - The concentration reported is a result of a diluted sample.
B - The analyte was found in the associated analysis batch blank.
J - The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
UJ - The analyte was not detected at a level greater than or equal to the RL; however, the reported RL is approximate and may be inaccurate or imprecise.
U - The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.

NOTES:
1. SAMPLING LOCATIONS ARE BASED ON FIELD MEASUREMENTS.
2. VERTICAL ELEVATION DATUM: NATIONAL VERTICAL DATUM OF 1988 (NAVD88)
3. 2016 SOIL BORING AND SOIL GAS LOCATIONS SAMPLED DURING THE CIDER PHASE II ESA.
4. 2021/2022 SAMPLES LOCATIONS AS PRESENTED IN THE 2022 LANGAN PHASE II EI REPORT.
5. AOC-4 CONSISTS OF HISTORIC FILL, WHICH IS PRESENT THROUGHOUT THE SITE.

LANGAN
300 Kimball Drive, Parsippany, NJ 07054
T: 973.560.4900 F: 973.560.4901 www.langan.com
NEW JERSEY NEW YORK VIRGINIA CALIFORNIA PENNSYLVANIA CONNECTICUT FLORIDA ABU DHABI ATHENS DOHA DUBAI ISTANBUL
Langan Engineering & Environmental Services, Inc.
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
Langan International LLC
Collectively known as Langan
NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project
1487 FIRST AVENUE REDEVELOPMENT SITE
BLOCK No. 1452, LOT No. 27
MANHATTAN
NEW YORK NEW YORK

Drawing Title
SOIL ANALYTICAL RESULTS

Project No. 100963701
Date 11/30/2022
Scale 1"=10'
Drawn By IHB
Figure 4

Location	LMW-7
Sample Name	LMW-7-20220822
Sample Date	08/22/2022
VOCs	
Acetone	1.9 J
Chloroform	4.9
Cis-1,2-Dichloroethene	<2.5 U
Tetrachloroethene (PCE)	2.3
Trichloroethene (TCE)	0.18 J
Vinyl Chloride	<1 U
SVOCs	
Chrysene	<0.5 U
Phenol	<5 U
Metals - Dissolved	
Antimony	<4 U
Beryllium	<0.5 U
Copper	3.56
Iron	22 J
Lead	<1 U
Magnesium	**158,000**
Manganese	**1,490**
Nickel	6.81
Selenium	5.34
Sodium	**126,000**
Metals - Total	
Antimony	1.17 J
Beryllium	**4.22**
Copper	**242.4**
Iron	**54,600**
Lead	**1,496**
Magnesium	**244,000**
Manganese	**12,390**
Nickel	**163.9**
Selenium	**25.7**
Sodium	**130,000**
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	0.127
Perfluorooctanoic Acid (PFOA)	0.136

Location	MW02
Sample Name	023_MW02_20211110
Sample Date	11/10/2021
VOCs	
Acetone	5.57
Chloroform	<0.2 U
Cis-1,2-Dichloroethene	**9.32**
Tetrachloroethene (PCE)	**2,660 D**
Trichloroethene (TCE)	**209 D**
Vinyl Chloride	<0.2 U
Metals - Total	
Beryllium	0.335
Copper	57.4
Lead	**41**
Manganese	**25,100 D**
Nickel	**156**
Selenium	8.81

Location	Former LMW-7R-S	Former LMW-7R-S	Former LMW-7R-S
Sample Name	061_MW-7_20	062_MW-7_28	063_DUP-5
Sample Date	02/01/2022	02/02/2022	02/02/2022
VOCs			
Acetone	2.67	2.06	2.27
Chloroform	**10.5**	**10.2**	**10.1**
Cis-1,2-Dichloroethene	**53.7**	**96.8**	**103**
Tetrachloroethene (PCE)	**24.9**	**65.3**	**67.1**
Trichloroethene (TCE)	**54.1**	**94.6**	**99.2**
Vinyl Chloride	0.41 J	0.76	0.8

Location	LMW-9
Sample Name	LMW-9-20220822
Sample Date	08/22/2022
VOCs	
Acetone	<50 U
Chloroform	<25 U
Cis-1,2-Dichloroethene	**70**
Tetrachloroethene (PCE)	**1,500**
Trichloroethene (TCE)	**170**
Vinyl Chloride	**8.3 J**
SVOCs	
Chrysene	**0.02 J**
Phenol	<5 U
Metals - Dissolved	
Antimony	<4 U
Beryllium	<0.5 U
Copper	2.06
Iron	27.7 J
Lead	<1 U
Magnesium	**198,000**
Manganese	**12,190**
Nickel	73.05
Selenium	9.1
Sodium	**199,000**
Metals - Total	
Antimony	0.56 J
Beryllium	0.88
Copper	94.62
Iron	**26,700**
Lead	**339.6**
Magnesium	**204,000**
Manganese	**13,070**
Nickel	**123.6**
Selenium	**10.3**
Sodium	**198,000**
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	0.0624
Perfluorooctanoic Acid (PFOA)	0.239

Legend

SITE BOUNDARY

AOC-2: FUEL OIL AST LOCATION

PETROLEUM IMPACTED SOIL LOCATION FROM AST REMOVAL

CROSS SECTION A-A

2022 RI SOIL BORING/ OVERBURDEN MONITORING WELL LOCATION

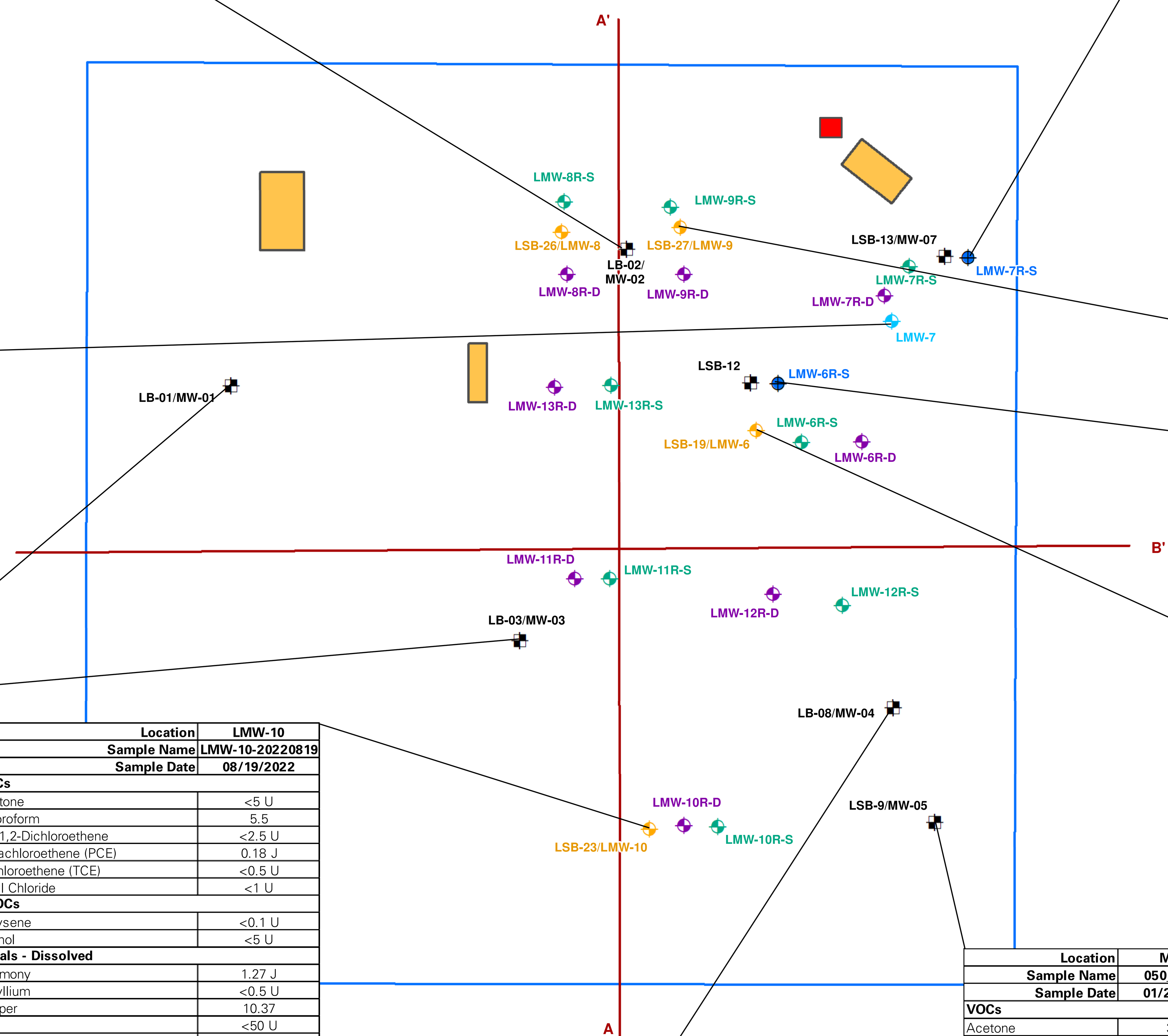
2022 RI OVERBURDEN MONITORING WELL LOCATION

2022 RI SHALLOW BEDROCK MONITORING WELL LOCATION

2022 RI DEEP BEDROCK MONITORING WELL LOCATION

2021/2022 PHASE II BEDROCK MONITORING WELL LOCATION

2021/2022 PHASE II SOIL BORING AND MONITORING WELL LOCATION (LANGAN)



Location	MW01
Sample Name	024_MW01_20211110
Sample Date	11/10/2021
VOCs	
Acetone	4.42
Chloroform	<0.2 U
Cis-1,2-Dichloroethene	<0.2 U
Tetrachloroethene (PCE)	1.48
Trichloroethene (TCE)	<0.2 U
Vinyl Chloride	<0.2 U
Metals - Total	
Beryllium	<0.333 U
Copper	34.4
Lead	**25.5**
Manganese	**1,690 D**
Nickel	66.1
Selenium	8.17

Location	Former LMW-6R-S	Former LMW-6R-S
Sample Name	064_MW-6_28	065_MW-6_45
Sample Date	02/02/2022	02/02/2022
VOCs		
Acetone	1.84 J	1.94 J
Chloroform	**11.3**	**15**
Cis-1,2-Dichloroethene	**85**	**59**
Tetrachloroethene (PCE)	**425 D**	**232 D**
Trichloroethene (TCE)	**151**	**96.9**
Vinyl Chloride	1.94	1.34

Analyte	NYSDEC SGVs	NYSDEC Guidance Values
VOCs		
Acetone	50	NS
Chloroform	7	NS
Cis-1,2-Dichloroethene	5	NS
Tetrachloroethene (PCE)	5	NS
Trichloroethene (TCE)	5	NS
Vinyl Chloride	2	NS
SVOCs		
Chrysene	0.002	NS
Phenol	1	NS
Metals - Dissolved		
Antimony	3	NS
Beryllium	3	NS
Copper	200	NS
Iron	300	NS
Lead	25	NS
Magnesium	35000	NS
Manganese	300	NS
Nickel	100	NS
Selenium	10	NS
Sodium	20000	NS
Metals - Total		
Antimony	3	NS
Beryllium	3	NS
Copper	200	NS
Iron	300	NS
Lead	25	NS
Magnesium	35000	NS
Manganese	300	NS
Nickel	100	NS
Selenium	10	NS
Sodium	20000	NS
PFAS		
Perfluorooctanesulfonic Acid (PFOS)	NS	0.01
Perfluorooctanoic Acid (PFOA)	NS	0.01

Exceedance Summary:

10 - Result exceeds NYSDEC SGVs

10 - Result exceeds NYSDEC Guidance Values

Location	MW-03	MW-03
Sample Name	020_MW-03_20211110	021_GWDUP_20211110
Sample Date	11/10/2021	11/10/2021
VOCs		
Acetone	<1 U	1.19 J
Chloroform	<0.2 U	<0.2 U
Cis-1,2-Dichloroethene	**6.79**	**6.33**
Tetrachloroethene (PCE)	3.87	3.45
Trichloroethene (TCE)	3.59	3.24
Vinyl Chloride	<0.2 U	<0.2 U
SVOCs		
Chrysene	<0.05 U	<0.05 U
Metals - Total		
Beryllium	<0.333 U	<0.333 U
Copper	5.68	5.06
Lead	2.52	2.27
Manganese	**2,950 D**	**2,980 D**
Nickel	16.4	15.6
Selenium	2.48	2.59

Location	LMW-10
Sample Name	LMW-10-20220819
Sample Date	08/19/2022
VOCs	
Acetone	<5 U
Chloroform	5.5
Cis-1,2-Dichloroethene	<2.5 U
Tetrachloroethene (PCE)	0.18 J
Trichloroethene (TCE)	<0.5 U
Vinyl Chloride	<1 U
SVOCs	
Chrysene	<0.1 U
Phenol	<5 U
Metals - Dissolved	
Antimony	1.27 J
Beryllium	<0.5 U
Copper	10.37
Iron	<50 U
Lead	<1 U
Magnesium	31,700
Manganese	**370.7 J**
Nickel	18.81
Selenium	**10.7**
Sodium	**56,400**
Metals - Total	
Antimony	1 J
Beryllium	0.69
Copper	61.29
Iron	**18,900**
Lead	**36.9**
Magnesium	34,700
Manganese	**1,159**
Nickel	54.37
Selenium	**10.4**
Sodium	**52,800**
PFAS	
Perfluorooctanesulfonic Acid (PFOS)	0.123
Perfluorooctanoic Acid (PFOA)	0.151

Location	MW04
Sample Name	022_MW04_20211110
Sample Date	11/10/2021
VOCs	
Acetone	1.39 J
Chloroform	<0.2 U
Cis-1,2-Dichloroethene	**61.1**
Tetrachloroethene (PCE)	**124**
Trichloroethene (TCE)	**60.6**
Vinyl Chloride	1.03
SVOCs	
Chrysene	<0.05 U
Metals - Total	
Beryllium	<0.333 U
Copper	15.4
Lead	14.5
Manganese	**4,990 D**
Nickel	**113**
Selenium	4

Location	MW05	MW05
Sample Name	050_MW05	051_DUP-3
Sample Date	01/27/2022	01/27/2022
VOCs		
Acetone	3.61	1.52 J
Chloroform	0.98	<0.2 U
Cis-1,2-Dichloroethene	**43.9**	**101**
Tetrachloroethene (PCE)	**24.5**	**60**
Trichloroethene (TCE)	**47.2**	**112**
Vinyl Chloride	0.3 J	0.75
SVOCs		
Chrysene	<0.0541 U	<0.0513 U
Phenol	<2.7 U	<2.56 U
Metals - Total		
Antimony	<1.11 U	<1.11 U
Beryllium	0.587	0.975
Copper	83.8	158
Iron	**34,100**	**61,000**
Lead	**25.8 B**	**45.6 B**
Magnesium	**96,400**	**104,000**
Manganese	**5,650**	**6,060**
Nickel	94.5	**146**
Selenium	**23.1**	**30.3**
Sodium	**130,000**	**112,000**

Location	LMW-6	LMW-6
Sample Name	LMW-6-20220819	DUP-20220819
Sample Date	08/19/2022	08/19/2022
VOCs		
Acetone	**15,000 J**	**8,800 J**
Chloroform	<250 U	<250 U
Cis-1,2-Dichloroethene	<250 U	<250 U
Tetrachloroethene (PCE)	<50 U	<50 U
Trichloroethene (TCE)	<50 U	<50 U
Vinyl Chloride	<100 U	<100 U
SVOCs		
Chrysene	<0.1 U	<0.1 U
Phenol	**5.5**	**3.6 J**
Metals - Dissolved		
Antimony	**3.21 J**	1.65 J
Beryllium	<2.5 U	<0.5 U
Copper	<5 U	0.77 J
Iron	**1,540**	**2,040**
Lead	<5 U	0.37 J
Magnesium	**168,000**	**137,000**
Manganese	**30,740**	**24,640**
Nickel	**173.9 J**	**100.5 J**
Selenium	<25 U	<5 U
Sodium	**33,100**	**31,900**
Metals - Total		
Antimony	2.8 J	1.96 J
Beryllium	<0.5 U	0.41 J
Copper	13.28 J	48.35 J
Iron	**3,360 J**	**18,700 J**
Lead	1.83 J	**32.78 J**
Magnesium	**146,000**	**131,000**
Manganese	**28,740**	**23,130**
Nickel	**169.8**	**133.1**
Selenium	<5 U	2.56 J
Sodium	**29,900**	**28,900**
PFAS		
Perfluorooctanesulfonic Acid (PFOS)	0.089	0.0989
Perfluorooctanoic Acid (PFOA)	0.081	0.0934

Notes:

CAS - Chemical Abstract Service

NS - No standard

ug/l - microgram per liter

NA - Not analyzed

RL - Reporting limit

<RL - Not detected

Groundwater sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 of the Official Compilation of New York Codes, Rules, and Regulations (NYCRR) Part 703.5 and the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA Water (herein collectively referenced as "NYSDEC SGVs").

Groundwater sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Part 375 Remedial Programs Guidelines for Sampling and Analysis of Per- and Polyfluoroalkyl Substances (PFAS) (June 2021) and the 1,4-Dioxane value reflects the drinking water maximum contaminant level (MCL) adopted by New York State for public water systems (July 2020). Pursuant to Part 375-1.7(f)(2), the NYSDEC will treat the MCL as relevant and appropriate and will consider this value in remedy selection.

Qualifiers:

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

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

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

NOTES:
1. SAMPLING LOCATIONS FOR THE MONITORING WELLS INSTALLED AS PART OF THE 2022 RI ARE BASED ON THE WELL AS-BUILT SURVEY PREPARED BY TRUE NORTH SURVEYORS, INC. DATED 21 OCTOBER 2022.
2. SAMPLING LOCATIONS FOR THE MONITORING WELLS INSTALLED AS PART OF THE PHASE II ESI ARE APPROXIMATE.
3. AOC-4 CONSISTS OF HISTORIC FILL, WHICH IS PRESENT THROUGHOUT THE SITE.

0 10 20
SCALE IN FEET

LANGAN
300 Kimball Drive, Parsippany, NJ 07054
T: 973.560.4900 F: 973.560.4901 www.langan.com
NEW JERSEY NEW YORK VIRGINIA CALIFORNIA PENNSYLVANIA CONNECTICUT FLORIDA
ABU DHABI ATHENS DOHA DUBAI ISTANBUL
NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

1487 FIRST AVENUE REDEVELOPMENT SITE

BLOCK No. 1452, LOT No. 27

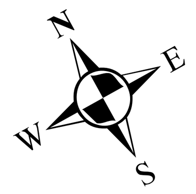
MANHATTAN

NEW YORK NEW YORK

Drawing Title

GROUNDWATER ANALYTICAL RESULTS

Project No.	100963701
Date	11/29/2022
Scale	1"=10'
Drawn By	IHB
Figure	5



Location	LSV-14
Sample Name	LSV-14_012523
Sample Date	1/25/2023
Sample Type	SV
VOCs	
1,1-Dichloroethene	<0.793 U
Cis-1,2-Dichloroethene	<0.793 U
Tetrachloroethene (PCE)	**466**
Trichloroethene (TCE)	2.32

Location	LSV-15
Sample Name	LSV-15_012523
Sample Date	1/25/2023
Sample Type	SV
VOCs	
1,1-Dichloroethene	<0.793 U
Cis-1,2-Dichloroethene	<0.793 U
Tetrachloroethene (PCE)	61.3
Trichloroethene (TCE)	<1.07 U

Location	LSV-16
Sample Name	LSV-16_012523
Sample Date	1/25/2023
Sample Type	SV
VOCs	
1,1-Dichloroethene	<0.793 U
Cis-1,2-Dichloroethene	<0.793 U
Tetrachloroethene (PCE)	**292**
Trichloroethene (TCE)	1.68

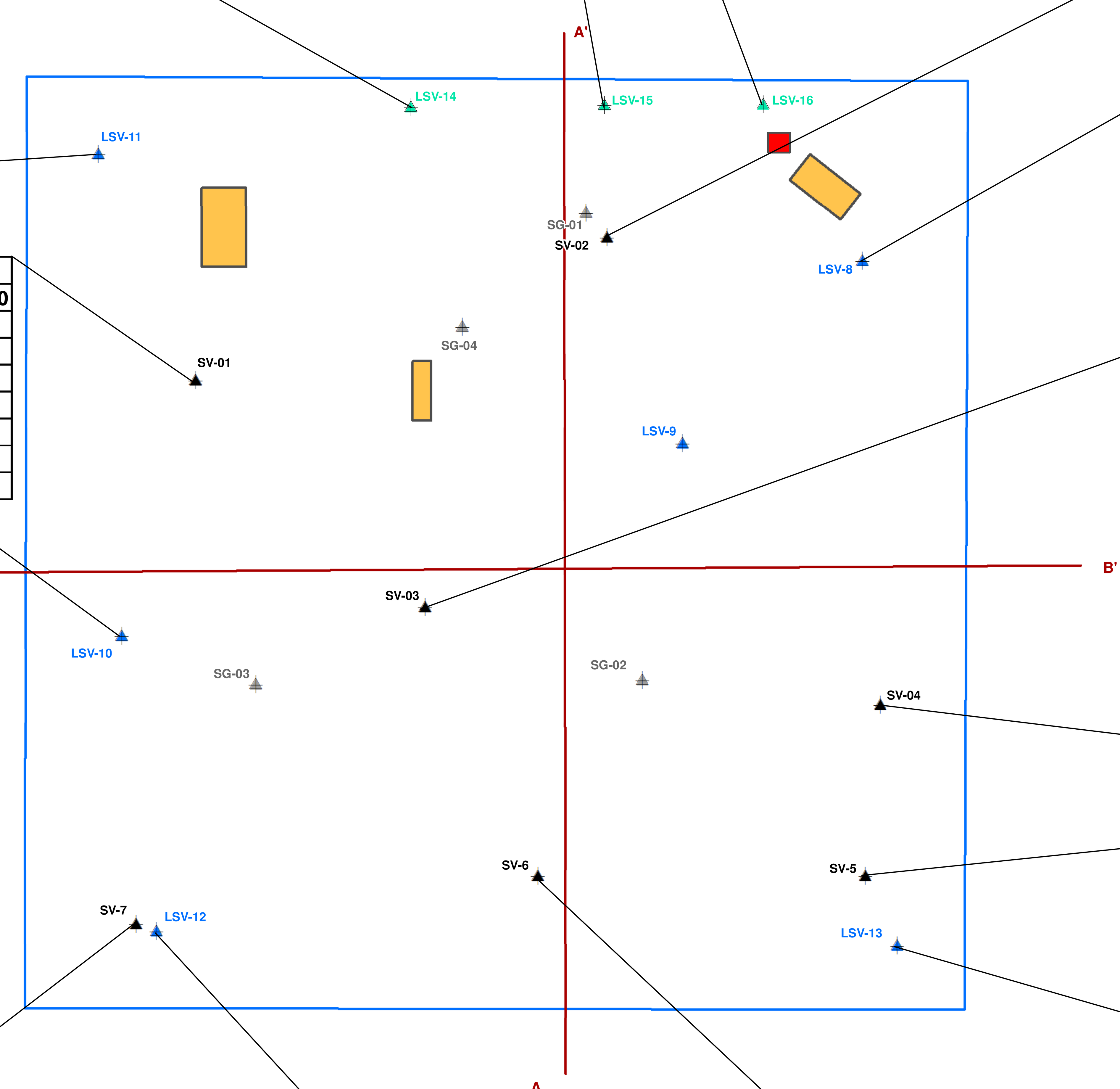
Location	SV-02
Sample Name	025_SV-02_20211110
Sample Date	11/10/2021
Sample Type	SV
VOCs	
1,1-Dichloroethene	<3.58 U
Cis-1,2-Dichloroethene	**6.44 D**
Tetrachloroethene (PCE)	**8,610 D**
Trichloroethene (TCE)	**489 D**

Legend

- SITE BOUNDARY
- AOC-2: FUEL OIL AST LOCATION
- PETROLEUM IMPACTED SOIL LOCATION FROM AST REMOVAL
- CROSS SECTION A-A
- 2022 RI SOIL VAPOR SAMPLE LOCATION
- 2023 SUPPLEMENTAL SOIL VAPOR SAMPLE LOCATION
- 2021/2022 PHASE II SOIL VAPOR SAMPLE LOCATION (LANGAN)
- 2016 SOIL GAS LOCATION (CIDER)

Location	LSV-11	LSV-11
Sample Name	LSV-11_080922	DUP_080922
Sample Date	8/9/2022	8/9/2022
Sample Type	SV	SV
VOCs		
1,1-Dichloroethene	<0.793 U	<0.793 U
Cis-1,2-Dichloroethene	<0.793 U	<0.793 U
Tetrachloroethene (PCE)	54.2	64.4
Trichloroethene (TCE)	<1.07 U	<1.07 U

Location	LSV-8
Sample Name	LSV-8_20220826
Sample Date	08/26/2022
Sample Type	SV
VOCs	
1,1-Dichloroethene	**7.97**
Cis-1,2-Dichloroethene	**40.8**
Tetrachloroethene (PCE)	**339**
Trichloroethene (TCE)	**169**



Location	SV-01	SV-01
Sample Name	027_SV-01_20211110	026_SVDUP_20211110
Sample Date	11/10/2021	11/10/2021
Sample Type	SV	SV
VOCs		
1,1-Dichloroethene	<0.349 U	<0.289 U
Cis-1,2-Dichloroethene	<0.349 U	<0.289 U
Tetrachloroethene (PCE)	4.78 D	4.65 D
Trichloroethene (TCE)	0.663 D	0.627 D

Location	SV-03
Sample Name	028_SV-03_20211110
Sample Date	11/10/2021
Sample Type	SV
VOCs	
1,1-Dichloroethene	<0.382 U
Cis-1,2-Dichloroethene	<0.382 U
Tetrachloroethene (PCE)	8.5 D
Trichloroethene (TCE)	0.518 D

Location	LSV-10
Sample Name	LSV-10_20220826
Sample Date	08/26/2022
Sample Type	SV
VOCs	
1,1-Dichloroethene	<0.793 U
Cis-1,2-Dichloroethene	<0.793 U
Tetrachloroethene (PCE)	10.2
Trichloroethene (TCE)	<1.07 U

Location	SV-04
Sample Name	029_SV-04_20211110
Sample Date	11/10/2021
Sample Type	SV
VOCs	
1,1-Dichloroethene	<1.2 U
Cis-1,2-Dichloroethene	<1.2 U
Tetrachloroethene (PCE)	13.2 D
Trichloroethene (TCE)	<0.815 U

Analyte	NYSDOH Decision Matrices Minimum Concentrations
VOCs	
1,1-Dichloroethene	6
Cis-1,2-Dichloroethene	6
Tetrachloroethene (PCE)	100
Trichloroethene (TCE)	6

Location	SV-7	SV-7
Sample Name	035_SV-7	036_DUP-2
Sample Date	01/25/2022	01/25/2022
Sample Type	SV	SV
VOCs		
1,1-Dichloroethene	<0.793 U	<0.793 U
Cis-1,2-Dichloroethene	<0.793 U	<0.793 U
Tetrachloroethene (PCE)	1.95	1.95
Trichloroethene (TCE)	<1.07 U	<1.07 U

Location	SV-5
Sample Name	033_SV-5
Sample Date	01/25/2022
Sample Type	SV
VOCs	
1,1-Dichloroethene	<0.793 U
Cis-1,2-Dichloroethene	<0.793 U
Tetrachloroethene (PCE)	3.68
Trichloroethene (TCE)	<1.07 U

Exceedance Summary:

10 - Result exceeds minimum soil vapor concentrations recommending mitigation

Location	AA	AA	AA
Sample Name	AA_012523	AA_080922	AA_20220826
Sample Date	1/25/2023	8/9/2022	8/26/2022
Sample Type	AA	AA	AA
VOCs			
1,1-Dichloroethene	<0.793 U	<0.793 U	<0.793 U
Cis-1,2-Dichloroethene	<0.793 U	<0.793 U	<0.793 U
Tetrachloroethene (PCE)	<1.36 U	<1.36 U	<1.36 U
Trichloroethene (TCE)	<1.07 U	<1.07 U	<1.07 U

Location	LSV-12
Sample Name	LSV-12_080922
Sample Date	8/9/2022
Sample Type	SV
VOCs	
1,1-Dichloroethene	<0.793 U
Cis-1,2-Dichloroethene	<0.793 U
Tetrachloroethene (PCE)	15.6
Trichloroethene (TCE)	<1.07 U

Location	SV-6
Sample Name	034_SV-6
Sample Date	01/25/2022
Sample Type	SV
VOCs	
1,1-Dichloroethene	<0.793 U
Cis-1,2-Dichloroethene	<0.793 U
Tetrachloroethene (PCE)	2.62
Trichloroethene (TCE)	<1.07 U

Location	LSV-13
Sample Name	LSV-13_080922
Sample Date	8/9/2022
Sample Type	SV
VOCs	
1,1-Dichloroethene	<0.793 U
Cis-1,2-Dichloroethene	<0.793 U
Tetrachloroethene (PCE)	39.7
Trichloroethene (TCE)	<1.07 U

Notes:
AA - Ambient Air
SV - Soil Vapor
CAS - Chemical Abstract Service
NS - No standard
ug/m3 - microgram per cubic meter
NA - Not analyzed
RL - Reporting limit
<RL - Not detected
Soil vapor sample analytical results are compared to the minimum soil vapor concentrations at which mitigation is recommended as set forth in the New York State Department of Health (NYSDOH) October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York Decision Matrices for Sub-Slab Vapor and Indoor Air and subsequent updates (2017).
Ambient air sample analytical results are shown for reference only.

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

NOTES:
1. SAMPLING LOCATIONS ARE BASED ON FIELD MEASUREMENTS.
2. 2016 SOIL BORING AND SOIL GAS LOCATIONS SAMPLED DURING THE CIDER PHASE II ESA.
3. 2021/2022 SAMPLES LOCATIONS AS PRESENTED IN THE 2022 LANGAN PHASE II EI REPORT.
4. AOC-4 CONSISTS OF HISTORIC FILL, WHICH IS PRESENT THROUGHOUT THE SITE.

0 10 20
SCALE IN FEET

LANGAN
300 Kimball Drive, Parsippany, NJ 07054
T: 973.560.4900 F: 973.560.4901 www.langan.com
NEW JERSEY NEW YORK VIRGINIA CALIFORNIA
PENNSYLVANIA CONNECTICUT FLORIDA
ABU DHABI ATHENS DOHA
DUBAI ISTANBUL
Langan Engineering & Environmental Services, Inc.
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
Langan International LLC
Collectively known as Langan
NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

1487 FIRST AVENUE REDEVELOPMENT SITE
BLOCK No. 1452, LOT No. 27
MANHATTAN
NEW YORK NEW YORK

Drawing Title
SOIL VAPOR ANALYTICAL RESULTS

Project No. 100963701
Date 3/28/2023
Scale 1"=10'
Drawn By IHB
Figure 6

Path: \\langan.com\data\PAR\data7\100963701\Project Data\ArcGIS\MXD\Environmental_Figures\2022-11 RAWP\Figure 6 - Soil Vapor Analytical Results.mxd Date: 3/28/2023 User: ibaker Time: 2:09:49 PM

LEGEND

- SITE BOUNDARY
- EXCAVATION TO 12 FEET BSL
- EXCAVATION TO 14 FEET BSL
- EXCAVATION TO 17 FEET BSL
- EXCAVATION TO 18 FEET BSL
- EXCAVATION TO 19 FEET BSL
- EXCAVATION TO APPROXIMATELY 18.5 FEET BSL FOR THE REMOVAL OF THE CVOC HOTSPOT (IN ACCORDANCE WITH THE IRMWP)

NOTES:
1. BASE MAP SOURCE: FO-100.00 FOUNDATION PLAN BY HILL WEST ARCHITECTS DATED 07 SEPTEMBER 2022.

15 0 15
SCALE IN FEET

LANGAN

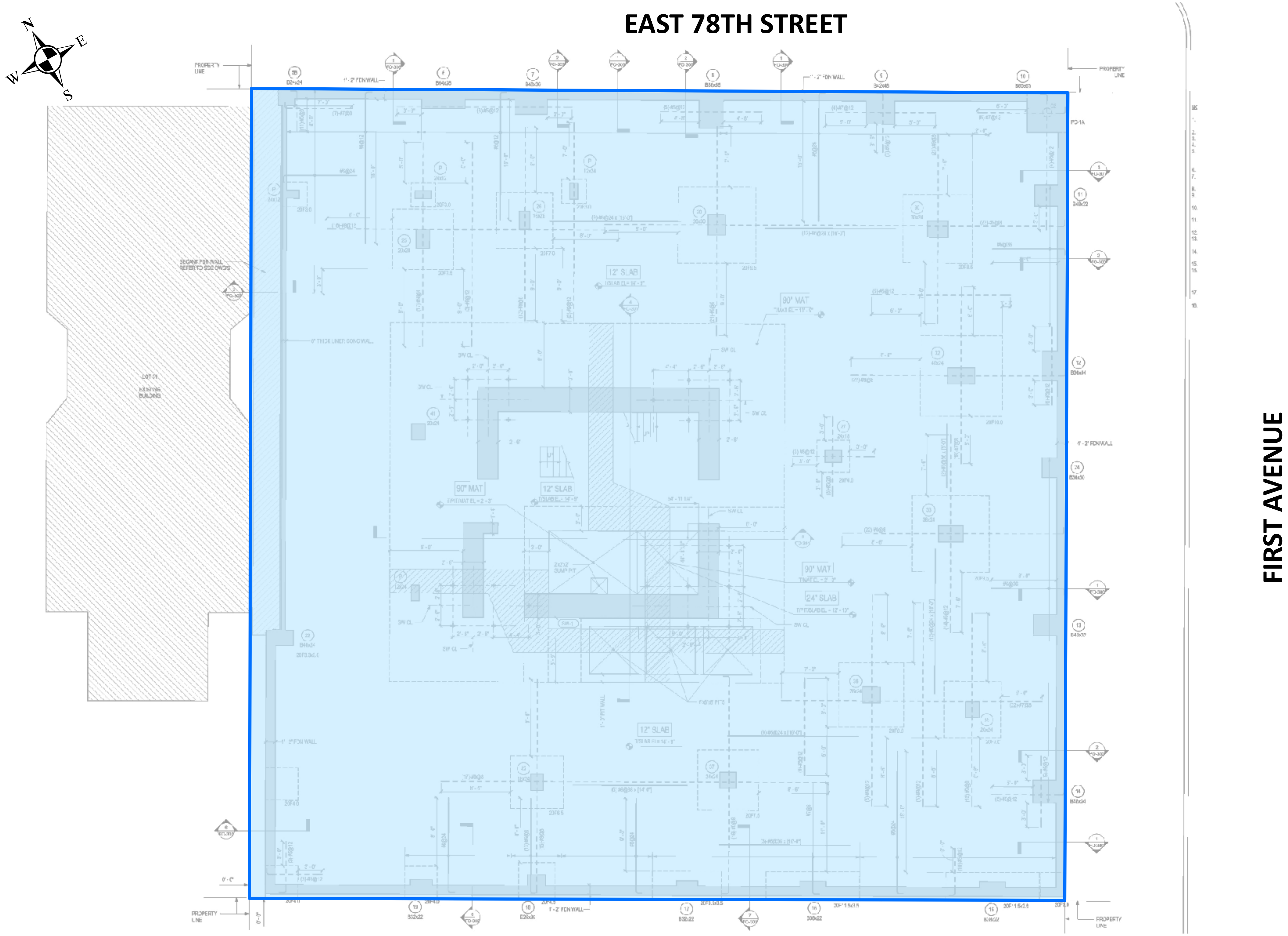
300 Kimball Drive
Parsippany, NJ 07054
T: 973.560.4900 F: 973.560.4901 www.langan.com

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

NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project	Drawing Title	Project No.	Figure
1487 FIRST AVENUE REDEVELOPMENT SITE BLOCK No. 1452, LOT No. 27 MANHATTAN NEW YORK NEW YORK	ALTERNATIVE I - TRACK 1 CLEANUP	100963701 Date: 3/13/2023 Scale: 1:180 Drawn By: PDT	7

Path: \\langan.com\data\PAR\data7\100963701\Project Data\ArcGIS\APRX\100963701\100963701.aprx Date: 3/27/2023 User: pditillio Time: 12:07 PM



LEGEND

SITE BOUNDARY

EXCAVATION TO 15 FEET BSL

NOTES:
1. BASE MAP SOURCE: FO-100.00 FOUNDATION PLAN BY HILL WEST ARCHITECTS DATED 07 SEPTEMBER 2022.

15 0 15
SCALE IN FEET

LANGAN

300 Kimball Drive
Parsippany, NJ 07054
T: 973.560.4900 F: 973.560.4901 www.langan.com

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

NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project

1487 FIRST AVENUE
REDEVELOPMENT SITE

BLOCK No. 1452, LOT No. 27

MANHATTAN

NEW YORK NEW YORK

Drawing Title

ALTERNATIVE II
- TRACK 2 CLEANUP

Project No. 100963701

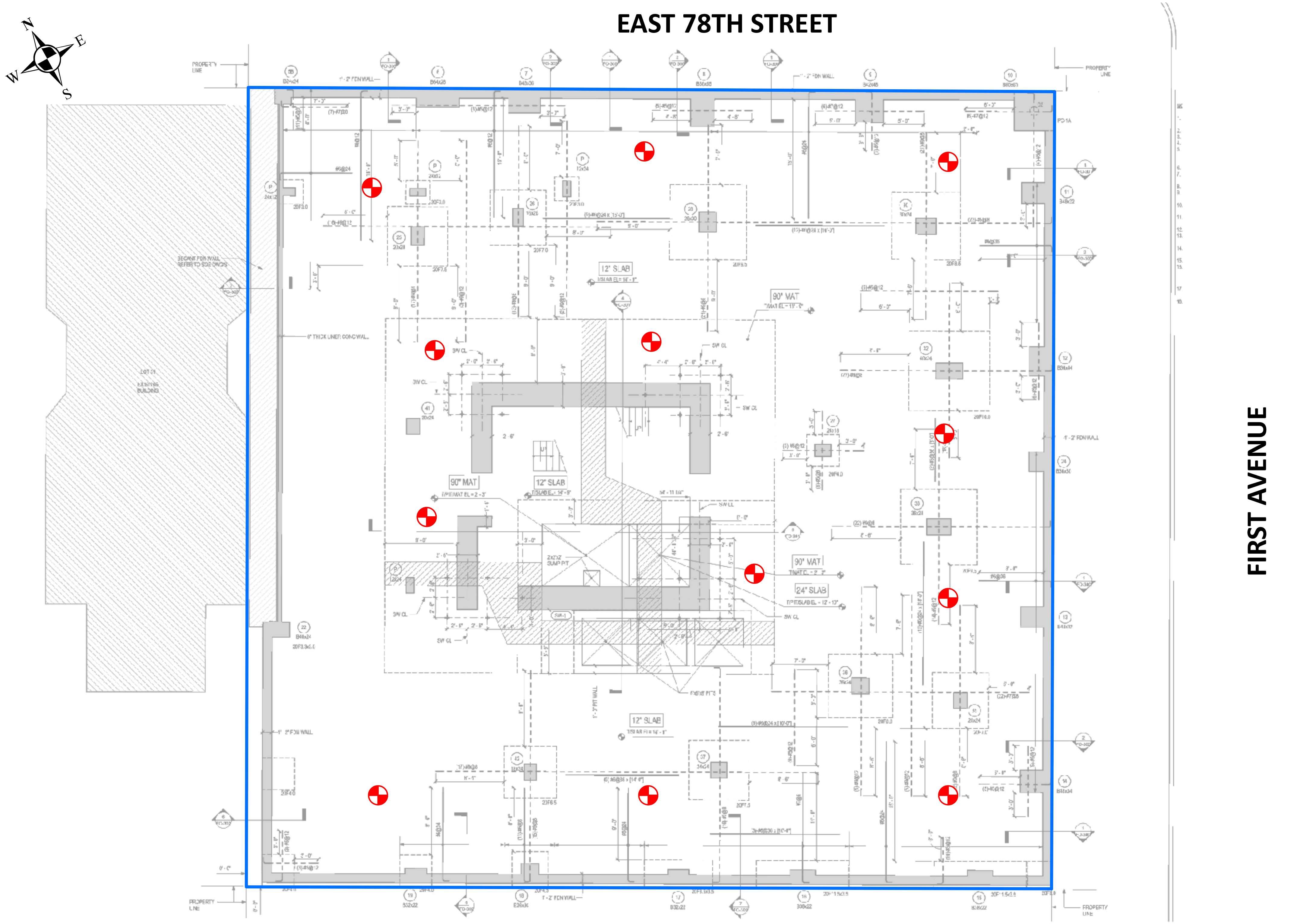
Date 3/30/2023

Scale 1 " = 15 '

Drawn By IHB

Figure 8

Path: \\langan.com\data\PAR\data7\100963701\Project Data\ArcGIS\MXD\Environmental_Figures\2022-11 RAWP\Figure 8 - Alternative II - Track 2 Cleanup.mxd Date: 3/30/2023 User: ibaker Time: 2:39:53 PM



LEGEND

- SITE BOUNDARY
- PROPOSED BOTTOM CONFIRMATION SOIL SAMPLE

NOTES:
1. BASE MAP SOURCE: FO-100.00 FOUNDATION PLAN BY HILL WEST ARCHITECTS DATED 07 SEPTEMBER 2022.
2. PROPOSED BOTTOM CONFIRMATION SOIL SAMPLE LOCATIONS ARE APPROXIMATE.

15 0 15
SCALE IN FEET

LANGAN
300 Kimball Drive
Parsippany, NJ 07054
T: 973.560.4900 F: 973.560.4901 www.langan.com

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

NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project	Drawing Title	Project No.	Figure
1487 FIRST AVENUE REDEVELOPMENT SITE BLOCK No. 1452, LOT No. 27 MANHATTAN NEW YORK NEW YORK	PROPOSED ENPOINT CONFIRMATION SAMPLING PLAN	100963701 Date: 3/30/2023 Scale: 1 " = 15 ' Drawn By: IHB	9

Path: \\langan.com\data\PAR\data7\100963701\Project Data\ArcGIS\MXD\Environmental_Figures\2022-11 RAWP\Figure 9 - Proposed Endpoint Confirmation Sampling Plan.mxd Date: 3/30/2023 User: ibaker Time: 12:03:58 PM

Legend

- Site Boundary
- Truck Route

3,000 0 3,000

SCALE IN FEET

Directions:

1. Turn left at the 2nd cross street onto E 79th St
2. Turn left onto Central Park West
3. Turn right onto W 77th St
4. Turn left onto Columbus Ave
5. Turn right onto W 57th St
6. Turn left at the 2nd cross street onto 11th Ave
7. Merge onto NY-495 W/Lincoln Tunnel via the ramp to New Jersey

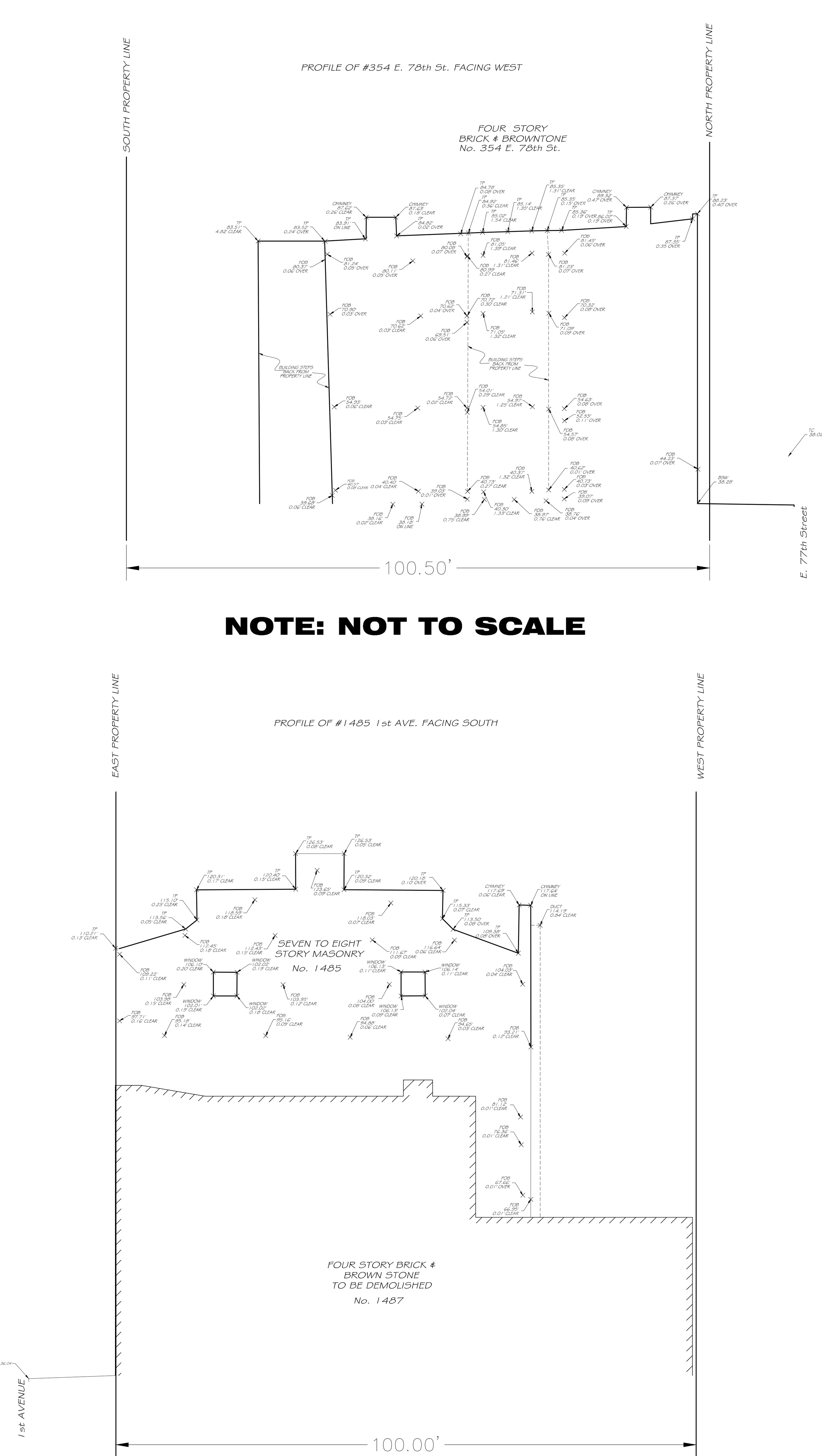
Notes:
1. World Streets basemap provided through Langan's subscription to Esri's ArcGIS software licensing.
2. Parcel information from MapPLUTO 21v2 copyrighted by the New York City Department of Planning, 2021.
3. Lots merged as Lot 27 in accordance with New York City RP-602 Form partially executed on 6 January 2022.

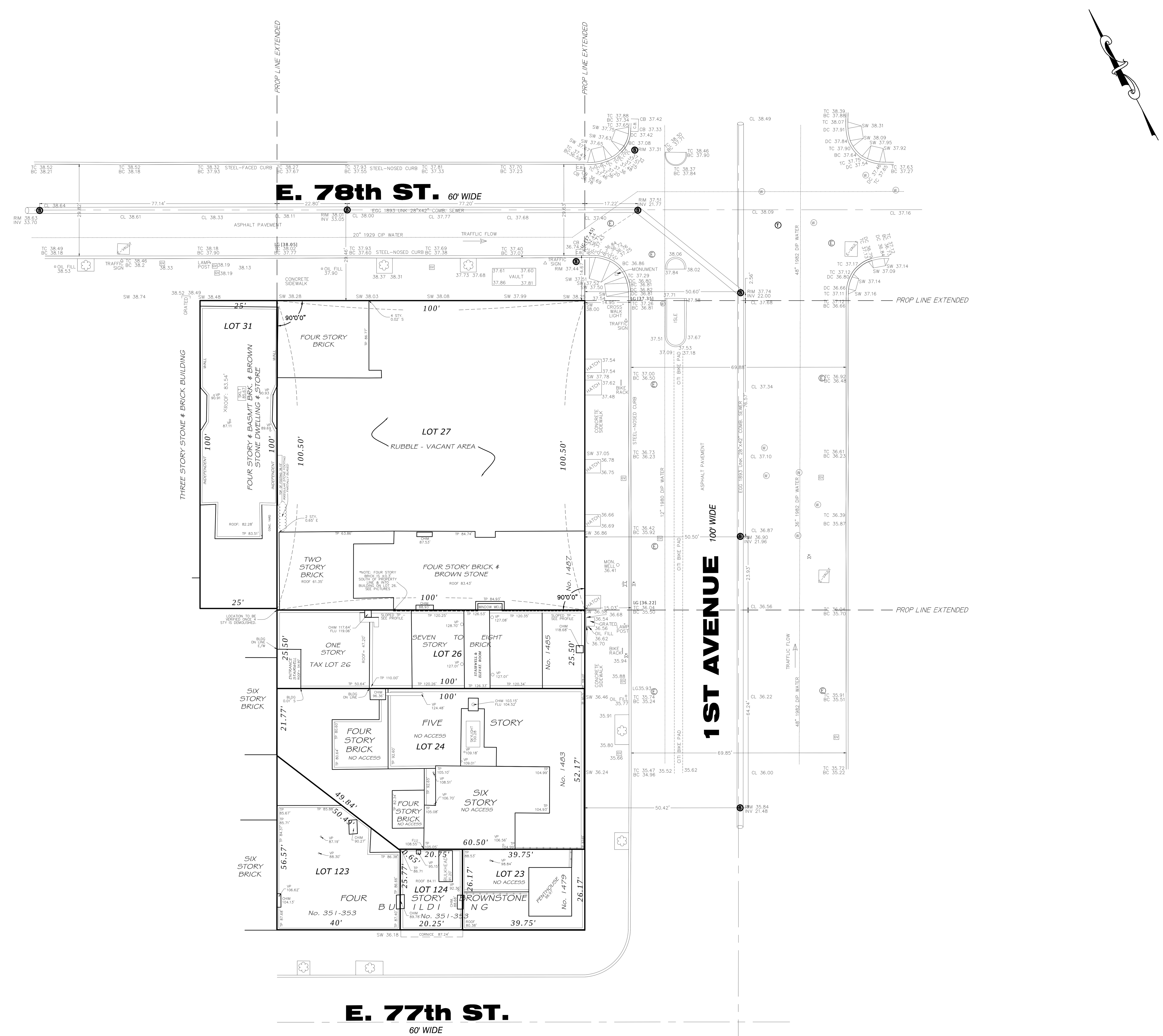
LANGAN
300 Kimball Drive
Parsippany, NJ 07054
T: 973.560.4900 F: 973.560.4901 www.langan.com
Langan Engineering & Environmental Services, Inc.
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
Langan International LLC
Collectively known as Langan
NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project	Drawing Title	Project No. / Date / Scale / Drawn By	Figure
1487 FIRST AVENUE REDEVELOPMENT SITE BLOCK No. 1452, LOT No. 27 MANHATTAN NEW YORK	TRUCK ROUTE MAP	Project No. 100805201 Date 11/7/2022 Scale 1 " = 3,000 ' Drawn By IHB	10

APPENDIX A

Site Survey





NOTES:

1) ELEVATIONS SHOWN ON THIS SURVEY MAP REFER TO NORTH AMERICAN VERTICAL DATUM OF 1988 AS ESTABLISHED AND MAINTAINED BY NATIONAL GEODETIC SURVEY OF THE NATIONAL OCEAN SERVICE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION OR SUCCESSOR AGENCY.

2) ALL DIMENSIONS SHOWN HEREON ARE IN THE UNITED STATES STANDARD OF MEASUREMENT.

3) THIS IS TO CERTIFY THAT THERE ARE NO STREAMS OR NATURAL WATER COURSES VISIBLE ON THE PREMISES SHOWN HEREON.

THE SUBSURFACE UTILITY INFORMATION SHOWN HEREON HAS BEEN EXTRACTED FROM INFORMATION OBTAINED FROM THE VARIOUS MUNICIPAL DEPARTMENTS AND PRIVATE COMPANIES AND IS PLACED ON THIS SURVEY FOR SCHEMATIC PURPOSES ONLY. SUCH INFORMATION IS NOT GUARANTEED AS TO ACCURACY OR COMPLETENESS EITHER BY SAID DEPARTMENTS OR COMPANIES NOR BY THE UNDERSIGNED. BEFORE ANY DRILLING, EXCAVATION OR CONSTRUCTION ON OR NEAR THE PREMISES SHOWN HEREON, IT IS REQUIRED BY NEW YORK STATE INDUSTRIAL CODE 53 THAT THE SUBSURFACE UTILITIES BE MARKED OUT AND IDENTIFIED BY THE COMPANIES OR AGENCIES HAVING JURISDICTION.

UTILITY MAPS SUPPLIED BY RESPECTIVE UTILITY AND GOVERMENTAL AGENCY, AND AS SUCH IT IS RECOMMENDED THAT BEFORE CONSTRUCTION COMMENCES THAT THE APPROPRIATE UTILITIES ARE CONTACTED. THE UTILITIES SHOWN ON THIS SURVEY MAP HAVE BEEN LOCATED BY FIELD OBSERVATIONS AND GUARANTEE IS GIVEN AS TO THE COMPLETENESS, LOCATION, SIZE OR TYPE OF UTILITY. IT IS RECOMMENDED THAT BEFORE CONSTRUCTION COMMENCES THAT THE APPROPRIATE UTILITIES ARE CONTACTED.

4) ESTABLISHED LEGAL GRADES SHOWN PER FINAL SECTION MAP 73 AS FOUND IN THE STATE OF NEW YORK, OFFICE OF THE PRESIDENT, TOPOGRAPHICAL BUREAU.

5) STREET NAMES AND R.O.W. WIDTHS, BLOCK, AND LOT NUMBERS AS PER CURRENT TAX MAPS.

6) OFFSETS (IF SHOWN) ARE FOR SURVEYING REFERENCES ONLY AND ARE NOT TO BE USED IN CONSTRUCTION OF ANY TYPE.

7) ELECTRIC AND GAS CON ED MAPS ARE NO LONGER AVAILABLE TO THIRD PARTIES. THIS INFORMATION MUST BE ATTAINED BY OWNERSHIP. UPON RECIEPT OF THIS INFORMATION FROM OWNERSHIP PLAT WILL BE APPROPRIATELY AMMENDED.

LOT AREAS:
MERGED LOT 27 (FORMERLY LOTS 27, 28, 29, 30): 10,500.00 SQ. FT.
LOT 31 : 2,500.00 SQ. FT.
LOT 26 : 2,550.00 SQ. FT.
LOT 24 : 4,616.59 SQ. FT.
LOT 123: 1,647.29 SQ. FT.
LOT 124: 1,040.25 SQ. FT.

ZONING:
MERGED LOT 27: ENTIRETY OF LOT FALLS WITHIN ZONE C2-8
LOT 31 : ENTIRETY OF LOT FALLS WITHIN ZONE R8B
LOT 26 : ENTIRETY OF LOT FALLS WITHIN ZONE C2-8
LOT 24 : ENTIRETY OF LOT FALLS WITHIN ZONE C2-8
LOT 123: ENTIRETY OF LOT FALLS WITHIN ZONE C2-8
LOT 124: ENTIRETY OF LOT FALLS WITHIN ZONE C2-8

FLOOD MAP NOTE:
BY GRAPHIC PLOTTING ONLY, THIS PROPERTY FALLS WITHIN ZONE X (UNSHADED) OF THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL NO. 3604970088F, WHICH BEARS AN EFFECTIVE DATE OF SEPTEMBER 5, 2007.

LEGEND:

TC–TOP OF CURB
BC–BOTTOM OF CURB
LG–LEGAL GRADE
TW–TOP OF WALL
BW–BOTTOM OF WALL
CLF–CHAIN LINK FENCE
ASPH–ASPHALT PAVEMENT
CONC–CONCRETE PAVEMENT
FH–FIRE HYDRANT
S–SEWER
E–ELECTRIC
W–WATER
GV–GAS VALVE
WV–WATER VALVE
OV–OIL VALVE
T–TELEPHONE
TP–TOP PARAPET
–LIGHT POLE
–UTILITY POLE
MW–MONITORING WELL
[0.00]–LEGAL GRADE
BSW – BACK OF SIDEWALK
DC– DEPRESSED CURB
VP – VENT PIPE
RD – ROOF DRAIN
DR – DRAIN
SC – STEEL COLUMN
BSW–BACK OF SIDEWALK
SW– SIDEWALK
SIGN

I CERTIFY TO:
CARMEL PARTNERS &
THE NEW YORK CITY BUILDING DEPARTMENT
THAT THIS SURVEY WAS PREPARED AND REVIEWED UNDER MY SUPERVISION IN THE OFFICE AND THE FIELD.

	AUTH.	DATE	FIELD DATE: 2-22-22
			SCALE: 1:20
			DRAWN BY: ARV
			CHKD BY: JJV
			COMP FILE: 4-29-22

PRELIMINARY ARCHITECTURAL SURVEY

SITUATED IN

THE BOROUGH OF MANHATTAN

CITY OF NEW YORK
STATE OF NEW YORK

1487 1st AVENUE
NY, NY, 10075
BLOCK 1452 LOT 27 (formerly lots 27, 28, 29, & 30)

True North Surveyors, Inc.
111 Kosciuszko Road, Whitehouse Station, NJ 08889
phone: (908) 534-6248 fax: (908) 534-6237

Date
John J.Vida N.Y.P.L.S. Lic. No. 050298
PROFESSIONAL LAND SURVEYOR

APPENDIX B

Previous Environmental Reports

(Submitted Under Separate Cover)

APPENDIX C

Construction Health and Safety Plan

CONSTRUCTION HEALTH AND SAFETY PLAN

for

1487 1st Avenue Redevelopment Site
1487 1st Avenue
New York, New York
NYSDEC BCP Site No. C231152

Prepared For:

CP VII 78th Street Owner, LLC
805 Third Avenue, 20th Floor
New York, New York 10022

Prepared By:

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
300 Kimball Drive
Parsippany, New Jersey 07054

November 2022
100963701

LANGAN

ENVIRONMENTAL HEALTH AND SAFETY PLAN

Client:	**CP VII 78th Street Owner**
Project:	**Excavation Activities and Groundwater Dewatering During Site Work**
Location:	**1487 1st Avenue**
Chemical Hazards:	**Chlorinated Volatile Organic Compounds, Volatile Organic Compounds, Pesticides, Metals**
Prepared By:	**Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.**
Version:	**1**
Date:	**November 2022**

Client Contact:	**Kyle Becker**	**(212) 202-5794**
Langan Project Manager (PM):	**Amanda Forsburg**	**(973) 560-4900**
Langan Health & Safety Manager (HSM):	**Tony Moffa, CHMM**	**(215) 491-6545**
Langan Health and Safety Officer (HSO):	**Field Personnel**	
WorkCare:		**1-888-449-7787**
Langan Incident/Injury Hotline:		**(973) 560-4699**

LANGAN ENGINEERING, ENVIRONMENTAL, SURVEYING, LANDSCAPE ARCHITECTURE AND GEOLOGY, D.P.C. (LANGAN), AND LANGAN SUBCONTRACTORS, DO NOT GUARANTEE THE HEALTH OR SAFETY OF ANY PERSON ENTERING THIS SITE. DUE TO THE NATURE OF THIS SITE AND THE ACTIVITY OCCURRING THEREON, IT IS NOT POSSIBLE TO DISCOVER, EVALUATE, AND PROVIDE PROTECTION FOR ALL POSSIBLE HAZARDS WHICH MAY BE ENCOUNTERED. STRICT ADHERENCE TO THE HEALTH AND SAFETY GUIDELINES SET FORTH HEREIN WILL REDUCE, BUT NOT ELIMINATE, THE POTENTIAL FOR INJURY AT THIS SITE. THE HEALTH AND SAFETY GUIDELINES IN THIS PLAN WERE PREPARED SPECIFICALLY FOR THIS SITE AND SHOULD NOT BE USED ON ANY OTHER SITE WITHOUT PRIOR RESEARCH AND EVALUATION BY A TRAINED HEALTH AND SAFETY SPECIALIST.

APPROVALS

By signature, the personnel identified below hereby acknowledge that they have reviewed this Construction Health and Safely Plan (CHASP) and agree to comply with the requirements contained therein as well as the applicable provisions of 29 CFR Parts 1910 and 1926. The undersigned also acknowledge and accept that this CHASP is the project CHASP for the site work described in the Remedial Action Plan (RAP). Furthermore, in reviewing and accepting this CHASP, as currently written, the undersigned agree that to the best of their knowledge, this CHASP adequately identifies the activities and hazards associated with work at this site and describes the appropriate and necessary precautions and protections for site workers required by the applicable OSHA statutes and regulations.

Amanda M. Forsburg	11/17/2022
LANGAN Project Manager - PM (Amanda Forsburg)	Date
LANGAN Health and Safety Manager (Tony Moffa, CHMM)	Date
LANGAN Health and Safety Officer – HSO	Date

TABLE OF CONTENTS

TABLES

FIGURES

ATTACHMENTS

1.0 INTRODUCTION

1.1 Purpose and Policy

This Construction Health and Safety Plan (CHASP) has been developed to comply with the regulations under Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120(b)(4), Hazardous Waste Operations and Emergency Response. It addresses foreseeable activities associated with the site work activities to be conducted at 1487 1st Avenue in Manhattan, New York (see Figure 1). This CHASP establishes personnel protection standards and mandatory safety practices and procedures. Additionally, it assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise while operations are being conducted at known or suspected hazardous waste sites.

Langan personnel involved with inspection of site work activities which involve the displacement of soil and/or material or dewatering of excavations during the proposed development shall comply with the requirements of this CHASP. All Langan personnel engaged in onsite activities will read this document carefully and complete the Safety Briefing Form (Attachment A), a copy of which will be provided to Langan's Project files. Contractors and subcontractors conducting construction-related activities which will disturb or displace soil in the identified AOC are required to develop and follow their own HASP which must be equal or more stringent than the Langan CHASP. Contractors and subcontractors are responsible for their own workers Health and Safety and providing a safe working environment in accordance with all applicable federal, state and local requirements. Each Subcontractor will have a designated Site Health and Safety Manager who will be responsible for ensuring that the designated procedures are implemented in the field. Personnel who have any questions or concerns regarding implementation of this plan are encouraged to request clarification from the Langan Project Manager. Field personnel must follow the designated health and safety procedures, be alert to the hazards associated with working close to vehicles and equipment, and use common sense and exercise reasonable caution at all times.

This CHASP covers construction related field activities which have the potential to disturb and/or displace contaminated fill material. These activities include, but are not limited to excavation, moving and grading of the fill material that was identified ranging from 0 to 20-feet in thickness from the current sidewalk level and CVOC impacted material within the vicinity of the former solvent tank. Additionally, as part of the site redevelopment activities dewatering will be required that will potentially allow for contact with impacted groundwater.

This CHASP was prepared in accordance with the following documents and/or guidelines:

- Occupational Safety and Health Administration (OSHA) regulations for hazardous site workers (29 CFR 1910.120 and 29 CFR 1926); and,
- NIOSH/OSHA/USCG/USEPA *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities.*

Langan's Health and Safety Program and Safe Operating Procedures support this site-specific CHASP.

The level of protection and the procedures specified in this CHASP represent the minimum health and safety requirements to be observed by site personnel engaged in the referenced inspection of construction related activities. Unknown conditions may exist, and known conditions may change. Should an employee find himself or herself in a potentially hazardous situation, the employee will immediately discontinue the hazardous procedures(s) and either personally effect appropriate preventative or corrective measures, or immediately notify the Health and Safety Officer or the Langan Project Manager of the nature of the hazard. In the event of an immediately dangerous or life threatening situation, the employee always has "stop work" authority. Any necessary revision to the Health and Safety procedures will be recorded in the Field Procedure Change Authorization Form (Attachment B), and will require authorization from the Langan Health and Safety Officer and Project Manager.

THE ULTIMATE RESPONSIBILITY FOR THE HEALTH AND SAFETY OF THE INDIVIDUAL EMPLOYEE RESTS WITH THE EMPLOYEE AND HIS OR HER COLLEAGUES. Each employee is responsible for exercising the utmost care and good judgment in protecting his or her own health and safety and that of fellow employees. Should any employee observe a potentially unsafe condition or situation, it is the responsibility of that employee to immediately bring the observed condition to the attention of the appropriate health and safety personnel as designated above and to follow-up the verbal notification by completing the Unsafe Conditions and Practices Form provided in Attachment C, a copy of which will be provided to the Langan Health and Safety Officer.

"Extenuating" circumstances such as budget or time constraints, equipment breakdown, changing or unexpected conditions, never justify unsafe work practices or procedures. In fact, the opposite is true. Under stressful circumstances all project personnel must be mindful of the potential to consciously or unconsciously compromise health and safety standards, and be especially safety conscious. **ALL SITE PERSONNEL ARE EXPECTED TO CONSIDER "SAFETY FIRST" AT ALL TIMES.**

1.2 Site Descriptions

The Site is located in the Upper East Side neighborhood of Manhattan, New York and is identified as Block 1452, Lot 27 [formerly consisting of Lots 27, 28, 29, and 30). Soil disturbance and groundwater dewatering activities will be completed to allow for the construction of the proposed mixed-use commercial/residential development. Work will be performed in accordance with the rules and regulations of the local governing bodies.

1.3 Scope of Work

The site work activities that will occur while Langan is providing environmental oversight include the following tasks:

- Task 1 - Excavation and off-site disposal of soil generated during construction as part of the proposed building foundation;
- Task 2 - Completion of foundation construction dewatering;
- Task 3 – Construction of the building foundation consisting of the concrete building slab;
- Task 4 - Installation of a vapor barrier; and,
- Task 5 – Post-excavation soil sample collection.

Details of the scopes of work to be completed in each of the work areas for this project are provided within the November 2022 Remedial Investigation Report and Remedial Action Work Plan.

The proposed site development consists of the construction of a 35-story mixed-use commercial/residential building. The building will contain one cellar level that will occupy the entirety of the site. General excavation will be completed across the majority of the Site footprint for construction of two cellar levels to approximately 23 and 31 feet bsl.

During construction, all soils excavated or disturbed at the site will be either transported off site for disposal at an approved facility or reused on the subject property. Personnel conducting activities that will contact the impacted historic fill, or impacted groundwater shall abide to the provisions of this CHASP.

2.0 PROJECT TEAM ORGANIZATION AND RESPONSIBILITIES

This section specifies the Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) Project Organization.

2.1 Langan Project Manager

The Langan Project Manager (PM) is Amanda Forsburg. The PM responsibilities include:

Responsibilities:

- Prepares and organizes the background review of site conditions, the site HASP, and the field team.
- Obtains permission for site access and coordinates activities with appropriate officials.
- Briefs the field team on their specific assignments.
- Coordinates with the Health and Safety Officer (HSO) to ensure that health and safety requirements are met.
- Serves as the liaison with public officials.
- Ensuring that this HASP is developed and approved prior to on-site activities.

- Ensuring that all the tasks in the project are performed in a manner consistent with Langan's comprehensive Health and Safety Program for Hazardous Waste Operations and this HASP.

2.2 Health and Safety Manager (HSM)

The Langan Corporate Health and Safety Manager (HSM) is Tony Moffa. His responsibilities include:

- Serving as a resource in the development and implementation of HASPs;
- Assist in reviewing results of Jobsite Safety Inspections;
- Assisting site Health and Safety Officer (HSO) with development of the HASP, updating HASP as dictated by changing conditions, jobsite inspection results, etc.;
- Maintaining all records on personnel (medical evaluation results, training and certifications, accident investigation results, etc.).

2.3 Health and Safety Officer (HSO)

The Langan Health and Safety Officer (HSO) will be identified prior to the start of field work. The HSO responsibilities include:

- Participating in the development and implementation of this HASP;
- Conducting Jobsite Safety Inspections (Attachment H) and correcting any shortcomings in a timely manner;
- Helping to select proper PPE (Personal Protective Equipment) and periodically inspecting it;
- Ensuring that PPE is properly stored and maintained;
- Controlling entry into and exit from the contaminated areas or zones of the site;
- Confirming each team member's suitability for work based on a current physician's recommendation;
- Monitoring the work parties for signs of stress, such as heat stress, fatigue, and cold exposure;
- Monitoring site hazards and conditions;
- Knowing (and ensuring that all site personnel also know) emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department;

- Resolves conflicting situations which may arise concerning safety requirements and working conditions;
- Conducting daily tailgate meetings to review applicable JSAs as well as check-in with site personnel.

3.0 HAZARDS ANALYSIS

This section presents all assessment of the general, chemical, physical and biological hazards that may be encountered during the tasks specified under this CHASP (Section 1.3). A detailed summary on types of potential contaminants of concerns Langan anticipates to encounter at different locations during implementation of the RAWP is listed in Tables 1 and 2 of this CHASP.

3.1 General Hazard Assessment

A general hazard assessment was conducted for the required field work described in Section 1.3 and the following potential hazards have been identified:

- Inhalation of volatile contaminants;
- Skin and eye contact with contaminants;
- Ingestion of contaminants;
- Inhalation of dusts impacted with SVOCs and metals;
- Physical hazards associated with the use of heavy equipment;
- Excavation hazards;
- Tripping hazards;
- Noise exposure;
- Heat stress (depending on weather conditions);
- Cold exposure (depending on weather conditions);
- Flammable hazards;
- Electrical hazards; and,
- Use of personal protective equipment.

These hazards are further described in the task-by-task hazard analysis in Table 3. Specific chemical, physical and biological hazards are discussed below.

Mitigation and controls will include as needed work procedures, work/rest regiment, dust control measures, personal protective equipment, and respiratory protection as appropriate.

3.2 Chemical Exposure Hazards

The following chemical hazard evaluation for the proposed site development activities is based on the previous environmental investigation of the site. The evaluation has been conducted to identify chemicals/materials that potentially may be present at the site, and to ensure that work activities, personnel protection, and emergency response are consistent with the specific contaminants that potentially could be encountered.

3.2.1 Specific Chemical Hazards Previously Detected at the Site

Impacted fill material and an impacted sand layer have been identified on the subject property as reported in the November 2022 Remedial Investigation Report. In addition, impacted groundwater and soil vapor was identified on-site. Table 1 lists Contaminants of Concern and potentially affected media. The potential contaminants that might be encountered during the field activities and the exposure limits are listed in Table 2.

3.2.2 Chemical Hazard Exposure Routes

Potential hazards and their exposure routes include:

- Inhalation of organic vapors due to the presence of volatile organic compounds from diesel-powered equipment.

- Inadvertent ingestion of potentially toxic substances via hand to mouth contact or deliberate ingestion of materials inadvertently contaminated with potentially toxic materials such as metals.

- Skin and eye contact with contaminants at the site and decontamination activities.

Exposure limits and health effects of selected chemicals are in Table 2. The probability of exposure for each task is outlined in Table 3.

3.2.3 Control of Exposure to Chemical Hazards

To protect potentially exposed personnel the following procedures and protocols will be adopted and used as needed: work procedures will be adhered to, work zones will be established, dust control will be utilized, respirators (if required) and personal protective equipment will be worn, area air monitoring will be conducted during times of disturbance of the impacted fill material and strict personnel decontamination procedures will be followed.

3.3 Physical Hazards

3.3.1 Temperature Extremes

Hot Temperatures
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. If onsite workers exhibit the signs of heat exhaustion or heat stroke, they should seek immediate medical attention.

Cold Temperatures
Workers may be exposed to the hazard of working in a cold environment. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia, as well as slippery surfaces, brittle equipment, poor judgment, and unauthorized procedural changes. In order to prevent frostbite, hypothermia, trench foot and immersion foot, the workers are responsible for dressing warmly in layers with thick socks, gloves, and appropriate head and face gear. Upon the onset of discomfort due to the cold, onsite workers should take regular five to ten minute breaks to warm up inside nearby buildings and to drink warm fluids. Please note that the NYCDEP statute prohibits idling an engine for more than three minutes (one-minute if adjacent to a school). This statue includes the use of a vehicle for the purpose of warming up employees. As such, all contractors and employees shall identify a place to warm up in advance. If discomfort continues and the onsite workers start to exhibit the signs of frostbite, hypothermia, trench foot or immersion foot, they should seek immediate medical attention.

3.3.2 Noise and Air Resources

Noise is a potential hazard associated with the operation of heavy equipment, power tools, pumps and generators. Hearing protection is required and shall be used in designated areas of the site as indicated by the posted signs.

3.3.3 Hand and Power Tools

In order to complete the various tasks for the project, personnel will utilize hand and power tools. The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut or struck by the tool, fire, and electrocution. Hand and power tools will be inspected prior to use. Proper personal protective equipment shall be worn while utilizing hand and power tools. Ground Fault Circuit Interrupters (GFCIs) are required for all portable electric tools.

3.3.4 Slips, Trips, and Falls

Working in and around the site will pose slip, trip and fall hazards due to equipment, piping, slippery surfaces that may be oil covered, or from surfaces that are wet from rain or ice. Potential adverse health effects include falling to the ground and becoming injured or twisting an ankle. Good housekeeping at the site must be maintained at all times.

3.3.5 Fire and Explosion

Prior to starting all excavation work, a review of appropriate New York City maps will be conducted to identify potential hazards. The possibility of encountering fire and explosion hazards exists from underground utilities and gases. Therefore, all excavation equipment must be grounded.

3.3.6 Material Handling

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

Whenever possible, heavy objects must be lifted and moved by mechanical devices rather than by manual effort. The mechanical devices will be appropriate for the lifting or moving task and will be operated only by trained and authorized personnel. Objects that require special handling or rigging will only be moved under the guidance of a person who has been specifically trained to move such objects, such as a Master Rigger or equivalent. Lifting devices, including equipment, slings, ropes, chains, and straps, will be inspected, certified, and labeled to confirm their weight capacities. Defective equipment will be taken out of service immediately and repaired or destroyed.

The wheels of any trucks being loaded or unloaded, and/or parked on an incline, will be chocked to prevent movement. If applicable, outriggers will be extended on a flat, firm surface during operation. The lift and swing path of a crane/equipment will be watched and maintained clear of obstructions. Personnel will not pass under a raised load, nor will a suspended load be left unattended. Personnel will not be carried on lifting equipment, unless it is specifically designed to carry passengers.

All reciprocating, rotating, or other moving parts will be guarded at all times. Accessible fire extinguishers will be made available in all mechanical lifting devices. All material must be stored in tiers, racked, blocked, or otherwise secure to prevent sliding, falling, or collapse. All loads/material will be verified to be secure before transportation.

3.3.7 Confined Space/Excavation Hazards

Personnel entry into trenches or unshored (*e.g.,* lagging) excavations within the designated areas of concern will not be permitted. No other confined spaces are known to exist on Site. If entry into trenches or excavations is required, all work will stop until the CHASP has been revised to address the new hazards.

3.3.8 Working Near Equipment

Personnel working in the immediate vicinity of heavy equipment (*e.g.*, excavators, loaders, etc.) may encounter physical hazards resulting from contact with equipment. Field personnel should be aware of the presence of these hazards at all times and take appropriate action to avoid them. Due to the limited ability to communicate when wearing respiratory protection, the risk is increased. Workers must be careful to communicate with heavy equipment operators regarding their location, and should maintain a safe distance from operating equipment at all times. Prior to working around equipment, the site personnel will review appropriate hand signals with the operator.

Equipment will be equipped with back up alarms.

3.3.9 Electrical Safety

Personnel may utilize hand and power tools. The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut or struck by the tool, fire, and electrocution. Ground Fault Circuit Interrupters (GFCIs) are required for all portable electric tools.

3.3.10 Utilities

Prior to the start of any intrusive work, the location of above-ground and underground utilities and other structures will be completed by the contractor/subcontractor responsible for completing construction activities.

3.3.11 Vehicular Traffic

Portions of site activities (load in and load out) will be conducted in the street so vehicular and pedestrian traffic will be present. Appropriate precautions to protect the on-site workers and civilians should be used including the use of cones and traffic vests as appropriate.

3.4 Biological Hazards

During the course of the project, there is a potential for workers to come into contact with biological hazards such as animals and insects. As the potential for exposure to blood borne pathogens during implementation of the RAWP is anticipated to be low, a Blood Borne Pathogen Exposure Plan (BBPEP) is not required. A BBPEP will be prepared if site operation requires its implementation.

3.4.1 Animals

During site operations, animals such as dogs, cats, pigeons, mice, and rats may be encountered. Workers shall use discretion and avoid all contact with animals. Bites and scratches from dogs and cats can be painful and if the animal is rabid, the potential for contracting rabies exists. Contact with rat and mice droppings may lead to contracting hantavirus. Inhalation of dried pigeon droppings may lead to psittacosis. Cryptococcosis and histoplasmosis are also diseases associated with exposure to dried bird droppings but these are less likely to occur in this occupational setting.

3.4.2 Insects

Insects, including bees, wasps, hornets, mosquitoes, spiders, and ticks may be present at the site. Some individuals may have a severe allergic reaction to an insect bite or sting that can result in a life threatening condition. In addition, mosquito bites may lead to St. Louis encephalitis or West Nile encephalitis.

3.4.3 Wound Care

A source of occupational exposure may occur when an employee gives First Aid and or CPR to an individual who had infectious blood. The occupational exposure occurs when there is the possibility for an employee’s eyes, mucous membranes, non-intact skin (i.e., cut and abraded skin) to come into contact with potentially infectious materials from another employee. If an accident were to occur where First Aid would need to be administered, the person administering the First Aid will presume that any wounds and materials used are contaminated with BBP and should wear the appropriate PPE to prevent contact with these materials. Additionally, should the use of First Aid materials and or clothing that was potentially contaminated with BBP be encountered these materials should be property containerized and transported to the nearest hospital for proper disposal.

3.5 Coronavirus

General Preventative Measures

Field personnel must follow general proper hygiene measures while in the field including:

- Avoid touching eyes, nose and mouth.
- Cover cough or sneeze with tissue, and throw in trash.
- Wash hands often with soap and water for 20 seconds after going to bathroom, before eating, after blowing nose, coughing or sneezing.
- Use hand sanitizer with at least 60% alcohol if soap and water are not available.
- Avoid physical contact with other people (e.g., no handshakes).
- Maintain a safe distance of at least 6 feet from other people (social distancing).
- Wear face coverings when around other worker to minimize spread of COVID-19. (May be required in certain states or locations.)

Construction Trailers

Employees should avoid use of shared construction trailers or where employees cannot maintain a safe distance (minimum 6 feet) from other workers. If trailer use is needed, areas such as desks, phones, chairs and other common areas, should be cleaned and disinfected before and after use. Protocols should be developed to minimize trailer use to essential personal, restrict use from any workers who are ill or showing symptoms of being ill, use if face coverings and ensure a safe distance of 6 feet can be established between workers.

Communication

Include Coronavirus topics and prevention topics in daily tailgate meetings to ensure Coronavirus awareness is communicated daily. Discussions can focus on general topics including: social distancing, prevention measures for field personnel, signs and symptoms and recent news on the Coronavirus. Site-specific topics should include minimizing face-to-face contact, disinfecting/sterilizing field equipment, use of PPE to reduce exposure, site security, use of face coverings and other potential exposure issues/concerns.

Sick/Ill Workers

No Langan employee is permitted to be onsite when ill and/or showing potential symptoms of the Coronavirus. Symptoms of the Coronavirus may appear 2-14 days after exposure and can range from mild to severe. The most common symptoms include: fever, fatigue, dry cough, shortness of breath chills, repeated shaking with chills, muscle pain, headache, sore throat, or new loss of taste or smell. If an employee or subcontractor is observed being ill or exhibiting symptoms of Coronavirus, employees must immediately utilize their Stop Work Authority and contact their project manager to address the situation. If an employee observes another worker onsite exhibiting symptoms of Coronavirus, immediately utilize Stop Work Authority and notify their project manager and site construction manager or safety officer. Work should resume when the safety and health of Langan and subcontractors is adequately addressed.

3.6 Task Hazard Analysis

The tasks to be completed during the proposed site work activities, as summarized in Section 1.3, are listed in Table 3 with a Hazard Analysis for each task.

4.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

4.1 Levels of Protection

PPE must protect workers from the specific hazards they are likely to encounter on site. Selection of the appropriate PPE must take into consideration: (1) identification of the hazards or suspected hazards; (2) potential exposure routes; and, (3) the performance of the PPE construction (materials and seams) in providing a barrier to these hazards. Based on anticipated site conditions and the proposed work activities to be performed at the Site, Level D Protection will be used. The upgrading/downgrading of these levels of protection will be based on continuous air monitoring results as described in Section 5.0. The decision to modify standard PPE will be made by the HSO after conferring with the Langan Project Manager. The levels of protection are described below.

- **Level D Protection**

    a. Safety glasses with sideshields or chemical splash goggles
    b. Safety boots/shoes (toe-protected)
    c. Hard hat
    d. Long sleeve work shirt and work pants
    e. Nitrile gloves
    f. Hearing protection (as needed)
    g. Reflective traffic vest

- **Level D Protection (Modified)**

  a. Safety glasses with sideshields or chemical splash goggles
  b. Safety boots/shoes (toe-protected)
  c. Disposable chemical-resistant boot covers
  d. Coveralls (polycoated Tyvek or equivalent to be worn when contact with wet contaminated soil, groundwater, or non-aqueous phase liquids is anticipated)
  e. Hard hat
  f. Long sleeve work shirt and work pants
  g. Nitrile gloves
  h. Hearing protection (as needed)
  i. Reflective traffic vest

- **Level C Protection**

  a. Full face-piece, air-purifying, cartridge*-equipped, NIOSH-approved respirator [*combo cartridge P100/OV/CL/HC/SD/CD/HS (escape)]
  b. Inner (latex) and outer (nitrile) chemical-resistant glove
  c. Chemical-resistant safety boots/shoes (toe-protected)
  d. Disposable chemical-resistant boot covers
  e. Hard hat
  f. Long sleeve work shirt and work pants
  g. Coveralls (Tyvek or equivalent, poly-coated Tyvek will be worn when contact, or anticipated contact with wet contaminated soils, ground water, and/or non-aqueous phase liquids (NAPL) is anticipated)
  h. Hearing protection (as needed)
  i. Reflective traffic vest

The action levels used in determining the necessary levels of respiratory protection and upgrading to Level C are provided in Table 4. The written Respiratory Protection Program is maintained by Langan's H&S Department. The monitoring procedures and equipment are outlined in Section 5.0.

4.2 Respirator Fit-Test

All Langan employees and subcontractors performing site work who could be exposed to hazardous substances at the work site are in possession of a full face-piece, air-purifying respirator and have been successfully quantitative fit-tested within the past year. Quantitative fit-test records are maintained by Langan's H&S Department.

4.3 Respirator Cartridge Change-Out Schedule

Respiratory protection is required to be worn when certain action levels (Table 2) are reached. A respirator cartridge change-out schedule has been developed in order to comply with 29 CFR 1910.134. The respirator cartridge change-out schedule for this project is as follows:

- Cartridges shall be removed and disposed of at the end of each shift, when cartridges become wet or wearer experiences breakthrough, whichever occurs first.
- 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 the time period was the previous day they were used.

5.0 AIR QUALITY MONITORING AND ACTIONS LEVELS

5.1 Monitoring During Site Operations

Atmospheric air monitoring results are used to provide data to determine when exclusion zones need to be established and when certain levels of personal protective equipment are required. For all instruments there are Site-specific action level criteria which are used in making field health and safety determinations. Other data, such as the visible presence of contamination or the steady state nature of air contaminant concentration, are also used in making field health and safety decisions. Therefore, the HSO may establish an exclusion zone or require a person to wear a respirator even though atmospheric air contaminant concentrations are below established CHASP action levels.

During site work involving disturbance of CVOC-impacted or fill material, real time air monitoring will be conducted for volatile organic compounds (VOCs). A photoionization detector (PID) with an 11.7v lamp and/or flame ionization detector (FID) will be used to monitor concentrations of VOCs at personnel breathing-zone height. Dust monitoring will be accomplished with an aerosol monitor. Air monitoring will be the responsibility of the HSO or designee. Air monitoring will be conducted approximately every 30 minutes during ground intrusive activities in the AOC on the project site. All manufacturers' instructions for instrumentation and calibration will be available onsite.

Subcontractors' air monitoring plans must be equal to or more stringent as the Langan plan.

An air monitoring calibration log is provided in Attachment D of this CHASP.

5.1.1 Volatile Organic Compounds

Monitoring with a PID, such as a MiniRAE 2000 (11.7v) or equivalent will occur during intrusive work. Colormetric Indicator Tubes for benzene may be used as backup for the PID, if measurements remain above background monitor every 2 hours. The HSO will monitor the employee breathing zone at least every 30 minutes, or whenever there is any indication that concentrations may have changed (odors, visible gases, etc.) since the last measurement. Instrument action levels for monitored gases are provided in Table 4.

5.1.2 Dust

During invasive procedures which have the potential for creating airborne dust, such as excavation of dry soils, a real time airborne dust monitor such as a a Thermo Personal DataRam (pDR) or a TSI DustTrakshould be used to monitor for air particulates. The HSO will monitor the employee breathing zone at least every 30 minutes, or whenever there is any indication that concentrations may have changed (appearance of visible dust) since the last measurement. Instrument action levels for dust monitoring are provided in Table 4.

5.2 Monitoring Equipment Calibration and Maintenance

Instrument calibration shall be documented and included in a dedicated safety and health logbook or on separate calibration pages of the field book. All instruments shall be calibrated before and after each shift. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

All instruments shall be operated in accordance with the manufacturers' specifications. Manufacturers' literature, including an operations manual for each piece of monitoring equipment will be maintained on site by the HSO for reference.

5.3 Determination of Background Levels

Background (BKD) levels for VOCs and dust will be established prior to intrusive activities within the AOC at an upwind location. A notation of BKD levels will be referenced in the daily monitoring log. BKD levels are a function of prevailing conditions. BKD levels will be taken in an appropriate upwind location as determined by the HSO.

Table 4 lists the instrument action levels.

6.0 COMMUNITY HEALTH AND SAFETY CONSIDERATIONS

Community air monitoring will be conducted in compliance with the NYSDOH Generic Community Air Monitoring Program (CAMP) provided as Appendix H in the RAWP.

Langan will conduct monitoring for dust and VOCs during ground-intrusive work. Upwind concentrations of VOCs and dust will be monitored continuously each day to establish background concentrations. Langan will monitor VOCs and dust at the downwind perimeter of the work zone, which will be established at a point on the Site where the general public or site employees may be present. Monitoring for VOCs will be conducted with a PID equipped with a 10.6 eV bulb. Dust emissions will be monitored using real-time monitoring equipment capable of measuring PM-10 (e.g., DustTrak).

Sustained concentrations of VOCs or PM10 will be reported to the NYSDEC and NYSDOH Project Managers and included in the daily report. In addition, a map showing the location of the downwind and upwind CAMP stations will be included in the daily report.

7.0 WORK ZONES AND DECONTAMINATION

7.1 Site Control

Work zones are intended to control the potential spread of contamination throughout the site and to assure that only authorized individuals are permitted into potentially hazardous areas.

Any person working in an area where the potential for exposure to site contaminants exists will only be allowed access after providing the HSO with proper training and medical documentation.

Exclusion Zone (EZ) - All activities which may involve exposure to site contaminants, hazardous materials and/or conditions should be considered an EZ. Decontamination of field equipment will also be conducted in the Contaminant Reduction Zone (CRZ) which will be located on the perimeter of the EZ. The EZ and the CRZ will be clearly delineated by cones, tapes or other means. The HSO may establish more than one EZ where different levels of protection may be employed or different hazards exist. The size of the EZ shall be determined by the HSO allowing adequate space for the activity to be completed, field members and emergency equipment.

7.2 Contamination Control

7.2.1 Personnel Decontamination Station

Personal hygiene, coupled with diligent decontamination, will significantly reduce the potential for exposure.

7.2.2 Minimization of Contact with Contaminants

During completion of all site activities, personnel should attempt to minimize the chance of contact with contaminated materials. This involves a conscientious effort to keep "clean" during site activities. All personnel should minimize kneeling, splash generation, and other physical contact with contamination as PPE is intended to minimize accidental contact. This may ultimately minimize the degree of decontamination required and the generation of waste materials from site operations.

Field procedures will be developed to control over spray and runoff and to ensure that unprotected personnel working nearby are not affected.

7.2.3 Personnel Decontamination Sequence

Decontamination will be performed by removing all PPE used in EZ and placing it in drums/trash cans at the CRZ. Baby wipes shall be available for wiping hands and face. Drums/trash cans will be labeled by the field crews in accordance with all local, state, and federal requirements. Management plans for contaminated PPE, tools and Investigative Derived Waste (i.e., soil cutting) are provided below.

7.2.4 Emergency Decontamination

If circumstances dictate that contaminated clothing cannot be readily removed, then remove gross contamination and wrap injured personnel with clean garments/blankets to avoid contaminating other personnel or transporting equipment. If the injured person can be moved, he/she will be decontaminated by site personnel as described above before emergency responders handle the victim. If the person cannot be moved because of the extent of the injury (a back or neck injury), provisions shall be made to ensure that emergency response personnel will be able to respond to the victim without being exposed to potentially hazardous atmospheric conditions. If the potential for inhalation hazards exist, such as with open excavation, this area will be covered with polyethylene sheeting to eliminate any potential inhalation hazards. All emergency personnel are to be immediately informed of the injured person's condition, potential contaminants, and provided with all pertinent data.

7.2.5 Hand-Held Equipment Decontamination

Hand-held equipment includes all monitoring instruments as stated earlier, samples, hand tools, and notebooks. The hand-held equipment is dropped at the first decontamination station to be decontaminated by one of the decontamination team members. These items must be decontaminated or discarded as waste prior to removal from the CRZ.

To aid in decontamination, monitoring instruments can be sealed in plastic bags or wrapped in polyethylene. This will also protect the instruments against contaminants. The instruments will be wiped clean using wipes or paper towels if contamination is visually evident. Sampling equipment, hand tools, etc. will be cleaned with non-phosphorous soap to remove any potentially contaminated soil, and rinsed with deionized water. All decontamination fluids will be containerized and stored on-site pending waste characterization sampling and appropriate off-site disposal.

7.2.6 Heavy Equipment Decontamination

All heavy equipment and vehicles arriving at the work site will be free from contamination from offsite sources. Any vehicles arriving to work that are suspected of being impacted will not be permitted on the work site. Potentially contaminated heavy equipment will not be permitted to leave the EZ unless it has been thoroughly decontaminated and visually inspected by the HSO or his designee.

7.3 Communications

The following communications equipment will be utilized as appropriate.

- Telephones - A cellular telephone will be located with the HSO for communication with the HSM and emergency support services/facilities.
- Hand Signals - Hand signals 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 partner's wrist or placement of both hands around partner's waist	Leave area immediately, no debate
Hands on top of head	Need assistance
Thumbs up	Okay, I'm all right, I understand
Thumbs down	No, negative

8.0 MEDICAL SURVEILLANCE

All personnel who will be performing field work involving potential exposure to toxic and hazardous substances will be required to have passed an initial baseline medical examination, with annual follow-up medical exams thereafter, consistent with 29 CFR 1910.120(f). Medical evaluations will be performed by, or under the direction of, a physician board-certified in occupational medicine. Results of medical evaluations are maintained by Langan's H&S Department.

9.0 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 that 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. In case of emergency, in addition to 911 the Langan Incident/Injury Hotline (973-560-4699) should be called as soon as possible.

9.1 Responsibilities

9.1.1 Health and Safety Officer (HSO)

The HSO is responsible for ensuring that all personnel are evacuated safely and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. The HSO is responsible for ensuring the HSM are notified of all incidents, all injuries, near misses, fires, spills, releases or equipment damage. The HSO is required to immediately notify the HSM of any fatalities or catastrophes (three or more workers injured and hospitalized) so that the HSM can notify OSHA within the required time frame.

9.1.2 Emergency Coordinator

The HSO or their designated alternate will serve as the Emergency Coordinator. The Emergency Coordinator is responsible for ensuring that all personnel are evacuated safely and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. They are also responsible for ensuring the HSM are notified of all incidents, all injuries, near misses, fires, spills, releases or equipment damage. The Emergency Coordinator is required to immediately notify the HSM of any fatalities or catastrophes (three or more workers injured and hospitalized.

The Emergency Coordinator shall locate emergency phone numbers and identify hospital routes prior *to beginning* work on the sites. The Emergency Coordinator shall make necessary arrangements to be prepared for any emergencies that could occur.

The Emergency Coordinator is responsible for implementing the Emergency Response Plan.

9.1.3 Site Personnel

Project site personnel are responsible for knowing the Emergency Response Plan and the procedures contained herein. Personnel are expected to notify the Emergency Coordinator of situations that could constitute a site emergency. Project site personnel, including all subcontractors will be trained in the Emergency Response Plan.

9.2 Communications

Once an emergency situation has been stabilized or as soon as practically possible, the HSO will contact the Langan Incident/Injury Hotline (973-560-4699) and Project Manager of identify any emergency situation.

9.3 Local Emergency Support Units

In order to be able to deal with any emergency that might occur during investigative activities at the site, Attachment E will be available in the field vehicles and provided to all personnel conducting work within the EZ.

Figure 2 shows the hospital route map. Outside emergency number 911 and local ambulance should be relied on for response to medical emergencies and transport to emergency rooms. Due to traffic congestion that is prevalent in the New York metropolitan area, alternate hospital routes will need to be considered. The Emergency Coordinator will determine the appropriate route based on time of day and traffic patterns. Changes in the referenced primary facilities shall be documented with the CHASP Field Change Authorization Request Form (Attachment B).

The Emergency Phone Numbers listed are preliminary. Upon mobilization, the HSO shall verify all numbers and document the changes in the Site Logbook. Any changes shall also be documented with the CHASP Field Change Authorization Request Form.

Hospital route maps will be provided to all field personnel.

9.4 Pre-Emergency Planning

Langan will communicate directly with administrative personnel from the emergency room at the hospital in order to determine whether the hospital has the facilities and personnel needed to treat cases of trauma resulting from any of the contaminants expected to be found on the site. Instructions for finding the hospital will be posted conspicuously in the site office and in each site vehicle.

9.5 Emergency Medical Treatment

The procedures and rules in this CHASP are designed to prevent employee injury. However, should an injury occur, no matter how slight, it will be reported to the HSO on site immediately. First-aid equipment will be available on site at the following locations:

First Aid Kit:	Vehicles
Emergency Eye Wash:	Vehicles

During the site safety briefing, project personnel will be informed of the location of the first aid station(s) that has been set up. 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-response squad arrives at the site or before the injured person can be transported to the hospital, will be followed closely.

Personnel with current first aid and CPR certification will be identified.

Only in non-emergency situations will an injured person be transported to the hospital by means other than an ambulance.

<u>Nearest hospital</u>: **New York Presbyterian Hospital**
520 E 70th Street
New York, NY 10021
(212) 746-5454
(directions from site to hospital found on Figure 2)

9.6 Non-Emergency Medical Treatment

In case of injury to personnel, which is not a medical emergency the employee will contact WorkCare at (1-888-449-7787). WorkCare provides access 24 hours / 7 days a week to experienced occupational health nurses and physicians who confer with employees at the onset of a work-related injury or illness. WorkCare will provide over the phone injury treatment or direct employees to medical treatment by third party provider, if appropriate.

9.7 Emergency Site Evacuation Routes and Procedures

All project personnel will be instructed on proper emergency response procedures and locations of emergency telephone numbers during the initial site safety meeting. If an emergency occurs as a result of implementation of the RAWP, including but not limited to fire, explosion or significant release of toxic gas into the atmosphere, the Langan Project Manager will be verbally notified immediately. All heavy equipment will be shut down and all personnel will evacuate the work areas and assemble at the nearest intersection to be accounted for and to receive further instructions.

9.8 Fire Prevention and Protection

In the event of a fire or explosion, procedures will include immediately evacuating the site and notification of the Langan Project Manager of the investigation activities. Portable fire extinguishers will be provided at the work zone. The extinguishers located in the various locations should also be identified prior to the start of work. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage).

9.8.1 Fire Prevention

Fires will be prevented by adhering to the following precautions:

- Good housekeeping and storage of materials.
- Storage of flammable liquids and gases away from oxidizers.
- Shutting off engines to refuel.
- Grounding and bonding metal containers during transfer of flammable liquids.
- Use of UL approved flammable storage cans.
- Fire extinguishers rated at least 10 pounds ABC located on all heavy equipment, in all trailers and near all hot work activities.

The person responsible for the control of fuel source hazards and the maintenance of fire prevention and/or control equipment is the HSO.

9.9 Significant Vapor Release

Based on the proposed tasks, the potential for a significant vapor release is low. However, if a release occurs, the following steps will be taken:

- Move all personnel to an upwind location. All non-essential personnel shall evacuate.
- Upgrade to Level C Respiratory Protection.
- Downwind perimeter locations shall be monitored for volatile organics.
- If the release poses a potential threat to human health or the environment in the community, the Emergency Coordinator shall notify the Langan Project Manager.
- Local emergency response coordinators will be notified.

9.10 Overt Chemical Exposure

The following are standard procedures to treat chemical exposures. Other, specific procedures detailed on the Safety Data Sheet (SDS) will be followed, when necessary.

SKIN AND EYE:	Use copious amounts of soap and water from eye-wash kits and portable hand wash stations.
CONTACT:	Wash/rinse affected areas thoroughly, then provide appropriate medical attention. Skin shall also be rinsed for 15 minutes if contact with caustics, acids or hydrogen peroxide occurs. Affected items of clothing shall also be removed from contact with skin.

Providing wash water and soap will be the responsibility of each individual contractor or subcontractor on-site.

9.11 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 omitted. The HSO or designee will accompany contaminated victims to the medical facility to advise on matters involving decontamination when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed on site, a plastic barrier placed between the injured individual and clean surfaces should be used to help prevent contamination of the inside of ambulances and/or medical personnel. Outer garments may then be removed at the medical facility. No attempt will be made to wash or rinse the victim if his/her injuries are life threatening, unless it is known that the individual has been contaminated with an extremely toxic or corrosive material which could also cause severe injury or loss of life to emergency response personnel. For minor medical problems or injuries, the normal decontamination procedures will be followed.

9.12 Incident Reporting

Once first aid and/or emergency response needs have been met, the following parties are to be contacted:

- WorkCare (1-888-449-7787)
- Langan Incident/Injury Report Hotline (973-560-4699)
- Langan Project Manager, Amanda Forsburg (973-560-4574)

- Langan Health and Safety Manager, Tony Moffa (215-491-6500)
- The employer of any injured worker who is not a Langan employee

For emergencies involving personal injury and/or exposure including near-misses, the HSO or designee will complete and submit an Incident Report form (Attachment F) within 24 hours. If the employee involved is not a Langan employee, his employer shall receive a copy of the report.

9.13 Adverse Weather Conditions

In the event of adverse weather conditions, the HSO will determine if work will continue without potentially risking the safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries.
- Potential for cold stress and cold-related injuries.
- Treacherous weather-related working conditions (hail, rain, snow, ice, high winds).
- Limited visibility (fog).
- Potential for electrical storms.
- Earthquakes.
- Other major incidents.

Site activities will be limited to daylight hours, or when suitable artificial light is provided, and acceptable weather conditions prevail. The HSO will determine the need to cease field operations or observe daily weather reports and evacuate, if necessary, in case of severe inclement weather conditions.

9.14 Spill Control and Response

All small spills/environmental releases shall be contained as close to the source as possible. Whenever possible, the SDS will be consulted to assist in determining proper waste characterization and the best means of containment and cleanup. For small spills, sorbent materials such as sand, sawdust or commercial sorbents should be placed directly on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. All spill containment materials will be properly disposed. An exclusion zone of 50 to 100 feet around the spill area should be established depending on the size of the spill.

All contractor vehicles shall have spill kits on them with enough material to contain and absorb the worst-case spill from that vehicle. All vehicles and equipment shall be inspected prior to be admitted on site. Any vehicle or piece of equipment that develops a leak will be taken out of service and removed from the job site.

The following seven steps shall be taken by the Emergency Coordinator:

1. Determine the nature, identity and amounts of major spills.
2. Make sure all unnecessary persons are removed from the spill area.
3. Notify the HSO immediately.
4. Use proper PPE in consultation with the HSO.
5. If a flammable liquid, gas or vapor is involved, remove all ignition sources and use non-sparking and/or explosion-proof equipment to contain or clean up the spill (diesel-only vehicles, air-operated pumps, etc.)
6. If possible, try to stop the leak with appropriate material.
7. Remove all surrounding materials that can react or compound with the spill.

In addition to the spill control and response procedures described in this CHASP, Langan personnel will coordinate with the designated project manager relative to spill response and control actions. Notification to the Project Manager must be immediate and, to the extent possible, include the following information:

- Time and location of the spill.
- Type and nature of the material spilled.
- Amount spilled.
- Whether the spill has affected or has a potential to affect a waterway or sewer.
- A brief description of affected areas/equipment.
- Whether the spill has been contained.
- Expected time of cleanup completion. If spill cleanup cannot be handled by Langan's on-site personnel alone, such fact must be conveyed to the Project Manager immediately.

Langan shall not make any notification of spills to outside agencies. The client will notify regulatory agencies as per their reporting procedures.

9.15 Emergency Equipment

The following minimum emergency equipment shall be kept and maintained on site:

- Industrial first aid kit.
- Fire extinguishers (one per site).

9.16 Restoration and Salvage

After an emergency, prompt restoration of utilities, fire protection equipment, medical supplies and other equipment will reduce the possibility of further losses. Some of the items that may need to be addressed are:

- Refilling fire extinguishers.
- Refilling medical supplies.
- Recharging eyewashes and/or showers.
- Replenishing spill control supplies.

10.0 TRAINING

10.1 General Health and Safety Training

Completion of an initial 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training program (or its equivalent) as detailed in OSHA's 29 CFR 1910.120(e) is required for all employees who will perform work in areas where the potential for a toxic exposure exists. Annual 8-hour refresher training is also required to maintain competencies to ensure a safe work environment.

10.2 Site-Specific Training

Prior to commencement of site 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 a documented verbal review of the entire CHASP and all the provisions within the

CHASP document. Should any new employees arrive on-site, they will also be given a documented full CHASP review – or one that address the appropriate tasks that remain at the time of the new employee's arrival.

10.3 Onsite Safety Briefings

Project personnel and visitors will participate in documented daily on-site health and safety briefings ("Tailgate Talks") led by the HSO to assist site personnel in safely conducting their work activities. The briefings will include information on operations to be conducted that shift, 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 for the work crews to be updated on monitoring results. Prior to starting any new activity, a training session will be held for crew members involved in the activity. The Safety Briefing form (Attachment A) can be used to facilitate this effort.

10.4 Hazard Communication

All material brought on-site will be in the appropriate containers and will be properly labeled. The SDS for unleaded gasoline, diesel fuel, and hydraulic fluid are attached. Langan's written Hazard Communication program, in compliance with 29 CFR 1910.1200, is maintained by Langan's H&S Department.

11.0 RECORDKEEPING

The following is a summary of required health and safety logs, reports and recordkeeping.

11.1 Field Change Authorization Request

A field change authorization request is to be completed for requesting a change to this CHASP (Attachment B). Any changes to the work to be performed that is not included in the CHASP will require an Addendum that is approved by the Langan Project Manager and Langan HSM to be prepared. Approved changes will be reviewed with all field personnel at a safety briefing.

11.2 Medical and Training Records

Copies or verification of training (40-hour, 8-hour, supervisor, site-specific training, documentation of three-day OJT, and respirator fit-test records) and medical clearance for Site work and respirator use will be maintained in the office and available upon request. Records for all subcontractor employees must also be available upon request. All employee medical records will be maintained by Langan's H&S Department.

11.3 Onsite Log

A log of personnel on site each day will be kept by the HSO or designee.

11.4 Daily Safety Meetings ("Tailgate Talks")

Completed Safety Briefing forms will be maintained by the HSO.

11.5 Exposure Records

All personal monitoring results, laboratory reports, calculations and air sampling data sheets are part of an employee exposure record. These records will be maintained by the HSO during site work. At the end of the project they will be maintained according to 29 CFR 1910.1020.

11.6 Hazard Communication Program/SDS

Safety Data Sheets (SDS) have been obtained for applicable substances and are included in this CHASP (Attachment G). Langan's written Hazard Communication program, in compliance with 29 CFR 1910.1200, is maintained by Langan's H&S Department.

11.7 Documentation

Employees are required to contact WorkCare at (1-888-449-7787) to document incidents/injuries which are not medical emergencies. Immediately following an incident or near miss, unless emergency medical treatment is required, either the employee or a coworker must contact the Langan Incident/Injury Hotline at (973-560-4699) and the client representative to report the incident or near miss. A written report must be completed and submitted to the client representative within 24 hours of the incident. For emergencies involving personnel injury and/or exposure, employee will complete and submit the Langan Incident/Injury Report to the Langan Corporate Health and Safety Manager as soon as possible following the incident. Accidents will be investigated in-depth to identify all causes and to recommend hazard control measures.

12.0 FIELD PERSONNEL REVIEW

This form serves as documentation that field personnel have been verbally given a full CHASP review by Langan personnel, and understand the provisions of this EHS Plan. It is maintained on site by the HSO as a project record.

Each field team member shall sign this section after Site-specific training is completed and before being permitted to work onsite.

Name (Print and Sign)	***Company***	***Date***

TABLES

TABLE 1
CONTAMINANTS OF CONCERN
1487 FIRST AVENUE
NEW YORK, NEW YORK

Contaminant of Concern	Affected Media
VOLATILES	
Acetone	Soil / Groundwater
Chloroform	Groundwater
Cis-1,2-Dichloroethene	Groundwater / Soil Vapor
Tetrachlorethylene	Soil / Groundwater / Soil Vapor
Trichloroethylene	Groundwater / Soil Vapor
Vinyl Chloride	Groundwater
1,1-Dichloroethene	Soil Vapor
Chlorinated VOCs	Groundwater / Soil Vapor
Total Volatiles	Groundwater / Soil Vapor
SEMI-VOLATILES	
Chrysene	Groundwater
Phenol	Groundwater
PESTICIDES	
4,4'-DDD	Soil
4,4'-DDE	Soil
4,4'-DDT	Soil
Dieldrin	Soil
METALS	
Antimony	Groundwater
Barium	Soil
Beryllium	Groundwater
Lead	Soil / Groundwater
Iron	Groundwater
Mercury	Soil
Magnesium	Groundwater
Manganese	Groundwater
Copper	Soil / Groundwater
Nickel	Soil / Groundwater
Silver	Soil
Selenium	Groundwater
Sodium	Groundwater
Zinc	Soil
Perfluorooctanoic acids	
Perfluorooctanesulfonic Acid (PFOS)	Soil / Groundwater
Perfluorooctanoic Acid (PFOA)	Soil / Groundwater

TABLE 2
SELECTED POTENTIAL CHEMICAL EXPOSURE LIMITS AND HEALTH EFFECTS
1487 FIRST AVENUE
NEW YORK, NEW YORK

Chemical	Permissible Exposure Limit	IDLH Limit	Exposure Routes	Exposure Symptoms
Acetone	1,000 ppm	2,500 ppm	Inhalation, Ingestion, Skin and/or Eye Contact	Irritation eyes, nose throat; headache, dizziness, central nervous system depression; dermatitits
Chloroform	50 ppm	500 ppm	Inhalation, Skin Absorption, Ingestion, Skin and/or Eye Contact	Irritation eyes, skin; dizziness, mental dullness, nausea, confusion; headache, lassitude (weakness, exhaustion); anesthesia; enlarged liver; [potential occupational carcinogen]
Cis-1,2-Dichloroethene	200 ppm	1,000 ppm	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, respiratory system; central nervous system depression
Tetrachloroethene	15 ppm	150 ppm	Inhalation, Skin Absorption, Ingestion, skin and/or eye contact	Nausea, vomiting, abdominal pain, tremor fingers, jaundice, hepatitis, liver tenderness, dermatitis, monocytosis, kidney damage [potential occupational carcinogen]
Trichloroethene	100 ppm	1,000 ppm	Inhalation, Skin Absorption, Ingestion, skin and/or eye contact	Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]
Vinyl Chloride	5 ppm	–	Inhalation, skin and/or eye contact (liquid)	Lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen]
Total Volatile Organics	15 ppm	150 ppm	Inhalation, Skin Absorption, Ingestion	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]

TABLE 2
SELECTED POTENTIAL CHEMICAL EXPOSURE LIMITS AND HEALTH EFFECTS
1487 FIRST AVENUE
NEW YORK, NEW YORK

Chemical	Permissible Exposure Limit	IDLH Limit	Exposure Routes	Exposure Symptoms
Chrysene	0.2 mg/m^3	80 mg/m^3	Inhalation, Skin Absorption, Ingestion	Irritate eyes, skin, upper respiratory system, cough
Phenol	5 ppm	250 ppm	Inhalation, Ingestion, Skin and/or Eye Contact	Irritation eyes, nose, throat; anorexia, weight loss; lassitude (weakness, exhaustion), muscle ache, pain; dark urine; cyanosis; liver, kidney damage; skin burns; dermatitis; ochronosis; tremor, convulsions, twitching
4,4'-DDD	1 mg/m^3	500 mg/m^3	Inhalation, Ingestion, Skin and/or Eye Contact	irritation eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]
4,4'-DDE	1 mg/m^3	500 mg/m^3	Inhalation, Ingestion, Skin and/or Eye Contact	irritation eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]
4,4'-DDT	1 mg/m^3	500 mg/m^3	Inhalation, Ingestion, Skin and/or Eye Contact	irritation eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]
Dieldrin	0.25 mg/m^3	50 mg/m^3	Inhalation, skin absorption, ingestion, skin and/or eye contact	Headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort), sweating; myoclonic limb jerks; clonic, tonic convulsions; coma

TABLE 2
SELECTED POTENTIAL CHEMICAL EXPOSURE LIMITS AND HEALTH EFFECTS
1487 FIRST AVENUE
NEW YORK, NEW YORK

Chemical	Permissible Exposure Limit	IDLH Limit	Exposure Routes	Exposure Symptoms
Lead	0.05 mg/m^3	100 mg/m^3	Inhalation, Ingestion, Skin and/or Eye Contact	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension
Antimony	0.5 mg/m^3	50 mg/m^3	Inhalation, Ingestion, Skin and/or Eye Contact	Irritation eyes, skin, nose, throat, mouth; cough; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; unable to smell properly
Arsenic	0.010 mg/m^3	5 mg/m^3	Inhalation, Ingestion, Skin Absorption, Skin and/or Eye Contact	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, resp irritation, hyperpigmentation of skin, [potential occupational carcinogen]
Barium	0.5 mg/m^3	50 mg/m^3	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, upper respiratory system; skin burns; gastroenteritis; muscle spasm; slow pulse, extrasystoles; hypokalemia
Beryllium	0.002 mg/m^3	4 mg/m^3	Inhalation, skin and/or eye contact	Berylliosis (chronic exposure): anorexia, weight loss, lassitude (weakness, exhaustion), chest pain, cough, clubbing of fingers, cyanosis, pulmonary insufficiency; irritation eyes; dermatitis; [potential occupational carcinogen]
Iron	–	–	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, mucous membrane; abdominal pain, diarrhea, vomiting; possible liver damage

TABLE 2
SELECTED POTENTIAL CHEMICAL EXPOSURE LIMITS AND HEALTH EFFECTS
1487 FIRST AVENUE
NEW YORK, NEW YORK

Chemical	Permissible Exposure Limit	IDLH Limit	Exposure Routes	Exposure Symptoms
Magnesium	15 mg/m^3	750 mg/m^3	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, nose, throat, lungs; metallic taste, headache, fever, chills, chest tightness, cough
Manganese	5 mg/m^3	500 mg/m^3	Inhalation, ingestion	Manganism; asthenia, insomnia, mental confusion; metal fume fever: dry throat, cough, chest tightness, dyspnea (breathing difficulty), rales, flu-like fever; low-back pain; vomiting; malaise (vague feeling of discomfort); lassitude (weakness, exhaustion); kidney damage
Mercury	0.1 mg/m3	10 mg/m3	Inhalation, Ingestion, Skin Absorption, Skin and/or Eye Contact	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria
Copper	1 mg/m3	100 mg/m3	Inhalation, Ingestion, skin and/or eye contact	Irritation eyes, respiratory system; cough, dyspnea (breathing difficulty), wheezing; [potential occupational carcinogen]
Nickel	1 mg/m3	10 mg/m3	Inhalation, Skin Absorption, Ingestion, skin and/or eye contact	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria

TABLE 2
SELECTED POTENTIAL CHEMICAL EXPOSURE LIMITS AND HEALTH EFFECTS
1487 FIRST AVENUE
NEW YORK, NEW YORK

Chemical	Permissible Exposure Limit	IDLH Limit	Exposure Routes	Exposure Symptoms
Silver	0.01 mg/m3	10 mg/m3	Inhalation, ingestion, skin and/or eye contact	Blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance
Selenium	0.02 mg/m3	1 mg/m3	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal disturbance; dermatitis; eye, skin burns; In Animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage
Sodium	---	---	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, and throat; cough, shortness of breath, headache, nausea, vomiting, diarrhea, and abdominal pain
Zinc	---	---	Inhalation, ingestions, skin and/or eye contact	Irritation eyes, skin; cough, wheezing, metallic taste, headache, fever and chills, chest tightness and cough

--- No exposure limits listed in the NIOSH Pocket Guide to Chemical Hazards dated November 2010.

TABLE 3
HAZARD ANALYSIS
1487 FIRST AVENUE
NEW YORK, NEW YORK

Task	Potential Risk	Description	Control Measure
1, 2, 3, 4, 5	Lifting equipment	Improper lifting/carrying of equipment and materials	Follow safe lifting and general material handling
1, 2, 3, 4, 5	Noise	Loud sounds caused by the machines during drilling, or excavation	Wear proper PPE (hearing protection)
1, 2, 3, 4, 5	Working near heavy machinery	Close proximity to drill rig and/or construction equipment	Be aware of surroundings, wear safety vest and hard hat
1, 2, 3, 4, 5	Slips, trips, and falls	Any number of injuries from slips, trips, and falls in carrying out these tasks	Good housekeeping at site, constant awareness and focus on the task
1, 2, 3, 4, 5	Inhalation of Dust	Breathing in visible dust from earthwork using drills or excavators	Wear proper PPE, monitor air for dust concentrations, use dust suppression techniques
1, 2, 3, 4, 5	Inhalation of Volatiles	Breathing in volatiles from earthwork using drills or excavators causing dust	Wear proper PPE, monitor air for volatile concentrations, use dust suppression techniques
1, 2, 3, 4, 5	Utilities	Hitting utility lines during drilling and or excavating	Use proper mark out of underground utilities before beginning earthwork
1, 2, 3, 4, 5	Skin contact with contaminated material	Material falls on skin; gets in eye	Wear proper PPE; follow safe work practices
1, 2, 3, 4, 5	Ingestion of contaminated material	Material falls on skin; gets into mouth	Wear proper PPE; follow safe work practices
1, 2, 3, 4, 5	Skin and eye contact with contaminated material	Material falls on skin; gets in eye	Wear proper PPE; follow safe work practices
1, 2, 3, 4, 5	Heat Stress	Stress or exhaustion related to high temperatures	Hydrate and rest as needed
1, 2, 3, 4, 5	Cold Stress	Stress or exhaustion related to low temperatures; hypothermia	Wear proper PPE; follow safe work practices
1, 2, 3, 4, 5	Bites and stings	Bee stings, ticks, snake bites	Wear proper PPE, be watchful, follow safe work practices
1, 2, 3, 4, 5	Lacerations and abrasions	Many opportunities working with hand tools	Inspect equipment being used for sharp edges, wear proper PPE; follow safe work practices

TABLE 4
INSTRUMENTATION ACTION LEVELS
1487 FIRST AVENUE
NEW YORK, NEW YORK

Instrument	Action Level	Level of Protection / Action Required
PID	Background to 5 ppm	Level D/No respirator; no further action required
	> 5 ppm for > 5 minutes	1. Temporarily discontinue all activities and evaluate potential causes of the excessive readings. If these levels persist and cannot be mitigated (i.e., by slowing drilling or excavation activities), contact HSO to review conditions and determine source and appropriate response action. 2. If PID readings remain above 5 ppm, temporarily discontinue work and upgrade to Level C protection. 3. If sustained PID readings fall below 1 ppm, downgrading to Level D protection may be permitted
	> 5 ppm but < 150 ppm for > 5 minutes	Level C/ 1. Discontinue all work; all workers shall move to an area upwind of the jobsite. 2. Evaluate potential causes of the excessive readings and allow work area to vent until VOC concentrations fall below 5 ppm. 3. Level C protection will continue to be used until PID readings fall below 1 ppm.
	> 30 ppm (steady state condition) within AOC zone	Stop Work / Suppress Emissions / Evacuate and re-evaluate.
	> 150 ppm	Evacuate the work area

Total Dust Aerosol Monitor	> 0.100 mg/m^3 above BKD (steady state condition) at perimeter of AOC zone for 15-minutes or visible dust.	Stop Work / Implement dust control / Continue dust monitoring if dust levels are less than 150 mg/m3
	> 0.150 mg/m3 above BKD (following dust suppression measures)	Stop Work / implement dust control, continue work once levels are <150 mg/m3
	>5 mg/m^3	Level C

Notes:

1. 1 ppm level based on OSHA Permissible Exposure Limit (PEL) for benzene.
2. 5 ppm level based on OSHA Short Term Exposure Limit (STEL) maximum exposure for vinyl chloride for any 15 minute period.
3. 150 ppm level based on NIOSH Immediately Dangerous to Life and Health (IDLH) for tetrachloroethylene

TABLE 5
PERSONAL PROTECTIVE EQUIPMENT
1487 FIRST AVENUE
New York, New York

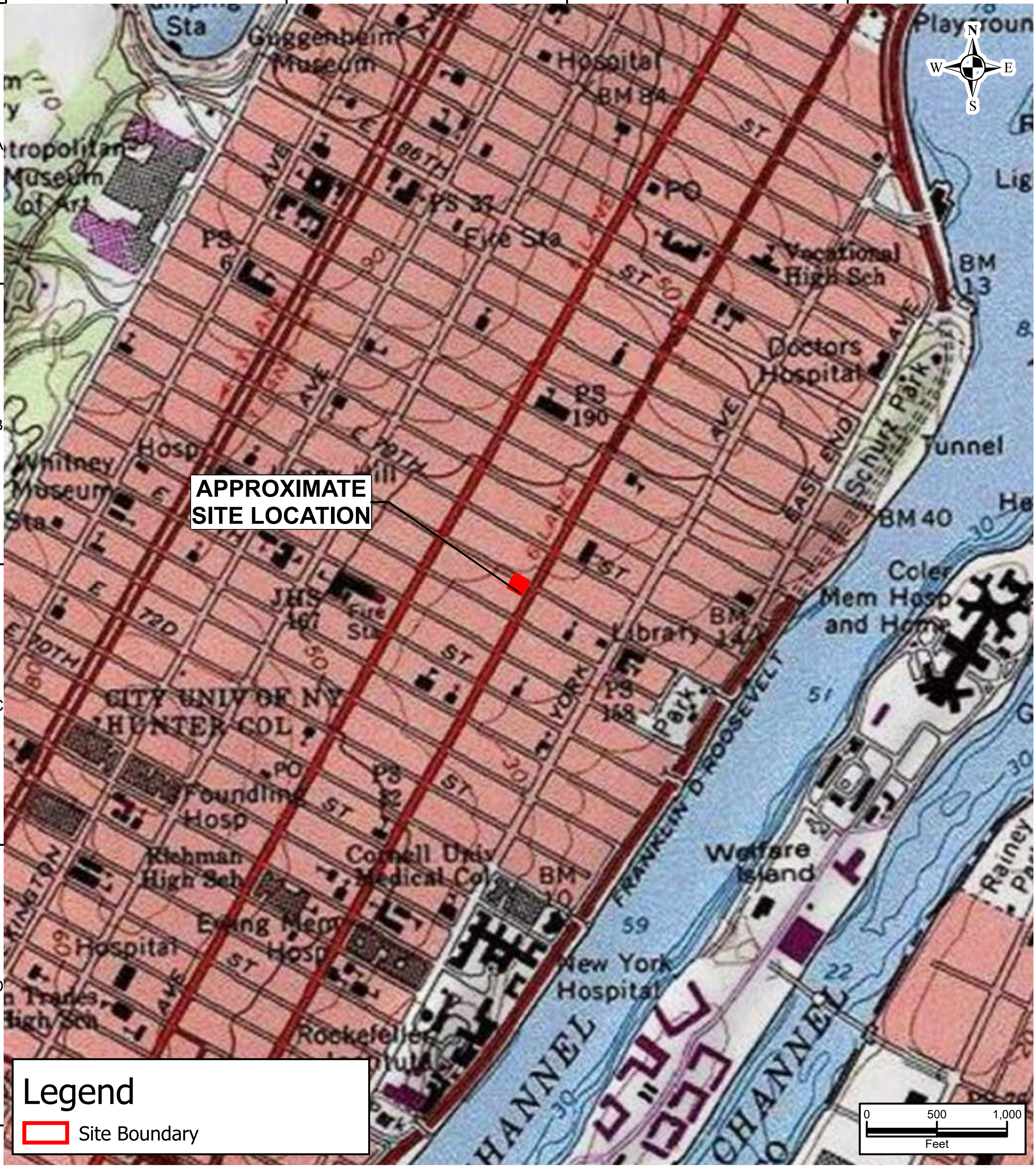
Respiratory Protection*:*

Level D:	No respirator required.
Level C:	Half-face, Air Purifying Respirator (APR) with combination HEPA (dusts, fumes, aerosols) and organic vapor cartridges. The respirator will be NIOSH-approved.
Level C - supplemental by task	Fullface, Air Purifying Respirator (APR) with combination HEPA (dusts, fumes, aerosols), acid gas, organic vapor cartridges. The respirator will be NIOSH-approved.

Personal Protective Clothing*:*

Level D:	Hard-hat, traffic vest (if working on or adjacent to the roadway), long sleeve work shirt & work pants of natural fibers, safety glasses or goggles, steel-toed boots, hearing protection (if needed), nitril inner gloves and leather outer gloves.
Level D - supplemental PPE by task	Tyvek disposal suit
Level C:	Chemically resistant outer boots and Chemical resistant Tyvek disposal suite.

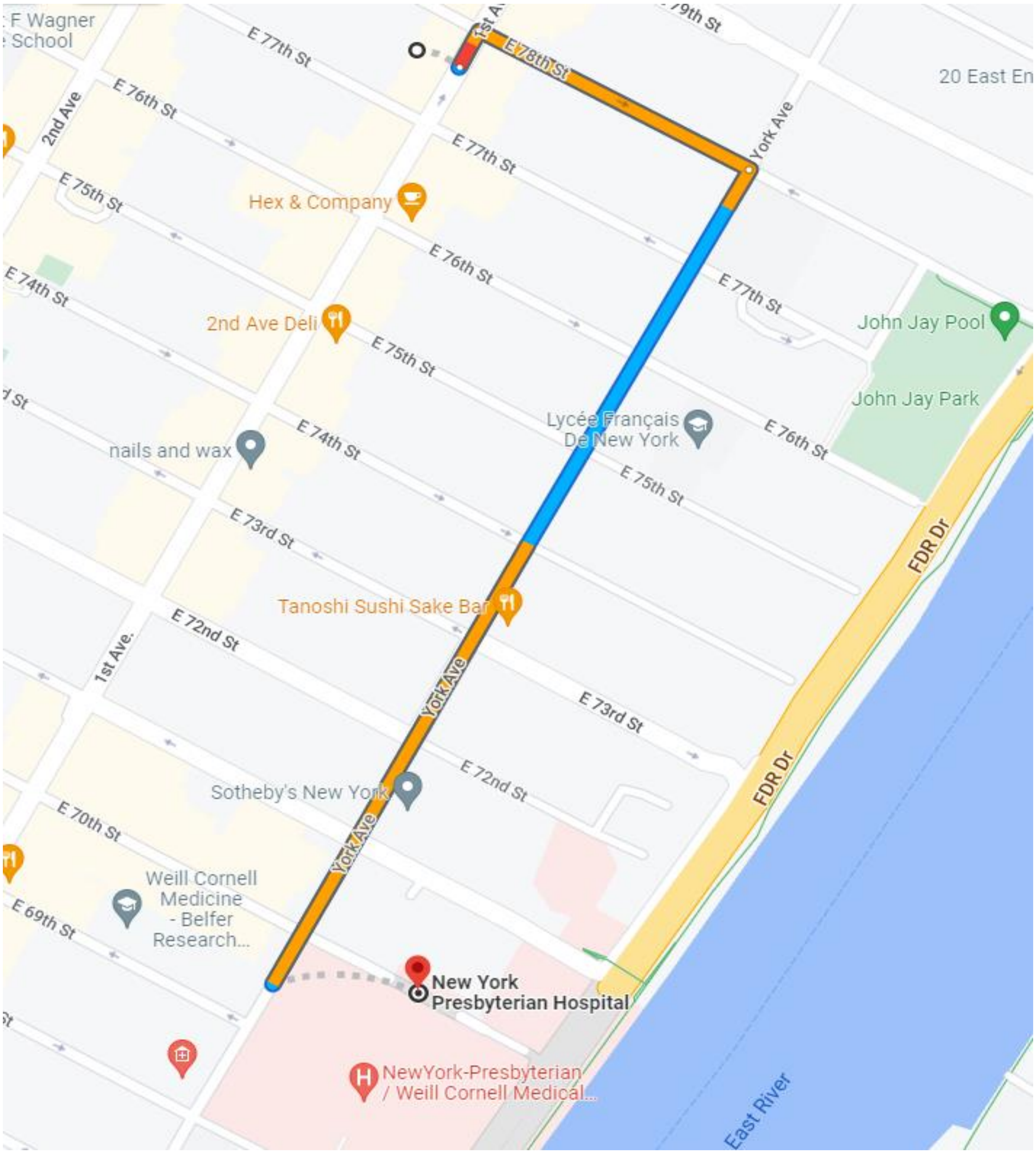
FIGURES



LANGAN 300 Kimball Drive Parsippany, NJ 07054 T: 973.560.4900 F: 973.560.4901 www.langan.com Langan Engineering & Environmental Services, Inc. Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. Langan International Collectively known as Langan	Project **1487 First Avenue** NEW YORK COUNTY NEW YORK NEW YORK	Drawing Title **SITE LOCATION**	Project No. Date 11/5/2021 Scale 1:1,000 Drawn By Site Analyzer Submission Date 11/05/2021	Figure 1 Sheet 1 of 1

Disclaimer: This information is produced by an automated system and may not be complete. The absence of a feature is not a confirmation that the feature is not present at the subject location. Information produced is in the public domain and unless noted has not been field verified or provided for any specific use. Users are also cautioned to confirm the information shown is suitable for their intended use.
Spatial Reference: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet

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



Emergency Route to NY Presbyterian Hospital (Phone # (212) 746-5454) :

1 Head northeast on 1st Ave toward E 78th Street
2 Turn right at the first cross street onto E 78th Street
3 Turn right at the first cross street onto York Avenue
4 Destination will be on the left (0.4 miles)

MAP REFERENCE: Google Maps

LANGAN	**Project** **1487 1st Avenue** **EMERGENGY HOSPITAL ROUTE MAP** **Brooklyn** **New York**			
	Project **100963701**	DATE **10/28/2022**	SCALE **NTS**	FIGURE NO. **2**

ATTACHMENT A

Health and Safety Briefing Statement

ATTACHMENT A

HEALTH AND SAFETY BRIEFING STATEMENT

The following personnel were present at a pre-job safety briefing conducted at __________(time) on ______________ (date) at ______________________________(location), and have read this Health and Safety Plan for the above Site and are familiar with its provisions:

Name	Signature

Fully charged ABC class fire extinguisher available on Site? __________

Fully stocked First Aid Kit available on Site? __________

All project personnel advised of location of nearest phone? __________

All project personnel advised of location of designated medical facility? __________

____

Name of Field Team Leader or Site Safety Officer

____

Signature Date

ATTACHMENT B

Field Procedures Change Authorization Form

ATTACHMENT B

FIELD PROCEDURES CHANGE AUTHORIZATION FORM

Section to be changed:____

Duration of Authorization Requested   Date:______________________________

_________ Today only

_________ Duration of Task

_________ Other____

____

____

Description of Procedures Modification:

____

____

____

Justification:

______________________________	______________________________
Person Requesting Change	Verbal Authorization Received From:
______________________________	______________________________
Name	Name Time
______________________________	______________________________
Title	Title
______________________________	
Signature	

Approvals:

____

____

____

ATTACHMENT C

Unsafe Conditions and Practices Form

ATTACHMENT C

UNSAFE CONDITIONS AND PRACTICES FORM

DESCRIPTION OF CIRCUMSTANCES REGARDING UNSAFE CONDITION OR PRACTICE:

____

____

____

____

____

____

____

IS THIS CONDITION EXISTING OR POTENTIAL?_______________________________

REPORTED TO: ____

REPORTED BY:____

DATE REPORTED:____

COMMENTS:____

____

____

ATTACHMENT D

Calibration Log

ATTACHMENT D

PROJECT:_____________

DATE:________________

CALIBRATION LOG

Time	Inst Type	Inst #	Media	Initial Reading	Span #	Calib Reading	Performed By:

ATTACHMENT E

Emergency Notification Numbers

ATTACHMENT E

EMERGENCY NOTIFICATION NUMBERS

The following list provides names and telephone numbers for emergency contact personnel.

ORGANIZATION	CONTACT	TELEPHONE
New York City Police		911
New York City Fire		911
New York Presbyterian		212-746-5454
WorkCare (Non-Emergency Medical Treatment)		1-888-449-7787
Langan Incident/Injury Hotline		973-560-4699
Langan Project Manager	Amanda Forsburg	973-560-4900
CHEMTREC	(US)	800-262-8200
	(worldwide)	703-741-5500
TSCA HOTLINE		202-554-1404
RCRA HOTLINE		800-424-9346
CDC		800-232-4636
	(regional poison control)	800-222-1222
BUREAU OF ALCOHOL, TOBACCO & FIREARMS		800-800-3855
	(local)	202-648-7777
NATIONAL RESPONSE CENTER		800-424-8802
PESTICIDE INFORMATION SERVICE		800-858-7378
BUREAU OF EXPLOSIVES, A.A. RAILWAYS		202-639-2265
	(Support Services)	719-584-7151
FEDERAL EXPRESS - HAZARDOUS MATERIAL INFO		800-463-3339 *call and say 'Hazardous Materials'

ATTACHMENT F

Accident / Incident Report Form

ATTACHMENT F

INCIDENT REPORT

LANGAN EMPLOYEE EXPOSURE/INJURY INCIDENT REPORT
(Submit a Separate Report for Each Employee and/or Incident)

Date: ______________________

Employee's Name:_______________________________________ Employee No:________________

Sex: M _____ F _____ Age: ______

Region: ____ Location:____________________

Project: ____ Project No: __________________

Incident:____

Type: Possible Exposure ______ Exposure _______ Physical Injury ______

Location: ____

Date of Incident: _____________________________ Time of Incident: _________________________

Date of Report Incident: ____

Person(s) to Whom Incident was Reported: ____

Weather Conditions During Incident: Temperature _________ Humidity _________

Wind Speed and Direction: _______________________ Cloud Cover: ____________________________

Clear: ____ Precipitation: ____________________________

Materials Potentially Encountered: ____

Chemical (give name of description - liquid, solid, gas, vapor, fume, mist):

____

____

Radiological:____

Other: ____

Nature of the Exposure/Injury: (State the nature of the exposure/injury in detail and list the parts of the body affected. Attach extra sheets if necessary).

____

____

____

____

____

Did you receive medical care? Yes _______ No _______ If so, when _______________________

Where? On-Site ________________ Off-Site _______________

By Whom: Name of Paramedic: ____

Name of Physician: ____

Other: ____

If Off-Site, name facility (hospital, clinic, etc):____

____

Length of stay at the facility?____

Was the Site Safety Officer contacted? Yes _______ No _______ When?_________

Was the Corporate Health and Safety Officer contacted? Yes _______ No _______

If so, who was the contact?____

Did the exposure/injury result in permanent disability? Yes ________ No ________

If so, explain:____

____

____

____

Has the employee returned to work? Yes ________ No ________

List the names of other persons affected during this incident:

____

____

____

____

____

____

____

List the names of persons who witnessed the exposure/injury incident:

____

____

____

____

____

____

____

Possible cause of the exposure/injury incident: ________________________________

____

____

____

____

____

What was the name and title of the field team leader or immediate supervisor at the site of the incident?

____

Was the operation being conducted under an established Health and Safety Plan?

Yes ___________ No ____________ If yes, attach a copy. If no, explain

____

____

____

____

____

____

Describe protective equipment and clothing used by the employee:

____

____

____

____

____

____

Did any limitations in safety equipment or protective clothing contribute to or affect exposure? If so, explain:

____

____

____

What was the employee doing when the exposure/injury occurred? (Describe briefly as Site Reconnaissance, Site Characterization, or Sampling, etc.):

____

____

____

____

Where exactly on site or off site did the exposure/injury occur?

____

____

____

____

____

How did the exposure/injury occur? (Describe fully what factors led up to and/or contributed to the incident):

____

____

____

____

____

Name of person(s) initiating report, job title, phone number:

____

____

____

____ ________________________

Employee Signature Date

____ ________________________

Site Safety Officer Signature or Field Team Leader Signature Date

ATTACHMENT G

Safety Data Sheets
(SDS)

ATTACHMENT G

MATERIAL SAFETY DATA SHEETS

SAFETY DATA SHEETS

All Langan Field Personnel Completing This Work Plan Are To Have Real Time Accessibility To Material Safety Data Sheet (MSDs) or Safety Data Sheet (SDSs) Through Their Smart Phone.

The link is http://www.msds.com/
The login name is "drapehead"
The password is "2angan987"

If You Are Unable To Use the Smart Phone App, You Are To Bring Printed Copies of the MSDs/SDSs to the Site

ATTACHMENT H

Jobsite Safety Inspection Checklist

LANGAN

JOBSITE SAFETY INSPECTION CHECKLIST

Client: ______________________________ Inspection Date: ________________________

Site: ________________________________ Inspector: ______________________________

Employees: ____

Notes:____

____

____

Check one of the following: **A:** Acceptable **NA**: Not Applicable **D**: Deficiency

	A	NA	D	Remarks
GENERAL				
Appropriate PPE being worn by Langan employees and subcontractors?				
Air monitoring instruments calibrated daily and results recorded on the Daily Instrument Calibration check sheet?				
Air monitoring readings recorded on the air monitoring data sheet/field log book?				
Incident reporting procedures known?				
Site security an issue?				
Vehicle /pedestrian traffic issue?				
Adequate size/type fire extinguisher supplied?				
Evidence that drilling operator is responsible for the safety of his rig.				
First Aid kit available?				
PERSONAL PROTECTIVE EQUIPMENT				
Eye Protection?				
Head protection?				
Safety Shoes?				
Safety vests?				
Hand protection?				
Other?				
Deficiencies??				
HOUSEKEEPING				
Work area kept clean/tidy to minimize potential hazards?				
Waste being disposed of quickly and properly				
Adequate lighting for job?				
Portable water available?				
HAND TOOLS				
Are tools in good condition and properly used? (INSPECT)				
Are proper tools being used?				
Are tools safety stored when not in use?				
Have tools been inspected prior to use?				
Are employees familiar with using tools?				
Is additional PPE required for tools? Available?				
POWER TOOLS				
Are tools in good condition and properly used? (INSPECT)				
Are tools properly grounded?				
Safety guards in place and used correctly?				
Competent instruction / supervision?				
Cords include in inspection?				

HAZWOPER				
Employees have current 40-hr./8-hr./Supervisor HAZWOPER training?				
Project staff medically cleared to work in hazardous waste sites and fit-tested to wear respirators, if needed?				
Respiratory protection readily available?				
Subcontract workers have current 40-hr./8-hr./Spvsr. HAZWOPER training, as appropriate?				
Subcontract workers medically cleared to work on site, and fit-tested for respirator wear?				
Subcontract workers have respirators readily available?				
HEALTH & SAFETY PLAN				
HASP available on site for inspection?				
Health & Safety Compliance agreement (in HASP) appropriately signed by Langan employees and subcontractors?				
Hospital route map with directions posted on site?				
Emergency Notification List posted on site?				
Personnel trained in CPR/First Aid on site?				
MSDSs readily available, and all workers knowledgeable about the specific chemicals and compounds to which they may be exposed?				
Project site safe practices ("Standing Orders") posted?				
Health & Safety Incident Report forms available?				
Decontamination procedures being followed as outlined in HASP?				
UNDERGROUND UTILITY				
Mark outs of underground utilities done prior to initiating any subsurface activities?				
Underground utilities located and authorities contacted before digging?				
Visually observed mark-outs?				
Is subsurface work within three feet of underground utilities?				
- Is so, is or was soft dig techniques used?				
Drilling performed in areas free from underground utilities?				
EXCAVATION / TRENCH				
Are excavations/trenches over 5 feet deep sloped, shored or a trench box used?				
Operations supervised by a Competent Person?				
Is Competent Person preforming daily inspections of excavation/trench?				
Adequate barricades in place?				
Have underground utilities been identified?				
Ladders / means of egress in trench with 25-foot of every worker?				
Has PE designed or approved protective system?				
Excavated material and other objects placed more than 2 feet away from excavation edge?				
Public protected from exposure to open excavation?				
CONFINED / PERMIT-ENTRY CONFINED SPACE				
People entering the excavation regarding it as a permit-required confined space and following appropriate procedures?				
Confined space entry permit is completed and posted?				
All persons knowledgeable about the conditions and characteristics of the confined space?				
All persons engaged in confined space operations have been trained in safe entry and rescue (non-entry)?				
Full body harnesses, lifelines, and hoisting apparatus available for rescue needs?				
Attendant and/or supervisor certified in basic first aid and CPR?				
Confined space atmosphere checked before entry and continuously while the work is going on?				
Results of confined space atmosphere testing recorded?				
Evidence of coordination with off-site rescue services to perform entry rescue, if needed?				
ELECTRICAL SAFETY				
Equipment at least 10 feet from overhead power lines?				
Is equipment grounded?				
GFCI used and tested where required?				
Are extension cords rated for this work being used and are they properly maintained?				
Electrical dangers posted at site?				

FLAMMABLE LIQUIDS				
Are flammable liquids used at site?				
Are flammable liquids stored in appropriate containers?				
Are flammable liquids kept away from combustion sources?				
Do flammable liquid containers have warning labels?				
LADDERS				
Are ladders used at site?				
Were ladders inspected prior to use?				
Are ladders in good working condition?				
Are ladders secured to prevent slipping, sliding or falling?				
Do side rails extend three feet above top of landing area?				
Are top two steps of stepladders being used?				
Is extension on ladder facing out?				
Are ladders sufficient for task?				
Are ladders sufficient for task?				

Unsafe acts observed? ____

____

____

____

____

____

Additional remarks ____

____

____

____

____

____

____

Notes:____

____

____

____

____

____

____

Distribution: Project Manager - Name: ___________________________

Health & Safety Officer - Name: ____________________________

Health & Safety Manager- Name: Anthony Moffa, CHMM

Q:\Other\HealthandSafety\GenericAppendixAJobsiteSafetyInspectionChecklist

ATTACHMENT I

Langan Guidelines

ATTACHMENT I

Langan Guidelines

GENERAL

- No smoking, eating, or drinking in this work zone.
- Upon leaving the work zone, personnel will thoroughly wash their hands and face.
- Minimize contact with contaminated materials through proper planning of work areas and decontamination areas, and by following proper procedures. Do not place equipment on the ground. Do not sit on contaminated materials.
- No open flames in the work zone.
- Only properly trained and equipped personnel are permitted to work in potentially contaminated areas.
- Always use the appropriate level of personal protective equipment (PPE).
- Maintain close contact with your buddy in the work zone
- Contaminated material will be contained in the Exclusion Zone (EZ).
- Report any unusual conditions.
- Work areas will be kept clear and uncluttered. Debris and other slip, trip, and fall hazards will be removed as frequently as possible.
- The number of personnel and equipment in the work zone will be kept to an essential minimum.
- Be alert to the symptoms of fatigue and heat/cold stress, and their effects on the normal caution and judgment of personnel.
- Conflicting situations which may arise concerning safety requirements and working conditions must be addressed and resolved quickly by the site HSO.

TOOLS AND HEAVY EQUIPMENT

- Do not, under any circumstances, enter or ride in or on any backhoe bucket, materials hoist, or any other device not specifically designed to carrying passengers.
- Loose-fitting clothing or loose long hair is prohibited around moving machinery.
- Ensure that heavy equipment operators and all other personnel in the work zone are using the same hand signals to communicate.
- Drilling/excavating within 10 feet in any direction of overhead power lines is prohibited.
- The locations of all underground utilities must be identified and marked out prior to initiating any subsurface activities.
- Check to insure that the equipment operator has lowered all blades and buckets to the ground before shutting off the vehicle.
- If the equipment has an emergency stop device, have the operator show all personnel its location and how to activate it.
- Help the operator ensure adequate clearances when the equipment must negotiate in tight quarters; serve as a signalman to direct backing as necessary.
- Ensure that all heavy equipment that is used in the Exclusion Zone is kept in that zone until the job is done, and that such equipment is completely decontaminated before moving it into the clean area of the work zone.
- Samplers must not reach into or get near rotating equipment such as the drill rig. If personnel must work near any tools that could rotate, the equipment operator must completely shut down the rig prior to initiating such work. It may be necessary to use a remote sampling device.

APPENDIX D

Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN

for

1487 1st Avenue Redevelopment Site
New York, New York
NYSDEC BCP Site No. C231152

Prepared For:

CP VII 78th Street Owner, LLC
805 Third Avenue, 20th Floor
New York, New York 10022

Prepared By:

Langan Engineering, Environmental, Surveying,
Landscape Architecture and Geology, D.P.C.
300 Kimball Drive
Parsippany, New Jersey 07054

November 2022
100963701

LANGAN

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ATTACHMENTS

1.0 PROJECT DESCRIPTION

1.1 Introduction

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) has prepared this Quality Assurance Project Plan (QAPP) on behalf of CP VII 78th Street Owner, LLC (Volunteer), for the ±10,050-square foot property located at 1487 First Avenue (Block 1452, Lot 27 [formerly consisting of Lots 27, 28, 29, and 30] in the Upper East Side neighborhood of Manhattan, New York (hereinafter the "Site"). A Site Location Map is included as Figure 1.

This QAPP specifies analytical methods to be used to ensure that data collected during the Remedial Action (RA) are precise, accurate, representative, comparable, complete, and meet the sensitivity requirements of the project.

1.2 Project Objectives

The Remedial Action Work Plan (RAWP) covers earthwork to be completed during construction of the proposed development at the site. A Construction Health and Safety Plan (CHASP) and Community Air Monitoring Plan (CAMP) for the protection of on-site workers, the community, and the environment has been developed and will be implemented during remediation and construction activities. These objectives have been established in order to meet standards that will protect public health and the environment for the site.

This QAPP addresses sampling and analytical methods that will be necessary in support of remedial activities. These objectives have been established in order to meet standards that will protect public health and the environment for the site.

1.3 Scope of Work

The specific scope of work covered in this QAPP includes any documentation sampling that will occur during implementation of the RAWP. The RAWP requires collection of endpoint soil samples from the remedial excavation base, in accordance with DER-10 to verify performance of the remedy. The selected remedy will include the following elements:

- Development and implementation of a CHASP and CAMP for the protection of on-Site workers, community/residents, and the environment during remediation and construction activities.

- Removal of soil imported to facilitate the demolition of the on-Site buildings.
- Bedrock well decommissioning in accordance with NYSDEC policy CP-43 Groundwater Monitoring Well Decommissioning Policy.
- Bedrock well re-installation in immediate proximity to the original well locations. Downhole geophysical evaluation of the bedrock wells to verify fracture depths, and performance monitoring well sampling 3 and 6 months following the completion of treatment injections in accordance with the IRMWP.
- Design and construction of the support of excavation (SOE) system around the Site boundary to facilitate the remedial excavation up to a depth of 23 feet bsl across the Site footprint (with deeper excavations to between 31 and 42 feet bsl for deeper foundation elements).
- Dewatering in compliance with city, state, and federal laws and regulations. Extracted groundwater will be treated under a permit from NYCDEP/NYSDEC that will be required to meet effluent limitations prior to discharge to the sewer system.
- Implementation of soil erosion, pollution and sediment control measures in compliance with applicable laws and regulations.
- Screening for indications of contamination (by visual means, odor, and monitoring with PIDs) of excavated material during intrusive Site work.
- Excavation, stockpiling, off-Site transport, and disposal of soil that exceeds Unrestricted Use SCOs as defined by 6 NYCRR Part 375-6.8 from ground surface to a minimum of 19 feet bsl to remove known elevated concentrations of VOCs, pesticides, and metals exceeding the Unrestricted Use SCOs at various locations throughout the Site footprint. The remediation depth may extend deeper if endpoint samples reveal elevated concentrations of compounds above the Unrestricted Use SCOs and over-excavation is required to achieve a Track 1 cleanup.
- Appropriate off-Site disposal of material removed from the Site in accordance with federal, state and local rules and regulations for handling, transport, and disposal.
- Removal and decommissioning of any encountered USTs and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) and disposal off-Site during Site redevelopment in accordance with

DER-10, 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements.

- Collection and analysis of confirmation soil samples from the remedial excavation base, in accordance with DER-10 to confirm Track 1 SCOs were achieved.
- Importation and backfilling of remediated areas, as necessary for development, with certified-clean material (meeting Track 1 SCOs), recycled concrete aggregate (RCA), or virgin, native crushed stone to backfill areas excavated deeper than the development depth.
- Reuse of Site soil meeting the Track 1 SCOs, if necessary.
- Installation of a vapor barrier membrane below the slab of the proposed building and along sidewalls of any subgrade foundation elements beneath occupied spaces as a green remediation component.
- All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State and local rules and regulations.

2.0 DATA QUALITY OBJECTIVES AND PROCESS

Data Quality Objectives (DQOs) are qualitative and quantitative statements to help ensure that data of known and appropriate quality are obtained during the project. The overall objectives is to prevent additional environmental impacts to site media (soil and groundwater) by removal of soil associated with the contaminated fill. DQOs for sampling activities are determined by evaluating five factors:

- Data needs and uses: The types of data required and how the data will be used after it is obtained.
- Parameters of Interest: The types of chemical or physical parameters required for the intended use.
- Level of Concern: Levels of constituents, which may require remedial actions or further investigations.
- Required Analytical Level: The level of data quality, data precision, and quality assurance/quality control (QA/QC) documentation required for chemical analysis.
- Required Detection Limits: The detection limits necessary based on the above information.

The quality assurance and quality control objectives for all measurement data include:

- Precision – an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Field sampling precision will be determined by analyzing coded duplicate samples and analytical precision will be determined by analyzing internal QC duplicates and/or matrix spike duplicates.
- Accuracy – a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern. For soil samples, accuracy will be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy will be assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), internal standards, laboratory method blanks, instrument calibration, and the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks.
- Representativeness – expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is dependent upon the adequate design of the sampling program and will be satisfied by ensuring that the scope of work is followed and that specified sampling and analysis techniques are used. Representativeness in the laboratory is ensured by compliance to nationally-recognized analytical methods, meeting sample holding times, and maintaining sample integrity while the samples are in the laboratory's possession. This is accomplished by following all applicable methods, laboratory-issued standard operating procedures (SOPs), the laboratory's Quality Assurance Manual, and this QAPP. The laboratory is required to be properly certified and accredited.
- Completeness – the percentage of measurements made which are judged to be valid. Completeness will be assessed through data validation. The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested.
- Comparability – expresses the degree of confidence with which one data set can be compared to another. The comparability of all data collected for this project will be ensured using several procedures, including standard methods for sampling and analysis as documented in the QAPP, using standard reporting units and reporting formats, and data validation.

- Sensitivity – the ability of the instrument or method to detect target analytes at the levels of interest. The project manager will select, with input from the laboratory and QA personnel, sampling and analytical procedures that achieve the required levels of detection.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITY

Implementation of the RAWP will be overseen by Langan for CP VII 78th Street Owner, LLC. The environmental consultant will also arrange data analysis and reporting tasks. The analytical services will be performed by an Environmental Laboratory Approval Program (ELAP)-certified laboratory. Data validation services will be performed by approved data validation contractor(s).

For the required sampling as stated in the RAWP, sampling will be conducted by Langan, the analytical services will be performed by Alpha Analytical, Inc. of Mansfield, MA. (New York State Department of Health [NYSDOH] ELAP certification number 11148 [Westboro Laboratory] and 11627 [Mansfield Laboratory]). Data validation services will be performed by Joseph Conboy; résumé attached (Attachment A).

Key contacts for this project are as follows:

CP VII 78th Street Owner, LLC	Kyle Becker Telephone: (212) 202-5794
Langan Project Manager:	Amanda Forsburg Telephone: (973) 560-4900
Langan Quality Assurance Officer (QAO):	Steve Ciambruschini Telephone: (973) 560-4900
Langan Remedial Engineer:	Stewart Abrams Telephone: (973) 560-4900
Program Quality Assurance Monitor:	Ashley Sandve Telephone: (973) 560-4900
Data Validator:	Joseph Conboy Telephone: (215) 845-8985
Laboratory Representative:	Alpha Analytical, Inc. Ben Rao Telephone: (201) 847-9100

4.0 QUALITY ASSURANCE OBJECTIVES FOR COLLECTION OF DATA

The overall quality assurance objective is to develop and implement procedures for sampling, laboratory analysis, field measurements, and reporting that will provide data of sufficient quality to evaluate soil impacts at the site. The sample set, chemical analysis results, and interpretations must be based on data that meet or exceed quality assurance objectives established for the site. Quality assurance objectives are usually expressed in terms of accuracy or bias, sensitivity, completeness, representativeness, comparability, and sensitivity of analysis. Variances from the quality assurance objectives at any stage of the investigation will result in the implementation of appropriate corrective measures and an assessment of the impact of corrective measures on the usability of the data.

Precision

Precision is a measure of the degree to which two or more measurements are in agreement. Field precision is assessed through the collection and measurement of field duplicates. Laboratory precision and sample heterogeneity also contribute to the uncertainty of field duplicate measurements. This uncertainty is taken into account during the data assessment process. For field duplicates, results less than 2x the reporting limit (RL) meet the precision criteria if the absolute difference is less than ±2X the RL. For results greater than 2X the RL, the acceptance criteria is a relative percent difference (RPD) of ≤50% (soil), and <30% (groundwater). RLs and method detection limits (MDL) are provided in Attachment B.

Accuracy

Accuracy is the measurement of the reproducibility of the sampling and analytical methodology. It should be noted that precise data may not be accurate data. For the purpose of this QAPP, bias is defined as the constant or systematic distortion of a measurement process, which manifests itself as a persistent positive or negative deviation from the known or true value. This may be due to (but not limited to) improper sample collection, sample matrix interferences, poorly calibrated analytical or sampling equipment, or limitations or errors in analytical methods and techniques.

Accuracy in the field is assessed through the use of field blanks and through compliance to all sample handling, preservation, and holding time requirements. All field blanks should be non-detect when analyzed by the laboratory. Any contaminant detected in an associated field blank was evaluated against laboratory blanks (preparation or method) and evaluated against field samples collected on the same day to determine potential for bias.

Laboratory accuracy is assessed by evaluating the percent recoveries of MS/MSD samples, LCS/LCSDs, surrogate compound recoveries, internal standard responses and the results of method preparation blanks. MS/MSD, LCS/LCSD, internal standard responses and surrogate percent recoveries were compared to either method-specific control limits or laboratory-derived control limits. Sample volume permitting, samples displaying outliers should be reanalyzed. All associated method blanks should be non-detect when analyzed by the laboratory.

Completeness

Laboratory completeness is the ratio of total number of samples analyzed and verified as acceptable compared to the number of samples submitted to the fixed-base laboratory for analysis, expressed as a percent. Three measures of completeness are defined:

- Sampling completeness, defined as the number of valid samples collected relative to the number of samples planned for collection;
- Analytical completeness, defined as the number of valid sample measurements relative to the number of valid samples collected; and
- Overall completeness, defined as the number of valid sample measurements relative to the number of samples planned for collection.

Soil and groundwater data will meet a 90% completeness criterion. If the criterion is not met, sample results will be evaluated for trends in rejected and unusable data. The effect of unusable data required for a determination of compliance will also be evaluated.

Representativeness

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. Representativeness is dependent upon the adequate design of the sampling program and was satisfied by ensuring that the scope of work is followed and that specified sampling and analysis techniques are used. This is performed by following applicable standard operating procedures (SOPs) and this QAPP. All field technicians will be given copies of appropriate documents prior to sampling events and will be required to read, understand, and follow each document as it pertains to the tasks at hand.

Representativeness in the laboratory is ensured by compliance to nationally-recognized analytical methods, meeting sample holding times, and maintaining sample integrity while the samples are in the laboratory's possession. This is performed by following all applicable EPA and standard methods, laboratory-issued SOPs, the laboratory's Quality Assurance Manual, and this QAPP. The laboratory is required to be properly certified and accredited.

Comparability

Comparability is an expression of the confidence with which one data set can be compared to another. Comparability is dependent upon the proper design of the sampling program and was satisfied by ensuring that the sampling plan is followed and that sampling is performed according to the SOPs or other project-specific procedures. Analytical data were comparable when similar sampling and analytical methods are used as documented in the QAPP. Comparability was controlled by requiring the use of specific nationally-recognized analytical methods and requiring consistent method performance criteria. Comparability is also dependent on similar quality assurance objectives. Previously collected data were evaluated to determine whether they may be combined with contemporary data sets.

Sensitivity

Sensitivity is the ability of the instrument or method to detect target analytes at the levels of interest (e.g., at the NYSDEC Subpart 375-6 Soil Cleanup Objectives). The Project Manager will select, with input from the laboratory and QA personnel, sampling and analytical procedures that achieve the required levels of detection and QC acceptance limits that meet established performance criteria. Concurrently, the Project Manager will select the level of data assessment to ensure that only data meeting the project DQOs are used in decision-making.

Field equipment will be used that can achieve the required levels of detection for analytical measurements in the field. In addition, the field sampling staff will collect and submit full volumes of samples as required by the laboratory for analysis, whenever possible. Full volume aliquots will help ensure achievement of the required limits of detection and allow for reanalysis if necessary. The concentration of the lowest level check standard in a multi-point calibration curve will represent the reporting limit.

Analytical methods and quality assurance parameters associated with the sampling program are presented in Attachment C. The frequency of associated field blanks and duplicate samples will be based on the recommendations listed in DER-10 and as described in Section 5.3.2.

5.0 SAMPLE COLLECTION AND FIELD DATA ACQUISITION PROCEDURES

Soil sampling will be conducted in accordance with the established NYSDEC protocols contained in DER-10/Technical Guidance for Site Investigation and Remediation (May 2010). The following sections describe procedures to be followed for specific tasks.

5.1 Field Documentation Procedures

Field documentation procedures will include summarizing field data in field books and proper sample labeling. These procedures are described in the following sections.

5.1.1 Field Data and Notes

Field notebooks contain the documentary evidence regarding procedures conducted by field personnel. Hard cover, bound field notebooks will be used because of their compact size, durability and secure page binding. The pages of the notebook will not be removed.

Entries were made in waterproof, permanent blue or black ink. No erasures will be allowed. Incorrect entries will be crossed out with a single strike mark and the change initialed and dated by the team member making the change.

Each entry will be dated. Entries will be legible and contain accurate and complete documentation of the individual or sampling team's activities or observations made. The level of detail will be sufficient to explain and reconstruct the activity conducted. Each entry will be signed by the person(s) making the entry.

The following types of information will be provided for each sampling task, as appropriate:

- Project name and number;
- Reasons for being on-site or taking the sample;
- Date and time of activity;
- Sample identification numbers;
- Geographical location of sampling points with references to the site, other facilities or a map coordinate system. Sketches were made in the field logbook when appropriate;

- Physical location of sampling locations such as depth below ground surface;
- Description of the method of sampling including procedures followed, equipment used and any departure from the specified procedures;
- Description of the sample including physical characteristics, odor, etc.;
- Readings obtained from health and safety equipment;
- Weather conditions at the time of sampling and previous meteorological events that may affect the representative nature of a sample;
- Photographic information including a brief description of what was photographed, the date and time, the compass direction of the picture and the number of the picture on the camera;
- Other pertinent observations such as the presence of other persons on the site, actions by others that may affect performance of site tasks, etc.; and,
- Names of sampling personnel and signature of persons making entries.

Field records will also be collected on field data sheets including boring logs, which will be used for geologic and drilling data during soil boring activities. Field data sheets will include the project-specific number and stored in the field project files when not in use. At the completion of the field activities, the field data sheets will be maintained in the central project file.

5.1.2 Sample Labeling

Each sample collected will be assigned a unique identification number and placed in an appropriate sample container. Each sample container will have a sample label affixed to the outside with the date and time of sample collection and project name. In addition, the label will contain the sample identification number, analysis required and chemical preservatives added, if any. All documentation will be completed in waterproof ink. Sample nomenclature procedures are included in Attachment D.

5.2 Equipment Calibration and Preventative Maintenance

A photoionization detector (PID) will be used during the sampling activities to evaluate work zone action levels and screen soil samples. Field calibration and/or field checking of the PID will be the responsibility of the field team leader and the site HSO, and will be accomplished by following the procedures outlined in the operating manual for the instrument. At a minimum, field calibration and/or field equipment checking will be performed once daily, prior to use. Field calibration will be documented in the field notebook. Entries made into the logbook regarding the status of field equipment will include the following information:

- Date and time of calibration
- Type of equipment serviced and identification number (such as serial number)
- Reference standard used for calibration
- Calibration and/or maintenance procedure used
- Other pertinent information

Equipment that fails calibration or becomes inoperable during use will be removed from service and segregated to prevent inadvertent utilization. The equipment will be properly tagged to indicate that it is out of calibration. Such equipment will be repaired and recalibrated to the manufacturer's specifications by qualified personnel. Equipment that cannot be repaired will be replaced.

Off-site calibration and maintenance of field instruments will be conducted as appropriate throughout the duration of project activities. All field instrumentation, sampling equipment and accessories will be maintained in accordance with the manufacturer's recommendations and specifications and established field equipment practice. Off-site calibration and maintenance will be performed by qualified personnel. A logbook will be kept to document that established calibration and maintenance procedures have been followed. Documentation will include both scheduled and unscheduled maintenance.

5.3 Sample Collection

5.3.1 Soil Samples

Where the Track 1 remedial excavation does not extend to bedrock, confirmation soil samples will be collected from the remedial excavation base of approximately 19 feet bsl at a frequency of one per 900 square feet accordance with DER-10 to confirm that the remaining soil does not exceed the Unrestricted Use SCOs. Sidewall samples will not be collected from the Site perimeter because excavation will extend across the Site footprint and SOE measures (e.g., sheeting and lagging) will preclude access to soil sidewalls. An estimated 12 confirmation soil samples, plus QA/QC samples, will be collected and will be analyzed for the full TAL/TCL of VOCs, SVOCs, PCBs, pesticides/herbicides, cyanide, metals including hexavalent and trivalent chromium, PFAS, and 1,4-dioxane to confirm remedial performance. If endpoint samples reveal elevated concentrations of compounds above the Unrestricted Use SCOs and over-excavation is required to achieve a Track 1 cleanup, over-excavation and additional endpoint sample collection may be implemented. Confirmation endpoint samples will not be collected where precluded by bedrock. As such, the number of samples may change based on over-excavation needs and the depth at which bedrock is encountered.

In the location of unidentified USTs, if the remedial or development excavation does not extend beyond the bottom of the encountered tank, five documentation samples will be collected from each excavation and will consist of one sample per excavation sidewall and a sample from each excavation base. As necessary, post removal soil samples will be collected in accordance with the requirements of CP-51. Samples will be analyzed for CP-51 List VOCs and SVOCs and compared to the CP-51 Table 2 Soil Cleanup Levels for Gasoline Contaminated Soils or Table 3 Soil Cleanup Levels for Fuel Oil Contaminated Soil and the 6 NYCRR Part 375-6.8(a) Unrestricted Use SCOs, depending on the contents of the USTs.

No additional excavation is anticipated; however, if hotspots are encountered during remedial construction, one base sample and one sidewall soil sample will be collected for every 30 linear feet of sidewall for those areas.

Soil samples will be visually classified and field screened using a PID to assess potential impacts from VOCs and for health and safety monitoring. Soil samples collected for analysis of VOCs will be collected using Terra Core® sampling equipment. For analysis of non-volatile parameters, samples will be homogenized and placed into glass jars. After collection, all sample jars will be capped and securely tightened, and placed in iced coolers and maintained at 4°C ±2°C until they are transferred to the laboratory for analysis, in accordance with the procedures outlined in Section 5.4. Analysis and/or extraction and digestion of collected soil samples will meet the holding times required for each analyte as specified in Attachment C. In addition, analysis of collected soil sample will meet all quality assurance criteria set forth by this QAPP and DER-10.

Soil samples analyzed for per- and poly-fluoro alkyl substances (PFAS) will be collected in an 8 ounce high-density polyethylene (HDPE) container provided by the laboratory and analyzed by using USEPA Method 1633. The reporting limits for PFAS in soil are included in Attachment B. The laboratory standard operating procedures (SOP) for the analysis of PFAS is included in Attachment E. Soil samples analyzed for 1,4-dioxane will be collected in an 8 ounce jar provided by the laboratory and analyzed using USEPA Method 8270. The reporting limit for 1,4-dioxane in soil is 0.1 milligram per kilogram (mg/kg).

5.3.1.1 Sample Field Blanks and Duplicates

Use of dedicated sampling equipment is planned; therefore, collection of field blanks is not anticipated. If the use of reusable sampling equipment is required, proper decontamination procedures will be employed (as further described in Section 5.7) and field blanks will be collected for quality assurance purposes at a rate of one per 20 investigative soil samples. If required, field blanks will be obtained by pouring laboratory-demonstrated analyte-free water on or through a decontaminated sampling device following use and implementation of decontamination protocols. The water will be collected off of the sampling device into a laboratory-provided sample container for analysis. Field blanks will be collected at a rate of one per 20 samples and will be analyzed for the complete list of analytes on the day of sampling. If less than 20 samples are collected during a particular sampling event, one field blank sample will be collected. Equipment blanks will be collected at a rate of one per day when soil samples are analyzed for PFAS. Trip blanks will be collected at a rate of one per day if soil samples are analyzed for VOCs during that day.

Duplicate soil samples will be collected and analyzed for quality assurance purposes. Duplicate samples will be collected at a frequency of 1 per 20 investigative soil samples and will be submitted to the laboratory as "blind" samples. If less than 20 samples are collected during a particular sampling event, one duplicate sample will be collected.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples (MS/MSD for organics; MS and laboratory duplicate for inorganics) will be taken at a frequency of one pair per 20 field samples. If less than 20 samples are collected during a particular sampling event, one MS/MSD sample will be collected. These samples are used to assess the effect of the sample matrix on the recovery of target compounds or target analytes.

5.3.2 Groundwater Samples

Groundwater sampling is not anticipated during remedial excavation activities. In the event that groundwater sampling is required, groundwater samples will be collected into laboratory-supplied containers and will be sealed, labeled, and placed in a cooler containing ice (to maintain a temperature of approximately 4 degrees Celsius) for delivery to a NYSDOH ELAP-certified analytical laboratory. Analysis and/or extraction and digestion of collected groundwater samples will meet the holding times required for each analyte as specified in Attachment C. In addition, analysis of collected groundwater samples will meet all quality assurance criteria set forth by this QAPP and DER-10.

Groundwater samples analyzed for PFAS will be collected in three 500-milliliter (mL) HDPE containers provided by the laboratory and analyzed using USEPA Method 1633. The reporting limits for PFAS in groundwater are provided in Attachment B. The laboratory SOP for the analysis of PFAS is included in Attachment E. Groundwater samples also be analyzed for 1,4-dioxane will be collected in a one-liter amber glass jar and analyzed using USEPA Method 8270 SIM. The reporting limit for 1,4-dioxane in groundwater is 0.35 micrograms per liter (ug/L).

5.3.2.1 Sample Field Blanks and Duplicates

Use of dedicated sampling equipment is planned; therefore, collection of field blanks is not anticipated. If the use of reusable sampling equipment is required, proper decontamination procedures will be employed (as further described in Section 5.7) and field blanks will be collected for quality assurance purposes at a rate of one per 20 investigative groundwater samples. If required, field blanks will be obtained by pouring laboratory-demonstrated analyte-free water on or through a decontaminated sampling device following use and implementation of decontamination protocols. The water will be collected off of the sampling device into a laboratory-provided sample container for analysis. Field blanks will be collected at a rate of one per 20 samples and will be analyzed for the complete list of analytes on the day of sampling. If less than 20 samples are collected during a particular sampling event, one field blank sample will be collected. Equipment blanks will be collected at a rate of one per day when groundwater samples are analyzed for PFAS. Trip blanks will be collected at a rate of one per day if groundwater samples are analyzed for VOCs during that day.

Duplicate groundwater samples will be collected and analyzed for quality assurance purposes. Duplicate samples will be collected at a frequency of 1 per 20 investigative soil samples and will be submitted to the laboratory as "blind" samples. If less than 20 samples are collected during a particular sampling event, one duplicate sample will be collected.

MS/MSD samples (MS/MSD for organics; MS and laboratory duplicate for inorganics) will be taken at a frequency of one pair per 20 field samples. If less than 20 samples are collected during a particular sampling event, one MS/MSD sample will be collected. These samples are used to assess the effect of the sample matrix on the recovery of target compounds or target analytes.

5.3.3 Soil Vapor Samples

Soil vapor sampling is not anticipated during remedial excavation activities. In the event that soil vapor sapling is required, samples will be collected in accordance with the Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH October 2006). Soil vapor implants will be set at a depth of approximately 19-feet below current site grades which corresponds to the depth interval directly below the proposed development excavation depth. Each vapor probe will consist of a new, dedicated stainless steel screen implant connected to polyethylene or Teflon™ tubing extending to the target depth. About 1 foot of clean sand filter pack will be placed around the screen implant, and the remaining annular space will be backfilled to grade with hydrated bentonite. Sampling will occur for the duration of 2 hours.

Samples will be collected in appropriate sized Summa canisters that have been certified clean by the laboratory and samples will be analyzed by using USEPA Method TO-15. Flow rate for both purging and sampling will not exceed 0.2 L/min. 24-hours following soil vapor probe installation, one to three implant volumes shall be purged prior to the collection of any soil-gas samples. A sample log sheet will be maintained summarizing sample identification, date and time of sample collection, sampling depth, identity of samplers, sampling methods and devices, soil vapor purge volumes, volume of the soil vapor extracted, vacuum of canisters before and after the samples are collected, apparent moisture content of the sampling zone, and chain of custody protocols.

As part of the vapor intrusion evaluation, a tracer gas will be used in accordance with NYSDOH protocols to serve as a quality assurance/quality control (QA/QC) device to verify the integrity of the soil vapor probe seal. A container (box, plastic pail, etc.) will serve to keep the tracer gas in contact with the probe during testing. A portable monitoring device will be used to analyze a sample of soil vapor for the tracer gas prior to sampling. If the tracer sample results show a significant presence of the tracer, the probe seals will be adjusted to prevent infiltration. At the conclusion of the sampling round, tracer monitoring will be performed a second time to confirm the integrity of the probe seals.

5.3.3.1 Soil Vapor Sample Duplicates

Duplicate soil vapor samples will be collected and analyzed for quality assurance purposes. Duplicate samples will be collected at a frequency of 1 per 20 investigative soil samples and will be submitted to the laboratory as "blind" samples. If less than 20 samples are collected during a particular sampling event, one duplicate sample will be collected.

5.3.4 PFAS Sampling Procedures

Soil sampling for PFAS analysis will be completed during the remedial action. All 12 endpoint soil samples collected during the proposed sampling event will be analyzed for PFAS. Field personnel conducting PFAS sampling will wear clothing and use equipment which does not contain PFAS materials including: powderless nitrile gloves, natural rubber overboots, and synthetic and natural fiber clothing. Clothing advertised as waterproof, water-repellant, and/or dirt and/or stain resistant will not be worn. Personal hygiene products with conditioning agents will be avoided prior to the sampling event. Insect repellent and sunscreen will be avoided. Consumption of food and/or beverages will be strictly prohibited during sampling activities, excluding bottled water for hydration. Ballpoint pens will be used as the sole writing instrument to complete labels and record field notes. Waterproof field books, including "Rite-in-Rain"™ will be avoided.

Only sampling equipment known to be devoid of PFAS containing materials will be used. Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. In general, PFAS-free pumps, tubing, interface probes, soil sampling equipment, and bottleware will be considered prior to the sampling event. It is not anticipated that groundwater samples will be collected for PFAS analysis; however, if required, peristaltic pumps will be utilized as the depth of groundwater is less than 20-feet. If groundwater is determined to be greater than 20 feet deep, bladder pumps (QED Sample Pro, or equivalent) with a fluoropolymer-free bladder will be used. HDPE will be used for tubing, soil sampling equipment, and bottleware.

Field personnel will follow standard discrete soil sampling and low flow procedures when sampling for PFAS. When possible, disposable and dedicated equipment will be used for each sample location to avoid potential cross contamination and limit errors from inadequate decontamination between samples. Bladder pumps and/or peristaltic pump tubing will not be re-used and therefore decontamination of sampling equipment between samples will not be necessary. Nitrile gloves will be changed between each step during set up and sampling.

When sampling for PFAS, 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 plumbers tape and sample bottle cap liners with a PTFE layer.

Whenever an action occurs outside of procedure, such as the writing of field notes, nitrile gloves will be changed. Sampling equipment will be staged 5-feet away from the boring or open wellhead. Equipment not directly related to sampling will be staged in a separate area away from the boring or open wellhead. When inserting the tubing into the well, the surrounding platform will be avoided as a source of transference. While stabilizing the well, the pump will not be allowed to stop as backflow from the water quality meter can pose a risk to cross contamination. Once stability has been achieved, sampling will occur. PFAS sample bottleware must be made of HDPE and bottleware must be filled to the container neck. Soil sample bottleware must only be filled half-way. The PFAS field and equipment blanks will be collected immediately following completion of PFAS sampling at the frequency discussed above (Sections 5.3.1.1 and 5.3.2.1).

The PFAS compounds to be analyzed includes: Perfluorobutanesulfonic acid (PFBS), Perfluoropentanesulfonic acid (PFPeS), Perfluorohexanesulfonic acid (PFHxS), Perfluoroheptanesulfonic acid (PFHpS), Perfluorooctanesulfonic acid (PFOS), Perfluorononanesulfonic acid (PFNS), Perfluorodecanesulfonic acid (PFDS), Perfluorododecanesulfonic acid (PFDoS), Perfluorobutanoic acid (PFBA), Perfluoropentanoic acid (PFPeA), Perfluorohexanoic acid (PFHxA), Perfluoroheptanoic acid (PFHpA), Perfluorooctanoic acid (PFOA), Perfluorononanoic acid (PFNA), Perfluorodecanoic acid (PFDA), Perfluoroundecanoic acid (PFUnA), Perfluorododecanoic acid (PFDoA), Perfluorotridecanoic acid (PFTrDA), Perfluorotetradecanoic acid (PFTeDA), Hexafluoropropylene oxide dimer acid (HFPO-DA), 4,8-Dioxa-3H-perfluorononanoic acid (ADONA), Perfluoro-3-methoxypropanoic acid (PFMPA), Perfluoro-4-methoxybutanoic acid (PFMBA), Nonafluoro-3,6-dioxaheptanoic acid (NFDHA), 4:2 Fluorotelomer sulfonic acid (4:2-FTS), 6:2 Fluorotelomer sulfonic acid (6:2-FTS), 8:2 Fluorotelomer sulfonic acid (8:2-FTS), 3:3 Fluorotelomer carboxylic acid (3:3 FTCA), 5:3 Fluorotelomer carboxylic acid (5:3 FTCA), 7:3 Fluorotelomer carboxylic acid (7:3 FTCA), Perfluorooctane sulfonamide (PFOSA), N-methylperfluorooctane sulfonamide (NMeFOSA), N-ethylperfluorooctane sulfonamide (NEtFOSA), N-methylperfluorooctane sulfonamidoacetic acid (N-MeFOSAA), N-ethylperfluorooctane sulfonamidoacetic acid (N-EtFOSAA), N-methylperfluorooctane sulfonamidoethanol (NMeFOSE), N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE), 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (F-53B Major) (9Cl-PF3ONS), 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B Minor) (11Cl-PF3OUdS), Perfluoro(2-ethoxyethane) sulfonic acid (PFEESA).

5.4 Sample Containers and Handling

Certified, commercially clean sample containers will be obtained from the analytical laboratory. The laboratory will also prepare and supply the required field blank sample containers and reagent preservatives. Sample containers, including the field blank containers, will be placed in plastic coolers by the laboratory. These coolers will be received by the field sampling team within 24 hours of their preparation in the laboratory. Prior to the commencement of field work, Langan field personnel will fill the plastic coolers with regular ice only in Ziploc® bags (or equivalent) to maintain a temperature of 4°C±2° C.

Samples collected in the field for laboratory analysis will be placed directly into the laboratory-supplied sample containers. Samples will then be placed and stored on-ice in laboratory provided coolers until shipment to the laboratory. The temperature in the coolers containing samples and associated field blanks will be maintained at a temperature of 4°C±2°C while on-site and during sample shipment to the analytical laboratory.

Possession of samples collected in the field will be traceable from the time of collection until they are analyzed by the analytical laboratory or are properly disposed. Chain-of-custody procedures, described in Section 5.9, will be followed to maintain and document sample possession. Samples will be packaged and shipped as described in Section 5.6.

5.5 Sample Preservation

Sample preservation measures will be used in an attempt to prevent sample decomposition by contamination, degradation, biological transformation, chemical interactions and other factors during the time between sample collection and analysis. Preservation will commence at the time of sample collection and will continue until analyses are performed. Should chemical preservation be required, the analytical laboratory will add the preservatives to the appropriate sample containers before shipment to the office or field. Samples will be preserved according to the requirements of the specific analytical method selected, as shown in Attachment C.

5.6 Sample Shipment

5.6.1 Packaging

Sample containers will be placed in plastic coolers. Regular ice only in Ziploc® bags (or equivalent) will be placed around sample containers. Cushioning material will be added around the sample containers if necessary. Chains-of-custody and other paperwork will be placed in a Ziploc® bag (or equivalent) and placed inside the cooler and custody seals will be affixed to one side of the cooler at a minimum. If the samples are being shipped by an express delivery company (third-party courier, e.g., FedEx) then laboratory address labels will be placed on top of the cooler.

5.6.2 Shipping

Standard procedures to be followed for shipping environmental samples to the analytical laboratory are outlined below.

- All environmental samples will be transported to the laboratory from the site or Langan office by a laboratory provided courier under the chain-of-custody protocols described in Section 5.9. A third-party courier may be used if necessary.

- Prior notice will be provided to the laboratory regarding when to expect shipped samples. If the number, type or date of shipment changes due to site constraints or program changes, the laboratory will be informed.

5.7 Decontamination Procedures

Though not anticipated, decontamination procedures will be used if non-dedicated sampling equipment is utilized during the RAWP. Field sampling equipment that is to be reused will be decontaminated in the field in accordance with the following procedures:

1. Laboratory-grade glassware detergent and tap water scrub to remove visual contamination
2. Generous tap water rinse
3. Distilled/de-ionized water rinse

Field sampling equipment that will be used for the collection of PFAS samples that is to be reused will be decontaminated in the field in accordance with the following procedures:

1. Laboratory-grade glassware detergent and clean, PFAS-free water scrub to remove visual contamination
2. Generous clean, PFAS-free water rinse

5.8 Residuals Management

Debris (e.g., paper, plastic and disposable PPE) will be collected in plastic garbage bags and disposed of as non-hazardous industrial waste. Debris is expected to be transported to a local municipal landfill for disposal.

5.9 Chain of Custody Procedures

A chain-of-custody protocol has been established for collected samples was and will be followed during sample handling activities in both field and laboratory operations. The primary purpose of the chain-of-custody procedures is to document the possession of the samples from collection through shipping, storage and analysis to data reporting and disposal. Chain-of-custody refers to actual possession of the samples. Samples are considered to be in custody if they are within sight of the individual responsible for their security or locked in a secure location. Each person who takes possession of the samples, except for third-party shipping couriers, is responsible for sample integrity and safe keeping. Chain-of-custody procedures are provided below:

- Chain-of-custody will be initiated by the laboratory supplying the pre-cleaned and prepared sample containers. Chain-of-custody forms will accompany the sample containers.
- Following sample collection, the chain-of-custody form will be completed for the samples collected. The sample identification number, date and time of sample collection, analysis requested and other pertinent information (e.g., preservatives) will be recorded on the form. Entries will be made in waterproof, permanent blue or black ink.
- Langan field personnel will be responsible for the care and custody of the samples collected until the samples are transferred to another party, dispatched to the laboratory, or disposed. The sampling/Field Team Leader will be responsible for enforcing chain-of-custody procedures during field work.
- When the form is full or when all samples have been collected that will fit in a single cooler, the sampling/Field Team Leader will check the form for possible errors and sign the chain-of-custody form. Any necessary corrections will be made to the record with a single strike mark, dated, and initialed.

Samples will be packaged for shipment or pickup via courier to the laboratory with the appropriate chain-of-custody form. If applicable, a shipping bill will be completed for each cooler and the shipping bill number recorded on the chain-of-custody form. A copy of the form will be retained by the Langan sampling team for the project file, and the original will be sent to the laboratory with the samples. Bills of lading will also be retained as part of the documentation for the chain-of-custody records, if applicable. When transferring custody of the samples, the individuals relinquishing and receiving custody of the samples will verify sample numbers and condition and will document the sample acquisition and transfer by signing and dating the chain-of-custody form. This process documents sample custody transfer from the sampler to the analytical laboratory.

Laboratory chain-of-custody will be maintained throughout the analytical processes as described in the laboratory's Quality Assurance Manual. The analytical laboratory will provide a copy of the chain-of-custody in the analytical data deliverable package. The chain-of-custody becomes the permanent record of sample handling and shipment.

5.10 Laboratory Sample Storage Procedures

The subcontracted laboratory will use a laboratory information management system (LIMS) to track and schedule samples upon receipt by the analytical laboratories. Any sample anomalies identified during sample log-in must be evaluated on individual merit for the impact upon the results and the data quality objectives of the project. When irregularities do exist, Langan must be notified to discuss recommended courses of action and documentation of the issue must be included in the project file.

For samples requiring thermal preservation, the temperature of each cooler will be immediately recorded. Each sample and container will be assigned a unique laboratory identification number and secured within the custody room walk-in coolers designated for new samples. Samples will be, as soon as practical, disbursed in a manner that is functional for the operational team. The temperature of all coolers and freezers will be monitored and recorded using a certified temperature sensor. Any temperature excursions outside of acceptance criteria (i.e., below 2°C or above 6°C) will initiate an investigation to determine whether any samples may have been affected. Following analysis, the laboratory's specific procedures for retention and disposal will be followed as specified in the laboratory's SOPs and/or QA manual.

6.0 DATA REDUCTION, VALIDATION, AND REPORTING

6.1 Introduction

Data collected during the field investigation will be reduced and reviewed by the laboratory QA personnel, and a report on the findings will be tabulated in a standard format. The criteria used to identify and quantify the analytes will be those specified for the applicable methods in the USEPA SW-846 and subsequent updates. The data package provided by the laboratory will contain all items specified in the USEPA SW-846 appropriate for the analyses to be performed, and be reported in standard format.

The completed copies of the chain-of-custody records (both external and internal) accompanying each sample from time of initial bottle preparation to completion of analysis shall be attached to the analytical reports.

6.2 Data Reduction

The Analytical Services Protocol (ASP) Category B data packages and an electronic data deliverable (EDD) will be provided by the laboratory after receipt of a complete sample delivery group. The Project Manager will immediately arrange for archiving the results and preparation of result tables. These tables will form the database for assessment of the site contamination condition.

Each EDD deliverable must be formatted using a Microsoft Windows operating system and the NYSDEC data deliverable format for EQuIS. To avoid transcription errors, data will be loaded directly into the American Standard Code for Information Interchange (ASCII) format from the LIMS. If this cannot be accomplished, the consultant should be notified via letter of transmittal indicating that manual entry of data is required for a particular method of analysis. All EDDs must also undergo a QC check by the laboratory before delivery. The original data, tabulations, and electronic media are stored in a secure and retrievable fashion.

The Project Manager or Task Manager will maintain close contact with the QA reviewer to ensure all non-conformance issues are acted upon prior to data manipulation and assessment routines. Once the QA review has been completed, the Project Manager may direct the Team Leaders or others to initiate and finalize the analytical data assessment.

6.3 Data Validation

Data validation will be performed in accordance with the USEPA Region 2 SOPs for data validation and USEPA's National Functional Guidelines for Organic and Inorganic Data Review. Tier 1 data validation (the equivalent of USEPA's Stage 2A validation) will be performed to evaluate data quality. Tier 1 data validation is based on completeness and compliance checks of sample-related QC results including:

- Holding times;
- Sample preservation;
- Blank results (method, trip, and field blanks);
- Surrogate recovery compounds and extracted internal standards (as applicable);
- LCS and LCSD recoveries and RPDs;

- MS and MSD recoveries and RPDs;
- Laboratory duplicate RPDs; and
- Field duplicate RPDs

A DUSR will be prepared by the data validator and reviewed by the QAM before issuance. The DUSR 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.

Based on the results of data validation, the validated analytical results reported by the laboratory will be assigned one of the following usability flags:

- "U" - Not detected. The associated number indicates the approximate sample concentration necessary to be detected significantly greater than the level of the highest associated blank;
- "UJ" - Not detected. Quantitation limit may be inaccurate or imprecise;
- "J" - Analyte is present. Reported value may be associated with a higher level of uncertainty than is normally expected with the analytical method;
- "R" – Unreliable result; data is rejected or unusable. Analyte may or may not be present in the sample; and,
- No Flag - Result accepted without qualification.

7.0 QUALITY ASSURANCE PERFORMANCE AUDITS AND SYSTEM AUDITS

7.1 Introduction

Quality assurance audits may be performed by the project quality assurance group under the direction and approval of the QAO. These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). Functioning as an independent body and reporting directly to corporate quality assurance management, the QAO may plan, schedule, and approve system and performance audits based upon procedures customized to the project requirements. At times, the QAO may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits. However, these personnel will not have responsibility for the project work associated with the performance audit.

7.2 System Audits

System audits may be performed by the QAO or designated auditors, and encompass a qualitative evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory quality control procedures and associated documentation may be system audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Project Manager requests, additional audits may occur.

7.3 Performance Audits

The laboratory may be required to conduct an analysis of Performance Evaluation samples or provide proof that Performance Evaluation samples submitted by USEPA or a state agency have been analyzed within the past twelve months.

7.4 Formal Audits

Formal audits refer to any system or performance audit that is documented and implemented by the QA group. These audits encompass documented activities performed by qualified lead auditors to a written procedure or checklists to objectively verify that quality assurance requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Audit reports will be written by auditors who have performed the site audit after gathering and evaluating all data. Items, activities, and documents determined by lead auditors to be in noncompliance shall be identified at exit interviews conducted with the involved management. Non-compliances will be logged, and documented through audit findings, which are attached to and are a part of the integral audit report. These audit-finding forms are directed to management to satisfactorily resolve the noncompliance in a specified and timely manner.

The Project Manager has overall responsibility to ensure that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be submitted to the Project Manager within fifteen days of completion of the audit. Serious deficiencies will be reported to the Project

Manager within 24 hours. All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the QAO prior to issue. Verification of acceptable resolutions may be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the QAO will close out the audit report and findings.

8.0 CORRECTIVE ACTION

8.1 Introduction

The following procedures have been established to ensure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected.

8.2 Procedure Description

When a significant condition adverse to quality is noted at site, laboratory, or subcontractor location, the cause of the condition will be determined and corrective action will be taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the QAO, Project Manager, Field Team Leader and involved contractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action.

All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality. Corrective actions will be initiated as follows:

- When predetermined acceptance standards are not attained;
- When procedure or data compiled are determined to be deficient;
- When equipment or instrumentation is found to be faulty;
- When samples and analytical test results are not clearly traceable;
- When quality assurance requirements have been violated;
- When designated approvals have been circumvented;
- As a result of system and performance audits;
- As a result of a management assessment;
- As a result of laboratory/field comparison studies; and,

- As required by USEPA SW-846, and subsequent updates, or by the NYSDEC ASP.

Project management and staff, such as field investigation teams, remedial response planning personnel, and laboratory groups, monitor on-going work performance in the normal course of daily responsibilities. Work may be audited at the sites, laboratories, or contractor locations. Activities, or documents ascertained to be noncompliant with quality assurance requirements will be documented. Corrective actions will be mandated through audit finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the Task Manager.

Personnel assigned to quality assurance functions will have the responsibility to issue and control Corrective Action Request (CAR) Forms (Figure 8.1 or similar). The CAR identifies the out-of-compliance condition, reference document(s), and recommended corrective action(s) to be administered. The CAR is issued to the personnel responsible for the affected item or activity. A copy is also submitted to the Project Manager. The individual to whom the CAR is addressed returns the requested response promptly to the QA personnel, affixing his/her signature and date to the corrective action block, after stating the cause of the conditions and corrective action to be taken. The QA personnel maintain the log for status of CARs, confirms the adequacy of the intended corrective action, and verifies its implementation. CARs will be retained in the project file for the records.

Any project personnel may identify noncompliance issues; however, the designated QA personnel are responsible for documenting, numbering, logging, and verifying the close out action. The Project Manager will be responsible for ensuring that all recommended corrective actions are implemented, documented, and approved.

FIGURE 8.1

CORRECTIVE ACTION REQUEST
Number: ______________________________ Date: ______________
TO: ____ You are hereby requested to take corrective actions indicated below and as otherwise determined by you to (a) resolve the noted condition and (b) to prevent it from recurring. Your written response is to be returned to the project quality assurance manager by ________________
CONDITION:
REFERENCE DOCUMENTS:
RECOMMENDED CORRECTIVE ACTIONS:
___________ Originator ______ Date ___________ Approval ________ Date ____________ Approval ________ Date
RESPONSE
CAUSE OF CONDITION
CORRECTIVE ACTION (A) RESOLUTION (B) PREVENTION (C) AFFECTED DOCUMENTS
C.A. FOLLOWUP: CORRECTIVE ACTION VERIFIED BY: ______________________________ DATE:______________

9.0 REFERENCES

NYSDEC. Division of Environmental Remediation. DER-10/Technical Guidance for Site Investigation and Remediation, dated May 3, 2010.

NYSDEC. Division of Environmental Remediation. Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs, dated June 2021.

NYSDOH. Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006.

Taylor, J. K., 1987. Quality Assurance of Chemical Measurements. Lewis Publishers, Inc., Chelsea, Michigan

USEPA, 1986. SW-846 "Test Method for Evaluating Solid Waste," dated November 1986. U.S. Environmental Protection Agency, Washington, D.C.

USEPA, 1987. Data Quality Objectives for Remedial Response Actions Activities: Development Process, EPA/540/G-87/003, OSWER Directive 9355.0-7 - U.S. Environmental Protection Agency, Washington, D.C.

USEPA, 1992a. CLP Organics Data Review and Preliminary Review. SOP No. HW-6, Revision #8, dated January 1992. USEPA Region II.

USEPA, 1992b. Evaluation of Metals Data for the Contract Laboratory Program (CLP) based on SOW 3/90. SOP No. HW-2, Revision XI, dated January 1992. USEPA Region II.

USEPA. Hazardous Waste Support Section. Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15. SOP No. HW-31, Revision #6, dated June 2014.

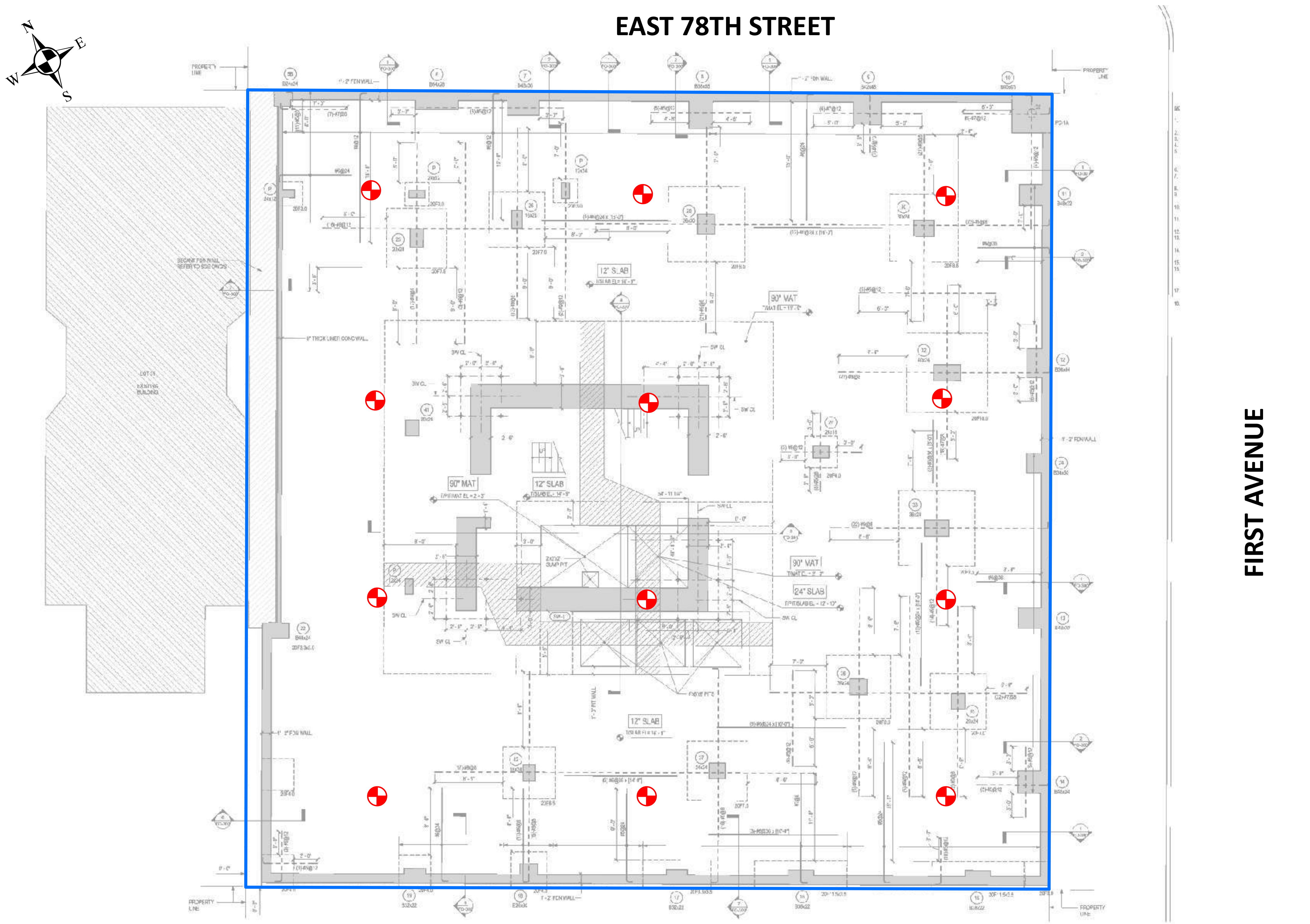
FIGURES

LANGAN

Notes:
Topographic basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online © 2011 National Geographic Society, i-cubed.

LANGAN 300 Kimball Drive Parsippany, NJ 07054 T: 973.560.4900 F: 973.560.4901 www.langan.com Langan Engineering & Environmental Services, Inc. Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. Langan International LLC Collectively known as Langan	Project **1487 FIRST AVENUE** BLOCK No. 1452, LOT No.27, 28, 29 & 30 MANHATTAN NEW YORK NEW YORK	Drawing Title **SITE LOCATION MAP**	Project No. 100963701 Date 12/3/2021 Scale 1"=2,000' Drawn By JF Submission Date	Figure 1

Path: \\langan.com\data\PAR\data7\100963701\Project Data\ArcGIS\APRX\100963701\100963701.aprx Date: 12/3/2021 User: Jfraser Time: 10:33 AM



LEGEND

SITE BOUNDARY

PROPOSED BOTTOM CONFIRMATION SOIL SAMPLE

NOTES:
1. BASE MAP SOURCE: FO-100.00 FOUNDATION PLAN BY HILL WEST ARCHITECTS DATED 07 SEPTEMBER 2022.
2. PROPOSED BOTTOM CONFIRMATION SOIL SAMPLE LOCATIONS ARE APPROXIMATE.

15 0 15

SCALE IN FEET

LANGAN	Project	Drawing Title	Project No.	Figure
300 Kimball Drive Parsippany, NJ 07054 T: 973.560.4900 F: 973.560.4901 www.langan.com Langan Engineering & Environmental Services, Inc. Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. Langan International LLC Collectively known as Langan NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400	1487 FIRST AVENUE REDEVELOPMENT SITE BLOCK No. 1452, LOT No. 27 MANHATTAN NEW YORK NEW YORK	PROPOSED ENPOINT CONFIRMATION SAMPLING PLAN	100963701 Date 11/8/2022 Scale 1 " = 15 ' Drawn By IHB	2

Path: \\langan.com\data\PAR\data7\100963701\Project Data\ArcGIS\MXD\Environmental_Figures\2022-11 RAWP\Figure 9 - Proposed Endpoint Confirmation Sampling Plan.mxd Date: 11/8/2022 User: ibaker Time: 4:05:44 PM

ATTACHMENT A

Resumes

STEWART H. ABRAMS, PE

PRINCIPAL/VICE PRESIDENT

CORPORATE DIRECTOR OF REMEDIATION TECHNOLOGY

Mr. Abrams has over 35 years of experience in soil and groundwater remediation, water treatment, Brownfields redevelopment, and engineering design. He is an expert in remedial technology, with particular emphasis on bioremediation, chemical oxidation/reduction technologies, soil vapor extraction, and air sparging. He also has extensive experience in water process engineering, notably water and wastewater treatment and industrial waste treatment for organics and metals. He is also involved in the fields of emerging contaminants and sustainable remediation. Before joining Langan, Mr. Abrams held positions of National Practice Leader for Remediation at a national consulting and engineering company and as vice president of operations at an environmental R&D firm. He is the founder of Langan's treatability facility, a joint venture with the New Jersey Institute of Technology (NJIT), whereby Langan personnel perform a wide variety of treatability and research studies for soil, groundwater and sediments.

SELECTED PROJECTS

Emerging Contaminants – Technical Director for a complex treatment upgrade project. Onsite pump and treat systems that do not currently address 1,4-dioxane, are being upgraded via the addition of an advanced oxidation process (AOP). Offsite, a public water supply, which had included air stripping for trichloroethylene removal, requires upgrade to address 1,4-dioxane and PFAS. AOP coupled with granular activated carbon is the selected approach. Treatability studies for various AOP processes; as well GAC were performed prior to final to final process selection. Mr. Abrams consults to a Superfund site where he formulates natural attenuation and other strategies for 1,4-dioxane. For the Interstate Technology Regulatory Council (ITRC), Mr. Abrams is one of a handful of experts on PFAS treatment providing seminars nationwide.

Peer Review Activities – Mr. Abrams serves routinely as an independent third party reviewer of remediation plans for Fortune 500 clients. This work is often performed in a collaborative panel format with other reviewers.

Technology Development Consulting - Mr. Abrams has an ongoing consulting relationship with a venture-capital technology start-up in the PFAS treatment field. He advises the firm on the engineering aspects of various developmental technologies.

Expert Testimony. Mr. Abrams has served as a testifying expert witness in both State and Federal Court. He has also been deposed and has prepared expert reports for submission as evidence.

Experimental Work – At Langan's Treatability Facility at the NJIT, recently directed a bench scale research test of an emerging technology for PFOS treatment, i.e., electrocoagulation. Findings showed the electrochemical adsorption may be a feasible as a more cost-effective alternative to conventional GAC.

EDUCATION

M.S., Environmental Sciences Rutgers University

B.S., Civil Engineering Rutgers University

B.A., Political Science Rutgers University

PROFESSIONAL REGISTRATION

Professional Engineer (PE) in NJ, NY, PA, NC

AFFILIATIONS

Battelle Conference on Bioremediation and Sustainable Remediation Technologies 2019 – Steering Committee Member

New Jersey Institute of Technology (NJIT) – Albert Dorman Honors College – Board of Visitors (2018-present)

PFAS Experts Symposium 2019, 2021. Chair – Available In-Situ Technologies Committee

Remediation Journal – Editorial Board (2019 – present)

Thermal Remediation – Directed the installation and operation of an in-situ Thermal Conductive Heating project to remediate PCE and naphthalene in both groundwater and soil. System successfully remediated soils to stringent NJDEP standards. Subsequently, directed the use of bioremediation "polishing" to remove

Injectable Activated Carbon – Providing technical direction for several projects utilizing this technology for the remediation of VOCs in sources areas.

MTBE/Propane Bioaugmentation – First use of propane infusion at a gasoline station to bioremediate MTBE. Combined use of low-level propane with oxygen infusion has been shown to promote the direct remediation of ethers, notably MTBE, with concentrations driven to non-detect in less than four months. Used bioaugmentation.

Zero Valent Iron – Directed the use of injected zero-valent iron for remediating chlorinated solvents at a Brownfield site. Pneumatic fracturing was used to inject 500,000 pounds of micro-scale iron into the shallow bedrock source zone. This process resulted in remediation of the 20,000-square-foot source zone and conditions favorable to the long-term natural attenuation of the plume.

Sulfate Reduction – Directing the use of sulfate addition (Epsom salts) in the remediation of benzene-contaminated soils and groundwater. Microcosm and column treatability studies completed. Directed use of gypsum for full scale sulfate reduction at Brownfield site.

Emulsified Zero Valent Iron (EZVI) – Directed combined use of emulsified vegetable oil and zero valent iron (NASA Patented technology) at a two separate sites: A Brownfield site in Brooklyn, NY and a dry cleaner in New Jersey. NJ site combined EZVI with pneumatic fracturing injection under the floor of the operating dry cleaner.

Ex-situ chemical oxidation mixing –Technical Director of large iron-activated persulfate soil mixing project. Contaminants in soil and groundwater include primarily chlorinated benzenes. Mixing accomplished via "Lang Tool". On-site laboratory utilized for oxidation optimization in real-time.

In-situ chromium remediation – Directed the in-situ remediation of hexavalent chromium through the use of calcium polysulfide (CaSx) addition injection. Injections performed both inside the building as well as outside. Pneumatic fracturing used for injection in shallow bedrock. Monitoring showed that concentrations in the source area groundwater declined to non-detect from 15,000 ug/l in less than a week.

Pump & Treat – Directed the design, installation and operation of a pump and treat system located in southeastern Pennsylvania. Unit processes include filtration, air stripping and granular activated carbon. Constructed in 2013, the system mitigates migration of a plume into a potable water supply.

New Jersey Turnpike, Cranbury, NJ – Managed design (pilot testing, conceptual, and plans and specifications) of a remediation system consisting of 77 air-sparging (AS) wells and 37 soil vapor extraction (SVE) wells for the New Jersey Turnpike at the Molly Pitcher Service Area. Oversaw installation and system startup. Innovative one-day AS/SVE pilot test. Volatilization and destruction of 10,000 gallons of subsurface free product. First use of catalytic oxidation at a Turnpike facility for air-pollution control.

Sustainable Remediation Forum (SURF) (2009 – present)

ITRC Perfluorinated Contaminants Committee (2017 – present) – Subcommittee on Remediation & Treatment

ITRC Integrated Chlorinated Site Remedy Committee (2007 – 2009)

NJDEP Advisory Council on Environmental Justice (2002 - 2004, 2006 - 2013)

Governor-elect Corzine Environmental Policy Transition Committee (2005 – 2006)

NJDEP Remediation Stakeholders Committee (2007 - 2009)

Woodlands Superfund Site, Woodland Twp., NJ – As a subcontractor to *de maximis, inc.,* directed the subsurface design, installation and testing of a major air sparging/SVE system (+200 vertical wells) for a Superfund site in southern New Jersey. Work involved pilot testing of air sparging, SVE pneumatic modeling, early use of CPT/MIPS, and an extensive well-installation using sonic drilling.

GE – Schenectady, NY – Served as technical director for the design of a comprehensive remediation program for a New York state site involving the bioremediation of three VOC plumes and the collection and treatment of leachate seeps. Supported GE Researchers in performing flow-through laboratory column tests using innovative sulfate reduction techniques to remediate a BTEX plume. Led the scale-up of this column study into a design.

BROS Superfund Site, Bridgeport, NJ – Directed extensive laboratory treatability studies and design scale-up of aerobic and anaerobic bioremediation, in-situ Fenton's reagent for chlorinated solvents, and BTEX and cometabolic testing of BCEE degradation. Bench testing was correlated to a site conceptual model, with particular tests tailored to conditions in specific segments and zones of the aquifer. This included detailed work plans for submission to USEPA Laboratories in Cincinnati and Oklahoma.

TCE & Chromium combined – Site with both Cr+6 and TCE contamination being contained by a pump-and-treat system. Pursued pump-and-treat shutdown strategy through laboratory testing and a comprehensive feasibility study. Zero-valent iron, bioremediation, calcium polysulfide, and ferrous sulfate were all lab-tested. Directed the field pilot testing of bioaugmentation and nano-scale zero-valent iron at the sites. Bioaugmentation selected for full scale, since it was highly effective for both Cr^{+6} and TCE.

TCE Cometabolic Bioaugmentation – Innovative first use of aerobic bioaugmentation for the shutdown of a 20-year-old pump-and-treat system in 1995. TCE and daughter products were the contaminants of concern. Shutdown occurred over six months through the repeated injection of bioaugmentation culture.

Zero Valent Iron for P&T Shutdown – Directed the use of injected zero-valent iron at a northern New Jersey site for the remediation of chlorinated solvents. Pneumatic fracturing used to inject micro-scale iron into the recovery zone. Temporary shutdown permission obtained from NJDEP. Injection was a significant success, resulting in permanent cessation of pump-and-treat activities at the site.

TCE Bioaugmentation – Directed the injection of emulsified vegetable oil, followed by bioaugmentation culture, in an aquifer contaminated with PCE. Aquifer preconditioned with baker's yeast and sugar, prior to injection of EVO. Bioaugmentation activities completed in April 2012. Second source area was remediated via in-situ thermal remediation in 2014.

Horizontal Injection Wells for Permanganate Injection – Directed the injection of over 400,000 pounds of potassium permanganate for chlorinated solvent destruction at a large Brownfields site in Maryland. Extensive use of horizontal wells. Work performed under a fixed-price contract with blended finite insurance. This project awarded the prestigious Phoenix Award for EPA Region 3 by the National Brownfields Association.

Selected Publications, Reports, and Presentations

PFAS Experts Symposium: White Paper. Position paper prepared by a group of 40 experts convened under the auspices of Remediation Journal. September 2019.

Treatment Technology for Perfluorinated Compounds. Presented at ITRC PFAS Annual Meeting. Boston, MA. March 2019.

Treatment Technology for Perfluorinated Compounds. Presented at ITRC PFAS Training Program. Montclair State University, New Jersey. October 2018.

Use of In-Situ Remediation Technology at Brownfield Sites – Case Studies. Presented at Battelle Symposium on Remediation of Chlorinated and Recalcitrant Compounds, Palm Springs, CA. (April 2018).

Air Sparging Technology Status Review: Advanced Design and Implementation Tools. Joint with Omer Uppal. Presented at Battelle Symposium on Bioremediation of Chlorinated and Recalcitrant Compounds, Palm Springs, CA. (May 2016).

Evaluation of Remedial Alternatives via Three Bench-Scale Treatability Studies for a Mixed Dense Non-Aqueous Phase Plume. Presented at Battelle International Symposium on Bioremediation and Sustainable Environmental Technologies, Jacksonville, FL. (June 2013).

Geng, X., Boufadel, M.C., Lee, K., Abrams, S., Suidan, M. (2014). Biodegradation of subsurface oil in a tidally influenced sand beach: Impact of hydraulics and interaction with pore water chemistry. *AGU Water Resources Research, 51,* 3193 – 3218.

From Flask to Field – The Role of Treatability and Pilot Tests in Remediation. Presented to Association of Environmental & Engineering Geologists (AEG) New York/Philadelphia Section, Somerset, NJ. (December 2014).

Evaluation of Remedial Alternatives via Three Bench-Scale Treatability Studies for a Mixed Dense Non-Aqueous Phase Plume. Presented at Battelle International Symposium on Bioremediation and Sustainable Environmental Technologies, Jacksonville, FL. (June 2013).

Sustainable Remediation and SURF. Presented at RE3 Conference, Atlantic City, NJ. (November 2012).

Application of Pneumatic Fracturing and Zero-valent Iron for a Maryland Brownfield Site. Presented at Battelle International Symposium on In-Situ and Sustainable Technologies, Monterey, CA. (May 2012).

Integrating Remediation and Redevelopment. Presented at Honeywell "All-Hands" RES Meeting, Morristown, NJ. (December 2011).

Assessing Innovative Remedial Technologies. Presented to Environmental Bankers Association, Charlotte, NC. (January 2009).
Time, Cost & Effectiveness: Assessing Innovative Remedial Technologies. Presented at ITRC/Langan Conference, East Brunswick, NJ. (June 2008).

Remediation Technology Pitfalls. Presented at Prudential Realty Investors Conference, New Orleans, LA. (December 2008).

Selecting Innovative Remedial Technologies. Presented at NJ Innovative Environmental Technology Conference, Newark, NJ. (October 2007).

Bioaugmentation for Site Remediation. Presented at AWMA Central New York Conference, Syracuse, NY. (March 2007).

Selecting Innovative Remedial Technologies. Presented at NJ Innovative Environmental Technology Conference, Newark, NJ. (October 2007).

Use of Persulfate for MTBE Remediation. Presented by Abrams, S.H. & E. Mott-Smith at AEHS West Conference, San Diego, CA. (March 2006).

Innovative Approaches to Chlorinated Solvent Remediation. Presented to Conference of Envirogen clients. Oak Brook, IL. (May 2002).

Bioremediation. Guest Lecturer at Rutgers Graduate School, New Brunswick, NJ. (October 2001).

Biosparging and Bioventing for In-situ Cleanup. Guest Lecturer at Rutgers Graduate School, New Brunswick, NJ. (April 1995).

NPDES Permitting in the Pulp & Paper Industry. Presented at Delaware Valley Section Meeting, Yardley, PA. (November 1991).

Strategies to Minimize Liabilities Under the New Jersey Clean Water Enforcement Act. Presented to New Jersey Business & Industry Association, West Windsor, NJ. (October 1990).

Meeting EPA's Organic Chemicals Plastics and Synthetic Fibers Pretreatment Regulations. Presented at Mid-Atlantic Industrial Waste Conference, Harrisburg, PA. (June 1989).

Design of Packed Columns for Water Treatment. Guest Lecturer at Rutgers Graduate School, New Brunswick, NJ. (March 1987).

Workshop on Response to Volatile Organics in Public Water Supplies. Presented to water suppliers at Technology transfer session. Edison, NJ (March 1987).

AMANDA FORSBURG, CHMM

SENIOR PROJECT SCIENTIST

BROWNFIELD REDEVELOPMENT, DUE DILIGENCE AND SITE INVESTIGATION, REMEDIAL ACTIONS

Ms. Forsburg has 14 years of experience primarily focused on providing environmental support to redevelopment sites within the metropolitan New York area. She has experience with projects in the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) and Spill Programs, New York City Office of Environmental Remediation (NYCOER) E-Designated and New York City Voluntary Cleanup Program (VCP) sites, and New York City Department of Environmental Protection (NYCDEP) remediation sites. Her field experience includes implementation and management of all phases of environmental projects involving soil, groundwater, and soil vapor contamination including Phase I inspections, Phase II site investigations, Remedial Investigations, and Remedial Actions.

During her tenure at Langan, Ms. Forsburg's experience has included schematic-, design-, and construction-phase project team involvement on numerous large scale construction projects requiring multi-disciplinary coordination and collaboration across different Langan teams and offices.

SELECTED PROJECTS

- 101 Murray Street, New York, NY (NYSDEC Spill Site, Multi-discipline)
- 110 University Place, New York, NY (NYSDEC Spill Site, Multi-discipline)
- 138 Willoughby Street, Brooklyn, NY (NYCOER E-Designation Site, Multi-discipline)
- 180 East 125th Street, New York, NY (NYCOER E-Designation Site, Multi-discipline)
- 1905 Surf Avenue, Brooklyn, NY (NYCOER E-Designation Site, Multi-discipline)
- 1921 Atlantic Avenue, Brooklyn, NY (NYSDEC BCP Site)
- 225 East 39th Street, New York, NY (NYCDEP Remediation Site, Multi-Discipline)
- 23-30 Borden Avenue, Queens, NY (NYSDEC BCP Site, Multi-discipline)
- 28-90 Review Avenue, Queens, NY (NYSDEC BCP Site, Multi-discipline)
- 280 West 155th Street, New York, NY (NYSDEC BCP Site, Multi-discipline)
- 311 West 42nd Street, New York, NY (NYCOER E-Designation Site, Multi-discipline)
- 363 and 365 Bond Street, Brooklyn, NY (NYSDEC BCP Site, Multi-discipline)
- 400 Park Avenue South, New York, NY (NYCOER E-Designation and VCP Site)
- 412 Greenwich Street, New York, NY (NYCOER E-Designation Site, Multi-discipline)

EDUCATION

B.A., Environmental Studies
Bucknell University

B.A., Environmental Geology
Bucknell University

PROFESSIONAL REGISTRATION

Certified Hazardous Materials Manager (CHMM)

OSHA 29 CFR 1910.120 Certification (HAZWOPER)

AFFILIATIONS

New Jersey Society of Women Environmental Professionals (NJSWEP) - MetroNet Committee

Association of Environmental and Engineering Geologists

Professional Women in Construction

Urban Land Institute, Norther New Jersey Chapter - Women's Leadership Initiative Co-Chair

LANGAN

- 42-50 24^{th} Street, Queens, NY (NYSDEC Spill Site, Multi-discipline)
- 460 West 41^{st} Street, New York, NY (NYCOER E-Designation Site, Multi-discipline)
- 505 West 19th Street, New York, NY (NYCOER E-Designation Site, Multi-discipline)
- 508 West 24th Street, New York, NY (NYCOER E-Designation and VCP Site, Multi-discipline)
- 525 West 52nd Street, New York, NY (NYCOER E-Designation Site, Multi-discipline)
- 53 West 53rd Street (MoMA Expansion), New York, NY (NYCOER E-Designation Site, Multi-discipline)
- 54 Crown Street, Brooklyn, NY (NYCOER E-Designation and VCP Site, Multi-discipline)
- 540 West 26th Street, New York, NY (NYSDEC Spill Site, Multi-discipline)
- 550 Tenth Avenue, New York, NY (NYCOER E-Designation Site, Multi-discipline)
- 68 Charlton Street, New York, NY (NYCOER E-Designation Site, Multi-discipline)
- Broome Street Parking Lot Site, New York, NY (NYSDEC BCP Site, Multi-discipline)
- Marble Collegiate Church Office Building, New York, NY (Multi-discipline)
- Norfolk Street Site, New York, NY (NYCOER E-Designation Site, Multi-discipline)

Steven Ciambruschini, PG, LEP

Principal/Vice President

Environmental Site Assessments/Investigations, Brownfield Remediation, UST Management

33 years in the industry ~ 28 years with Langan

Mr. Ciambruschini has over 30 years of experience in hydrogeologic and environmental investigations including management of environmental and geotechnical investigations relating to petroleum and chlorinated solvent spill sites, underground storage tank sites, manufactured gas plant sites, landfills, wastewater treatment facilities and industrial/commercial sites. His experience includes managing environmental compliance audits, remedial investigation, pre-acquisition due diligence and permitting assessment, feasibility studies and design, construction and operation of complex innovative remediation systems to treat, contain and recover contaminated soil and groundwater. These projects are managed under various NJDEP, PADEP, NYDEC, NYCDEP and CTDEP programs. Mr. Ciambruschini provides consultation to a diverse group of clients including private developers, utilities, retail and industrial facilities and is expert in assessing remediation options and funding options under various state and federal grant, loan and tax reimbursement programs including Brownfield programs.

Selected Projects

- Brodson Property, Montville NJ, (RCRA, NJDEP ACO Cleanup)
- Carroll Gardens, Brooklyn, NY (NY Brownfield, EPA Superfund, OER E-designated Site)
- Con Edison Appendix B Spill Sites - Various Locations, NY
- Former MGP Site, Brooklyn, NY (VCP Site)
- Extell Development, Hudson Yards, New York, NY (NYC E-designated, NYS Brownfield Site)
- Pan Graphics, Bergen County, NJ (ISRA, LSRP)
- New Jersey Turnpike General Environmental Services Contract, Various Sites, NJ
- Liberty Science Center, Jersey City, NJ (EO 215)
- Blue Back Square, West Hartford, CT (UST, Transfer Act, Brownfield)
- Hershey, Act II Investigation (PA VCP)
- Hershey, Naugatuck, CT (CT Transfer Act)
- Halby Chemical Sites, Various Sites, DE (CERCLA)
- Unisys, Middletown CT, (CT Transfer Act, Brownfield)
- Ryder Rental, Various Sites in CT (CT Transfer Act)
- St. Marks Avenue, Brooklyn, NY (Vapor Mitigation)
- Pan Graphics, Lodi, NJ (Eco Risk Assessment, LSRP)

Education

M.S., Geology
Montclair State University

M.A., Environmental Science
Montclair University

B.S., Environmental Science
Cook College, Rutgers University

Professional Registration

Professional Geologist (PG) in NY, DE, KY

Licensed Environmental Professional (LEP) in CT

Underground Storage Tank License in NJ

Affiliations

National Ground Water Association

Association of Ground Water Scientists and Engineers

American Association of Petroleum Geologists

Environmental Professionals of Connecticut

American Bar Association (ABA)

ASHLEY SANDVE

SENIOR STAFF ENGINEER

ENVIRONMENTAL ENGINEERING

Ms. Sandve's 6 years of experience includes field work and office work on environmental investigation and remediation projects. Her field work experience includes soil, soil vapor, indoor air and groundwater sampling; drilling oversight; air monitoring; soil management; and remediation oversight, including excavation and off-site soil disposal. Her office work experience includes environmental site background research, state environmental database research, EQuIS database management, data evaluation, remedial design, and report work, including, but not limited to, Phase I ESAs, Preliminary Assessment/Site Investigations, Spill Closure Reports, Remedial Investigation Reports, Remedial Action Work Plans, and Remedial Action Reports. Ms. Sandve is proficient in excel and database management and has ample experience researching sites through the online NJDEP and NYSDEC portals.

EDUCATION

B.E., Environmental Engineering
Stevens Institute of Technology

PROFESSIONAL REGISTRATION

OSHA 29 CFR 1910.120 Certification (HAZWOPER)

SELECTED PROJECTS

- 1921 Atlantic Avenue, NYSDEC BCP Site Remediation, Brooklyn, New York
- 28-90 Review Avenue, NYSDEC BCP Site Remediation, Queens, NY
- 550 Tenth Avenue, NYSDEC BCP Site Remediation, New York, NY
- Norfolk Street Site, NYCOER E-Designation Remediation, New York, NY
- Broome Street Parking Lot Site, NYSDEC BCP Site Remediation, New York, NY
- 1538 Stillwell Avenue, NYCOER E-Designation and VCP Site Remediation, Bronx, NY
- 540 West 26th Street, NYSDEC Spills Redevelopment, Remedial Action, New York, NY
- 412 Greenwich Street, NYCOER E-Designation Remediation, New York, NY
- 125 Greenbush Road, Soil and Groundwater Investigation, Orangeburg, NY
- 12 West 48th Street, Phase II Environmental Investigation, New York, NY
- 68 Charlton Street, NYCOER E-Designation Remediation, New York, NY
- Carlyle Residential Portfolio, Brooklyn & Queens, NY
- Phase I Environmental Site Assessments and Due Diligence Investigations, Various Sites, NJ and NY
- Former Penick Corporation Facility RCRA Site, Data Management, Remedial Investigation, and Remedial Action, Montville, NJ
- Former Hess Terminal, Remediation Oversight, Edgewater, NJ
- Stop & Shop, Soil Vapor Intrusion Investigation, Emerson, NJ
- ThorLabs, Groundwater and Soil Vapor Intrusion Investigation, Andover, NJ
- Bright Horizons, Preliminary Assessment and Site Investigation, Roseland, NJ

JOSEPH CONBOY

STAFF CHEMIST

ENVIRONMNETAL

Mr. Conboy has seven years of environmental chemistry, quality assurance, and environmental database management experience, with a current emphasis on validation of laboratory data for submittal to NJDEP via the New Jersey Data of Known Quality Protocols and to NYSDEC. Previous work experience includes performing validation of data for projects in USEPA Regions 2 and 3 while employing appropriate validation guidelines for each region, managing large data sets, updating appropriate regulatory limits, performing statistical evaluations, and preparing electronic data deliverables and report deliverables using the Earthsoft EQuIS database program, and acted as an intermediary between project managers, field staff, and laboratories. Mr. Conboy also has experience in field sampling techniques and maintains current OSHA HAZWOPER certification.

EDUCATION

B.Sc., Chemistry with a minor in Mathematics
Rowan University

CERTIFICATIONS & TRAINING

OSHA 40-Hour HAZWOPER 29 CFR 1910.120(e)(4) Certification

NJ Analytical Guidance and Data Usability Training

USEPA Data Validation Training

Earthsoft EQuIS Environmental Database Training

SELECTED PROJECTS

- 1400 Ferris, Bronx, NY – Completed validation of soil and groundwater data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOCs and SVOCs including 1,4-dioxane, and tangentially used based on professional judgment to perform validation of PFAS data.
- Broome Street Parking Lot, NY - Completed validation of waste characterization data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOCs, SVOCs, herbicides, PCBs, pesticides, metals including mercury, ignitability temperature, pH, reactive cyanide, reactive sulfide, cyanide, and hexavalent chromium. Toxicity characteristic leachate procedure extraction data for VOCs, SVOCs, herbicides, pesticides, metals, and mercury were also validated.
- 215 North 10th Street, Brooklyn, NY - Completed validation of soil and groundwater data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data.
- 35 Commercial Street, Brooklyn, NY - Completed validation of soil data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data, and tangentially used based on professional judgment to perform validation of PFAS data.
- Suffolk Street, Lower East Side, NY- Completed validation of soil, groundwater, and soil vapor data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II

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

- Managed a database for a confidential client containing 10+ years of environmental chemical data from multiple laboratories, requiring select data validation in accordance with New Jersey Data of Known Quality Protocols and identifying areas of delineation from historic field information. Once identified, NJDEP designated groundwater, surface water, soil, sediment, soil vapor, and custom screening criteria were researched and applied to each area, requiring individualized flagging for reporting.*
- Prepared the New Jersey Data of Known Quality Protocol Data Usability Evaluation and managed the database for a confidential client for a data set greater than 20 years old. A DUE or any validation effort was not prepared in the 20 years prior to current. This included data from variations of methods for volatile organic compounds, semivolatile organic compounds, total and dissolved metals, pesticides, herbicides, natural attenuation parameters, and per- and polyfluoroalkyl substances in multiple media.*
- Performed 200+ Stage 2a validations for a combined 87-acre USEPA designated Corrective Action site under the Resource Conservation and Recovery Act, including a quick-turn USEPA required PCB by soxhlet extraction investigation across multiple plants. Once a former train car painting facility, USEPA required a quick-turn PCB by soxhlet extraction soil investigation.
- Preparation of a quality assurance program for a confidential client in West Virginia. A quick turn QAPP was prepared in a service location new to the consultant, resulting in research into state requirements for data usability and auditing newly employed laboratories. The QAPP was understood to be prepared for groundwater only, but the client did not reveal the need for sediment and soil. Two QAPPs were submitted for review to governing agencies.*
- Used statistical software to determine a localized background upper confidence limit of chromium for a confidential client's sand and gravel site. Validation was used to confirm laboratory procedures, and data was used in ProUCL calculations to compare to researched background chromium levels for Pennsylvania soils. *
- Prepared daily perimeter dust and air monitoring summaries and validation of low level mirex data for a confidential client's superfund site. Low level mirex data was generated by university laboratories and subject to validation following national functional guidelines to aide in river clean-up, including sediment, surface water, and treatment system water matrices.*

Project completed prior to employment at LANGAN.

MARLENA JEWETT

DATA ANALYST

CAD/GIS

1 year in the industry

Proposed Title: Field Technician

Ms. Jewett is a data analyst with experience in database design, management and visualization using EarthSoft's EQuIS™ database in support of environmental site characterizations for sites regulated under federal and state compliance programs. Her expertise includes integration of analytical databases and coordination with GIS users.

In her current role Marlena assists project teams with planning and implementation of project databases and data visualization. This includes coordinating with field staff and laboratories to define, workflows, SOPs and ensure the receipt of the proper deliverables for field and lab data; reviewing and managing project data and information using EQuIS™, Microsoft® Access, and Excel; generating data reports including tables, graphs, charts, and GIS compatible files; and generating and reviewing electronic data deliverables following project or agency specific formats.

Education

B.A., Environmental Economics
Colgate University

Work History

Equitable Advisors
Financial Advisor
9/7/2020-4/23/2021

Langan
Data Analyst
5/10/2021 – Present

SELECTED PROJECTS

EQuIS Management and NYSDEC deliverables – Data Analyst. Loaded and maintained soil, groundwater, and soil vapor data in an EQuIS database for a remedial investigation and waste characterizations of New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP), NYC Office of Environmental Remediation (OER), and due diligence sites. Provided final report deliverables including sample summaries; tags; and exceedance summary exports from EQuIS. Completed this work for the following projects:

- **2-8 Main Street**
- **28-90 Review Avenue**
- **34-15 10th Street**
- **37-11 30th Street**
- **44-01 Northern Boulevard**
- **45 Commercial Avenue**
- **50 Jersey Avenue**
- **111 Willow Street**
- **118 West 13th Street**
- **122 Fifth Avenue**
- **155 Third Street**
- **160 East 125th Street**
- **210 Clarkson Avenue**
- **241 West 28th Street**
- **266 West 96th Street**
- **445 Gerard Avenue**
- **475 Bay Street and 31 Wave Street**

- **495 Peninsula Boulevard**
- **561 Greenwich Street**
- **563 Sackett Street**
- **805-825 Atlantic Avenue**
- **1525 Bedford Avenue**
- **2455 Third Avenue**
- **4650 Broadway**
- **ABC Block 27**
- **Bay Crane**
- **Broome Street**
- **Former Grant Hardware**
- **Forsyth and Delancy Street**
- **Gowanus Canal Northside**
- **Greenpoint Landing E1**
- **Greenpoint Landing Parcel H3**
- **John Evans**
- **Kissena Boulevard**
- **NYCHA Farragut**
- **Remeeder**

ATTACHMENT B

Laboratory Reporting Limits and Method Detection Limits

Date Created: 01/29/20
Created By: Ben Rao
File: PM7985-1
Page: 1

Langan Engineering & Environmental

TCL Volatiles - EPA 8260C/5035 High&Low (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - 1 Vial MeOH/2 Vial Water

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Methylene chloride	75-09-2	5	2.29	ug/kg	70-130	30	70-130	30	30			
1,1-Dichloroethane	75-34-3	1	0.145	ug/kg	70-130	30	70-130	30	30			
Chloroform	67-66-3	1.5	0.14	ug/kg	70-130	30	70-130	30	30			
Carbon tetrachloride	56-23-5	1	0.23	ug/kg	70-130	30	70-130	30	30			
1,2-Dichloropropane	78-87-5	1	0.125	ug/kg	70-130	30	70-130	30	30			
Dibromochloromethane	124-48-1	1	0.14	ug/kg	70-130	30	70-130	30	30			
1,1,2-Trichloroethane	79-00-5	1	0.267	ug/kg	70-130	30	70-130	30	30			
Tetrachloroethene	127-18-4	0.5	0.196	ug/kg	70-130	30	70-130	30	30			
Chlorobenzene	108-90-7	0.5	0.127	ug/kg	70-130	30	70-130	30	30			
Trichlorofluoromethane	75-69-4	4	0.695	ug/kg	70-139	30	70-139	30	30			
1,2-Dichloroethane	107-06-2	1	0.257	ug/kg	70-130	30	70-130	30	30			
1,1,1-Trichloroethane	71-55-6	0.5	0.167	ug/kg	70-130	30	70-130	30	30			
Bromodichloromethane	75-27-4	0.5	0.109	ug/kg	70-130	30	70-130	30	30			
trans-1,3-Dichloropropene	10061-02-6	1	0.273	ug/kg	70-130	30	70-130	30	30			
cis-1,3-Dichloropropene	10061-01-5	0.5	0.158	ug/kg	70-130	30	70-130	30	30			
1,3-Dichloropropene, Total	542-75-6	0.5	0.158	ug/kg				30	30			
1,1-Dichloropropene	563-58-6	0.5	0.159	ug/kg	70-130	30	70-130	30	30			
Bromoform	75-25-2	4	0.246	ug/kg	70-130	30	70-130	30	30			
1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.166	ug/kg	70-130	30	70-130	30	30			
Benzene	71-43-2	0.5	0.166	ug/kg	70-130	30	70-130	30	30			
Toluene	108-88-3	1	0.543	ug/kg	70-130	30	70-130	30	30			
Ethylbenzene	100-41-4	1	0.141	ug/kg	70-130	30	70-130	30	30			
Chloromethane	74-87-3	4	0.932	ug/kg	52-130	30	52-130	30	30			
Bromomethane	74-83-9	2	0.581	ug/kg	57-147	30	57-147	30	30			
Vinyl chloride	75-01-4	1	0.335	ug/kg	67-130	30	67-130	30	30			
Chloroethane	75-00-3	2	0.452	ug/kg	50-151	30	50-151	30	30			
1,1-Dichloroethene	75-35-4	1	0.238	ug/kg	65-135	30	65-135	30	30			
trans-1,2-Dichloroethene	156-60-5	1.5	0.137	ug/kg	70-130	30	70-130	30	30			
Trichloroethene	79-01-6	0.5	0.137	ug/kg	70-130	30	70-130	30	30			
1,2-Dichlorobenzene	95-50-1	2	0.144	ug/kg	70-130	30	70-130	30	30			
1,3-Dichlorobenzene	541-73-1	2	0.148	ug/kg	70-130	30	70-130	30	30			
1,4-Dichlorobenzene	106-46-7	2	0.171	ug/kg	70-130	30	70-130	30	30			
Methyl tert butyl ether	1634-04-4	2	0.201	ug/kg	66-130	30	66-130	30	30			
p/m-Xylene	179601-23-1	2	0.56	ug/kg	70-130	30	70-130	30	30			
o-Xylene	95-47-6	1	0.291	ug/kg	70-130	30	70-130	30	30			
Xylene (Total)	1330-20-7	1	0.291	ug/kg				30	30			
cis-1,2-Dichloroethene	156-59-2	1	0.175	ug/kg	70-130	30	70-130	30	30			
1,2-Dichloroethene (total)	540-59-0	1	0.137	ug/kg				30	30			
Dibromomethane	74-95-3	2	0.238	ug/kg	70-130	30	70-130	30	30			
Styrene	100-42-5	1	0.196	ug/kg	70-130	30	70-130	30	30			
Dichlorodifluoromethane	75-71-8	10	0.915	ug/kg	30-146	30	30-146	30	30			
Acetone	67-64-1	10	4.811	ug/kg	54-140	30	54-140	30	30			

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7985-1
Page: 2

Langan Engineering & Environmental

TCL Volatiles - EPA 8260C/5035 High&Low (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - 1 Vial MeOH/2 Vial Water

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Carbon disulfide	75-15-0	10	4.55	ug/kg	59-130	30	59-130	30	30			
2-Butanone	78-93-3	10	2.22	ug/kg	70-130	30	70-130	30	30			
Vinyl acetate	108-05-4	10	2.15	ug/kg	70-130	30	70-130	30	30			
4-Methyl-2-pentanone	108-10-1	10	1.28	ug/kg	70-130	30	70-130	30	30			
1,2,3-Trichloropropane	96-18-4	2	0.127	ug/kg	68-130	30	68-130	30	30			
2-Hexanone	591-78-6	10	1.18	ug/kg	70-130	30	70-130	30	30			
Bromochloromethane	74-97-5	2	0.205	ug/kg	70-130	30	70-130	30	30			
2,2-Dichloropropane	594-20-7	2	0.202	ug/kg	70-130	30	70-130	30	30			
1,2-Dibromoethane	106-93-4	1	0.279	ug/kg	70-130	30	70-130	30	30			
1,3-Dichloropropane	142-28-9	2	0.167	ug/kg	69-130	30	69-130	30	30			
1,1,1,2-Tetrachloroethane	630-20-6	0.5	0.132	ug/kg	70-130	30	70-130	30	30			
Bromobenzene	108-86-1	2	0.145	ug/kg	70-130	30	70-130	30	30			
n-Butylbenzene	104-51-8	1	0.167	ug/kg	70-130	30	70-130	30	30			
sec-Butylbenzene	135-98-8	1	0.146	ug/kg	70-130	30	70-130	30	30			
tert-Butylbenzene	98-06-6	2	0.118	ug/kg	70-130	30	70-130	30	30			
o-Chlorotoluene	95-49-8	2	0.191	ug/kg	70-130	30	70-130	30	30			
p-Chlorotoluene	106-43-4	2	0.108	ug/kg	70-130	30	70-130	30	30			
1,2-Dibromo-3-chloropropane	96-12-8	3	0.998	ug/kg	68-130	30	68-130	30	30			
Hexachlorobutadiene	87-68-3	4	0.169	ug/kg	67-130	30	67-130	30	30			
Isopropylbenzene	98-82-8	1	0.109	ug/kg	70-130	30	70-130	30	30			
p-Isopropyltoluene	99-87-6	1	0.109	ug/kg	70-130	30	70-130	30	30			
Naphthalene	91-20-3	4	0.65	ug/kg	70-130	30	70-130	30	30			
Acrylonitrile	107-13-1	4	1.15	ug/kg	70-130	30	70-130	30	30			
n-Propylbenzene	103-65-1	1	0.171	ug/kg	70-130	30	70-130	30	30			
1,2,3-Trichlorobenzene	87-61-6	2	0.322	ug/kg	70-130	30	70-130	30	30			
1,2,4-Trichlorobenzene	120-82-1	2	0.272	ug/kg	70-130	30	70-130	30	30			
1,3,5-Trimethylbenzene	108-67-8	2	0.193	ug/kg	70-130	30	70-130	30	30			
1,2,4-Trimethylbenzene	95-63-6	2	0.334	ug/kg	70-130	30	70-130	30	30			
1,4-Dioxane	123-91-1	80	35.1	ug/kg	65-136	30	65-136	30	30			
1,4-Diethylbenzene	105-05-5	2	0.177	ug/kg	70-130	30	70-130	30	30			
4-Ethyltoluene	622-96-8	2	0.384	ug/kg	70-130	30	70-130	30	30			
1,2,4,5-Tetramethylbenzene	95-93-2	2	0.191	ug/kg	70-130	30	70-130	30	30			
Ethyl ether	60-29-7	2	0.341	ug/kg	67-130	30	67-130	30	30			
trans-1,4-Dichloro-2-butene	110-57-6	5	1.42	ug/kg	70-130	30	70-130	30	30			
1,2-Dichloroethane-d4	*17060-07-0*									*70-130*		
2-Chloroethoxyethane												
Toluene-d8	*2037-26-5*									*70-130*		
4-Bromofluorobenzene	*460-00-4*									*70-130*		
Dibromofluoromethane	*1868-53-7*									*70-130*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7985-1
Page: 1

Langan Engineering & Environmental

NYTCL Semivolatiles - EPA 8270D (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Acenaphthene	83-32-9	133.6	17.3012	ug/kg	31-137	50	31-137	50	50			
1,2,4-Trichlorobenzene	120-82-1	167	19.1048	ug/kg	38-107	50	38-107	50	50			
Hexachlorobenzene	118-74-1	100.2	18.704	ug/kg	40-140	50	40-140	50	50			
Bis(2-chloroethyl)ether	111-44-4	150.3	22.6452	ug/kg	40-140	50	40-140	50	50			
2-Chloronaphthalene	91-58-7	167	16.5664	ug/kg	40-140	50	40-140	50	50			
1,2-Dichlorobenzene	95-50-1	167	29.9932	ug/kg	40-140	50	40-140	50	50			
1,3-Dichlorobenzene	541-73-1	167	28.724	ug/kg	40-140	50	40-140	50	50			
1,4-Dichlorobenzene	106-46-7	167	29.1582	ug/kg	28-104	50	28-104	50	50			
3,3'-Dichlorobenzidine	91-94-1	167	44.422	ug/kg	40-140	50	40-140	50	50			
2,4-Dinitrotoluene	121-14-2	167	33.4	ug/kg	40-132	50	40-132	50	50			
2,6-Dinitrotoluene	606-20-2	167	28.6572	ug/kg	40-140	50	40-140	50	50			
Fluoranthene	206-44-0	100.2	19.1716	ug/kg	40-140	50	40-140	50	50			
4-Chlorophenyl phenyl ether	7005-72-3	167	17.869	ug/kg	40-140	50	40-140	50	50			
4-Bromophenyl phenyl ether	101-55-3	167	25.4842	ug/kg	40-140	50	40-140	50	50			
Bis(2-chloroisopropyl)ether	108-60-1	200.4	28.5236	ug/kg	40-140	50	40-140	50	50			
Bis(2-chloroethoxy)methane	111-91-1	180.36	16.7334	ug/kg	40-117	50	40-117	50	50			
Hexachlorobutadiene	87-68-3	167	24.4488	ug/kg	40-140	50	40-140	50	50			
Hexachlorocyclopentadiene	77-47-4	477.62	151.302	ug/kg	40-140	50	40-140	50	50			
Hexachloroethane	67-72-1	133.6	27.0206	ug/kg	40-140	50	40-140	50	50			
Isophorone	78-59-1	150.3	21.6766	ug/kg	40-140	50	40-140	50	50			
Naphthalene	91-20-3	167	20.3406	ug/kg	40-140	50	40-140	50	50			
Nitrobenzene	98-95-3	150.3	24.716	ug/kg	40-140	50	40-140	50	50			
NitrosoDiPhenylAmine(NDPA)/DPA	86-30-6	133.6	19.0046	ug/kg	36-157	50	36-157	50	50			
n-Nitrosodi-n-propylamine	621-64-7	167	25.7848	ug/kg	32-121	50	32-121	50	50			
Bis(2-Ethylhexyl)phthalate	117-81-7	167	57.782	ug/kg	40-140	50	40-140	50	50			
Butyl benzyl phthalate	85-68-7	167	42.084	ug/kg	40-140	50	40-140	50	50			
Di-n-butylphthalate	84-74-2	167	31.6632	ug/kg	40-140	50	40-140	50	50			
Di-n-octylphthalate	117-84-0	167	56.78	ug/kg	40-140	50	40-140	50	50			
Diethyl phthalate	84-66-2	167	15.4642	ug/kg	40-140	50	40-140	50	50			
Dimethyl phthalate	131-11-3	167	35.07	ug/kg	40-140	50	40-140	50	50			
Benzo(a)anthracene	56-55-3	100.2	18.8042	ug/kg	40-140	50	40-140	50	50			
Benzo(a)pyrene	50-32-8	133.6	40.748	ug/kg	40-140	50	40-140	50	50			
Benzo(b)fluoranthene	205-99-2	100.2	28.1228	ug/kg	40-140	50	40-140	50	50			
Benzo(k)fluoranthene	207-08-9	100.2	26.72	ug/kg	40-140	50	40-140	50	50			
Chrysene	218-01-9	100.2	17.368	ug/kg	40-140	50	40-140	50	50			
Acenaphthylene	208-96-8	133.6	25.7848	ug/kg	40-140	50	40-140	50	50			
Anthracene	120-12-7	100.2	32.565	ug/kg	40-140	50	40-140	50	50			
Benzo(ghi)perylene	191-24-2	133.6	19.6392	ug/kg	40-140	50	40-140	50	50			
Fluorene	86-73-7	167	16.2324	ug/kg	40-140	50	40-140	50	50			
Phenanthrene	85-01-8	100.2	20.3072	ug/kg	40-140	50	40-140	50	50			
Dibenzo(a,h)anthracene	53-70-3	100.2	19.3052	ug/kg	40-140	50	40-140	50	50			
Indeno(1,2,3-cd)Pyrene	193-39-5	133.6	23.2798	ug/kg	40-140	50	40-140	50	50			

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7985-1
Page: 2

Langan Engineering & Environmental

NYTCL Semivolatiles - EPA 8270D (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Pyrene	129-00-0	100.2	16.5998	ug/kg	35-142	50	35-142	50	50			
Biphenyl	92-52-4	380.76	38.744	ug/kg	37-127	50	37-127	50	50			
4-Chloroaniline	106-47-8	167	30.394	ug/kg	40-140	50	40-140	50	50			
2-Nitroaniline	88-74-4	167	32.1976	ug/kg	47-134	50	47-134	50	50			
3-Nitroaniline	99-09-2	167	31.4962	ug/kg	26-129	50	26-129	50	50			
4-Nitroaniline	100-01-6	167	69.138	ug/kg	41-125	50	41-125	50	50			
Dibenzofuran	132-64-9	167	15.7982	ug/kg	40-140	50	40-140	50	50			
2-Methylnaphthalene	91-57-6	200.4	20.1736	ug/kg	40-140	50	40-140	50	50			
Acetophenone	98-86-2	167	20.6746	ug/kg	14-144	50	14-144	50	50			
2,4,6-Trichlorophenol	88-06-2	100.2	31.6632	ug/kg	30-130	50	30-130	50	50			
P-Chloro-M-Cresol	59-50-7	167	24.883	ug/kg	26-103	50	26-103	50	50			
2-Chlorophenol	95-57-8	167	19.7394	ug/kg	25-102	50	25-102	50	50			
2,4-Dichlorophenol	120-83-2	150.3	26.8536	ug/kg	30-130	50	30-130	50	50			
2,4-Dimethylphenol	105-67-9	167	55.11	ug/kg	30-130	50	30-130	50	50			
2-Nitrophenol	88-75-5	360.72	62.792	ug/kg	30-130	50	30-130	50	50			
4-Nitrophenol	100-02-7	233.8	68.136	ug/kg	11-114	50	11-114	50	50			
2,4-Dinitrophenol	51-28-5	801.6	77.822	ug/kg	4-130	50	4-130	50	50			
4,6-Dinitro-o-cresol	534-52-1	434.2	80.16	ug/kg	10-130	50	10-130	50	50			
Pentachlorophenol	87-86-5	133.6	36.74	ug/kg	17-109	50	17-109	50	50			
Phenol	108-95-2	167	25.217	ug/kg	26-90	50	26-90	50	50			
2-Methylphenol	95-48-7	167	25.885	ug/kg	30-130.	50	30-130.	50	50			
3-Methylphenol/4-Methylphenol	108-39-4/106-44-5	240.48	26.1522	ug/kg	30-130	50	30-130	50	50			
2,4,5-Trichlorophenol	95-95-4	167	31.9972	ug/kg	30-130	50	30-130	50	50			
Benzoic Acid	65-85-0	541.08	169.004	ug/kg	10-110	50	10-110	50	50			
Benzyl Alcohol	100-51-6	167	51.102	ug/kg	40-140	50	40-140	50	50			
Carbazole	86-74-8	167	16.2324	ug/kg	54-128	50	54-128	50	50			
1,4-Dioxane	123-91-1	25.05	7.682	ug/kg	40-140	50	40-140	50	50			
2-Fluorophenol	*367-12-4*									*25-120*		
Phenol-d6	*13127-88-3*									*10-120*		
Nitrobenzene-d5	*4165-60-0*									*23-120*		
2-Fluorobiphenyl	*321-60-8*									*30-120*		
2,4,6-Tribromophenol	*118-79-6*									*10-136*		
4-Terphenyl-d14	*1718-51-0*									*18-120*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7985-1
Page: 1

Langan Engineering & Environmental

TCL Pesticides - EPA 8081B (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Delta-BHC	319-86-8	1.6008	0.31349	ug/kg	30-150	30	30-150	50	50			
Lindane	58-89-9	0.667	0.298149	ug/kg	30-150	30	30-150	50	50			
Alpha-BHC	319-84-6	0.667	0.189428	ug/kg	30-150	30	30-150	50	50			
Beta-BHC	319-85-7	1.6008	0.60697	ug/kg	30-150	30	30-150	50	50			
Heptachlor	76-44-8	0.8004	0.358846	ug/kg	30-150	30	30-150	50	50			
Aldrin	309-00-2	1.6008	0.563615	ug/kg	30-150	30	30-150	50	50			
Heptachlor epoxide	1024-57-3	3.0015	0.90045	ug/kg	30-150	30	30-150	50	50			
Endrin	72-20-8	0.667	0.27347	ug/kg	30-150	30	30-150	50	50			
Endrin aldehyde	7421-93-4	2.001	0.70035	ug/kg	30-150	30	30-150	50	50			
Endrin ketone	53494-70-5	1.6008	0.412206	ug/kg	30-150	30	30-150	50	50			
Dieldrin	60-57-1	1.0005	0.50025	ug/kg	30-150	30	30-150	50	50			
4,4'-DDE	72-55-9	1.6008	0.370185	ug/kg	30-150	30	30-150	50	50			
4,4'-DDD	72-54-8	1.6008	0.570952	ug/kg	30-150	30	30-150	50	50			
4,4'-DDT	50-29-3	3.0015	1.28731	ug/kg	30-150	30	30-150	50	50			
Endosulfan I	959-98-8	1.6008	0.378189	ug/kg	30-150	30	30-150	50	50			
Endosulfan II	33213-65-9	1.6008	0.534934	ug/kg	30-150	30	30-150	50	50			
Endosulfan sulfate	1031-07-8	0.667	0.317492	ug/kg	30-150	30	30-150	50	50			
Methoxychlor	72-43-5	3.0015	0.9338	ug/kg	30-150	30	30-150	50	50			
Toxaphene	8001-35-2	30.015	8.4042	ug/kg	30-150	30	30-150	50	50			
cis-Chlordane	5103-71-9	2.001	0.557612	ug/kg	30-150	30	30-150	50	50			
trans-Chlordane	5103-74-2	2.001	0.528264	ug/kg	30-150	30	30-150	50	50			
Chlordane	57-74-9	13.0065	5.30265	ug/kg	30-150	30	30-150	50	50			
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*		
Decachlorobiphenyl	*2051-24-3*									*30-150*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7985-1
Page: 1

Langan Engineering & Environmental

TCL PCBs - EPA 8082A (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Aroclor 1016	12674-11-2	33.5	2.9748	ug/kg	40-140	50	40-140	50	50			
Aroclor 1221	11104-28-2	33.5	3.3567	ug/kg	40-140	50	40-140	50	50			
Aroclor 1232	11141-16-5	33.5	7.102	ug/kg	40-140	50	40-140	50	50			
Aroclor 1242	53469-21-9	33.5	4.5158	ug/kg	40-140	50	40-140	50	50			
Aroclor 1248	12672-29-6	33.5	5.025	ug/kg	40-140	50	40-140	50	50			
Aroclor 1254	11097-69-1	33.5	3.6649	ug/kg	40-140	50	40-140	50	50			
Aroclor 1260	11096-82-5	33.5	6.1908	ug/kg	40-140	50	40-140	50	50			
Aroclor 1262	37324-23-5	33.5	4.2545	ug/kg	40-140	50	40-140	50	50			
Aroclor 1268	11100-14-4	33.5	3.4706	ug/kg	40-140	50	40-140	50	50			
PCBs, Total	1336-36-3	33.5	2.9748	ug/kg				50	50			
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*		
Decachlorobiphenyl	*2051-24-3*									*30-150*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7985-1
Page: 1

Langan Engineering & Environmental

Herbicides -EPA 8151A (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
2,4-D	94-75-7	0.1665	0.0104895	mg/kg	30-150	30	30-150	30	30			
2,4,5-T	93-76-5	0.1665	0.0051615	mg/kg	30-150	30	30-150	30	30			
2,4,5-TP (Silvex)	93-72-1	0.1665	0.0044289	mg/kg	30-150	30	30-150	30	30			
DCAA	*19719-28-9*									*30-150*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7985-1
Page: 1

Langan Engineering & Environmental

METALS by 6010D (SOIL)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container/Sample Preservation
Aluminum, Total	7429-90-5	4	1.08	mg/kg	48-151		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Antimony, Total	7440-36-0	2	0.152	mg/kg	1-208		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Arsenic, Total	7440-38-2	0.4	0.0832	mg/kg	79-121		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Barium, Total	7440-39-3	0.4	0.0696	mg/kg	83-117		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Beryllium, Total	7440-41-7	0.2	0.0132	mg/kg	83-117		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Cadmium, Total	7440-43-9	0.4	0.0392	mg/kg	83-117		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Calcium, Total	7440-70-2	4	1.4	mg/kg	81-119		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Chromium, Total	7440-47-3	0.4	0.0384	mg/kg	80-120		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Cobalt, Total	7440-48-4	0.8	0.0664	mg/kg	84-115		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Copper, Total	7440-50-8	0.4	0.1032	mg/kg	81-118		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Iron, Total	7439-89-6	2	0.3612	mg/kg	45-155		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Lead, Total	7439-92-1	2	0.1072	mg/kg	81-117		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Magnesium, Total	7439-95-4	4	0.616	mg/kg	76-124		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Manganese, Total	7439-96-5	0.4	0.0636	mg/kg	81-117		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Nickel, Total	7440-02-0	1	0.0968	mg/kg	83-117		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Potassium, Total	7440-09-7	100	5.76	mg/kg	71-129		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Selenium, Total	7782-49-2	0.8	0.1032	mg/kg	78-122		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Silver, Total	7440-22-4	0.4	0.1132	mg/kg	75-124		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Sodium, Total	7440-23-5	80	1.26	mg/kg	72-127		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Thallium, Total	7440-28-0	0.8	0.126	mg/kg	80-120		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Vanadium, Total	7440-62-2	0.4	0.0812	mg/kg	78-122		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Zinc, Total	7440-66-6	2	0.1172	mg/kg	82-118		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7985-1
Page: 1

Langan Engineering & Environmental

METALS by 7471B (SOIL)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container/Sample Preservation
Mercury, Total	7439-97-6	0.08	0.05216	mg/kg	72-128		80-120	20	20		28 days	1 - Metals Only-Glass 60mL/2oz unpreserved

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7985-1
Page: 1

Langan Engineering & Environmental

WETCHEM (SOIL)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Method	Holding Time	Container/Sample Preservation
Chromium, Hexavalent	18540-29-9	0.8	0.16	mg/kg	80-120	20	75-125	20	20	7196A	30 days	1 - Glass 120ml/4oz unpreserved
Cyanide, Total	57-12-5	1	0.212	mg/kg	80-120	35	75-125	35	35	9010C/9012B	14 days	1 - Glass 250ml/8oz unpreserved

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 02/26/20
Created By: Ben Rao
File: PM8104-2
Page: 1

Langan Engineering & Environmental

NJ EPH Method (10/08, Rev3) -Category 1 (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Total EPH	NONE	24.012	24.012	mg/kg	40-140	25	40-140	50	50			
Chloro-Octadecane	*3386-33-2*									*40-140*		
o-Terphenyl	*84-15-1*									*40-140*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 02/26/20
Created By: Ben Rao
File: PM8104-2
Page: 1

Langan Engineering & Environmental

New Jersey - EPA 8260C/5035 High & Low (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - 1 Vial MeOH/2 Vial Water

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
1,2-Dibromo-3-chloropropane	96-12-8	0.003	0.000396	mg/kg	40-160	30	40-160	30	30			
1,4-Dioxane	123-91-1	0.1	0.01442	mg/kg	40-160	30	40-160	30	30			
1,2-Dibromoethane	106-93-4	0.003	0.0001744	mg/kg	70-130	30	70-130	30	30			
Methylene chloride	75-09-2	0.005	0.001104	mg/kg	70-130	30	70-130	30	30			
1,1-Dichloroethane	75-34-3	0.0015	0.0000856	mg/kg	70-130	30	70-130	30	30			
Chloroform	67-66-3	0.0015	0.00037	mg/kg	70-130	30	70-130	30	30			
Carbon tetrachloride	56-23-5	0.001	0.00021	mg/kg	70-130	30	70-130	30	30			
1,2-Dichloropropane	78-87-5	0.0035	0.000228	mg/kg	70-130	30	70-130	30	30			
Dibromochloromethane	124-48-1	0.001	0.0001536	mg/kg	70-130	30	70-130	30	30			
1,1,2-Trichloroethane	79-00-5	0.0015	0.000304	mg/kg	70-130	30	70-130	30	30			
Tetrachloroethene	127-18-4	0.001	0.0001402	mg/kg	70-130	30	70-130	30	30			
Chlorobenzene	108-90-7	0.001	0.000348	mg/kg	70-130	30	70-130	30	30			
Trichlorofluoromethane	75-69-4	0.005	0.000388	mg/kg	40-160	30	40-160	30	30			
1,2-Dichloroethane	107-06-2	0.001	0.0001134	mg/kg	70-130	30	70-130	30	30			
1,1,1-Trichloroethane	71-55-6	0.001	0.0001108	mg/kg	70-130	30	70-130	30	30			
Bromodichloromethane	75-27-4	0.001	0.0001732	mg/kg	70-130	30	70-130	30	30			
trans-1,3-Dichloropropene	10061-02-6	0.001	0.0001208	mg/kg	70-130	30	70-130	30	30			
cis-1,3-Dichloropropene	10061-01-5	0.001	0.0001176	mg/kg	40-160	30	40-160	30	30			
1,3-Dichloropropene, Total	542-75-6	0.001	0.0001176	mg/kg				30	30			
Bromoform	75-25-2	0.004	0.000236	mg/kg	40-160	30	40-160	30	30			
1,1,2,2-Tetrachloroethane	79-34-5	0.001	0.0001008	mg/kg	40-160	30	40-160	30	30			
Benzene	71-43-2	0.001	0.000118	mg/kg	70-130	30	70-130	30	30			
Toluene	108-88-3	0.0015	0.0001948	mg/kg	70-130	30	70-130	30	30			
Ethylbenzene	100-41-4	0.001	0.0001274	mg/kg	70-130	30	70-130	30	30			
Chloromethane	74-87-3	0.005	0.000294	mg/kg	40-160	30	40-160	30	30			
Bromomethane	74-83-9	0.002	0.000338	mg/kg	40-160	30	40-160	30	30			
Vinyl chloride	75-01-4	0.002	0.0001174	mg/kg	70-130	30	70-130	30	30			
Chloroethane	75-00-3	0.002	0.000316	mg/kg	40-160	30	40-160	30	30			
1,1-Dichloroethene	75-35-4	0.001	0.000262	mg/kg	70-130	30	70-130	30	30			
trans-1,2-Dichloroethene	156-60-5	0.0015	0.000212	mg/kg	70-130	30	70-130	30	30			
Trichloroethene	79-01-6	0.001	0.000125	mg/kg	70-130	30	70-130	30	30			
1,2-Dichlorobenzene	95-50-1	0.005	0.0001532	mg/kg	70-130	30	70-130	30	30			
1,3-Dichlorobenzene	541-73-1	0.005	0.000135	mg/kg	70-130	30	70-130	30	30			
1,4-Dichlorobenzene	106-46-7	0.005	0.0001384	mg/kg	70-130	30	70-130	30	30			
Methyl tert butyl ether	1634-04-4	0.002	0.0000844	mg/kg	70-130	30	70-130	30	30			
p/m-Xylene	179601-23-1	0.002	0.0001978	mg/kg	70-130	30	70-130	30	30			
o-Xylene	95-47-6	0.002	0.0001718	mg/kg	70-130	30	70-130	30	30			
Xylene (Total)	1330-20-7	0.002	0.0001718	mg/kg				30	30			
cis-1,2-Dichloroethene	156-59-2	0.001	0.0001428	mg/kg	70-130	30	70-130	30	30			
1,2-Dichloroethene (total)	540-59-0	0.001	0.0001428	mg/kg				30	30			
Styrene	100-42-5	0.002	0.000402	mg/kg	40-160	30	40-160	30	30			
Dichlorodifluoromethane	75-71-8	0.01	0.0001908	mg/kg	40-160	30	40-160	30	30			

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)

Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 02/26/20
Created By: Ben Rao
File: PM8104-2
Page: 2

Langan Engineering & Environmental

New Jersey - EPA 8260C/5035 High & Low (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - 1 Vial MeOH/2 Vial Water

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Acetone	67-64-1	0.036	0.001036	mg/kg	40-160	30	40-160	30	30			
Carbon disulfide	75-15-0	0.01	0.001102	mg/kg	40-160	30	40-160	30	30			
2-Butanone	78-93-3	0.01	0.000272	mg/kg	40-160	30	40-160	30	30			
4-Methyl-2-pentanone	108-10-1	0.01	0.000244	mg/kg	40-160	30	40-160	30	30			
2-Hexanone	591-78-6	0.01	0.000666	mg/kg	40-160	30	40-160	30	30			
Bromochloromethane	74-97-5	0.005	0.000276	mg/kg	70-130	30	70-130	30	30			
Isopropylbenzene	98-82-8	0.001	0.0001038	mg/kg	70-130	30	70-130	30	30			
1,2,3-Trichlorobenzene	87-61-6	0.005	0.0001476	mg/kg	70-130	30	70-130	30	30			
1,2,4-Trichlorobenzene	120-82-1	0.005	0.0001818	mg/kg	70-130	30	70-130	30	30			
Methyl Acetate	79-20-9	0.004	0.00027	mg/kg	70-130	30	70-130	30	30			
Cyclohexane	110-82-7	0.02	0.000146	mg/kg	70-130	30	70-130	30	30			
Methyl cyclohexane	108-87-2	0.004	0.0001546	mg/kg	70-130	30	70-130	30	30			
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	0.02	0.000274	mg/kg	70-130	30	70-130	30	30			
1,2-Dichloroethane-d4	*17060-07-0*									*70-130*		
Toluene-d8	*2037-26-5*									*70-130*		
4-Bromofluorobenzene	*460-00-4*									*70-130*		
Dibromofluoromethane	*1868-53-7*									*70-130*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 02/26/20
Created By: Ben Rao
File: PM8104-2
Page: 1

Langan Engineering & Environmental

New Jersey ABN Extractables - EPA 8270D (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Acenaphthene	83-32-9	0.1332	0.0139194	mg/kg	70-130	30	70-130	30	30			
2-Chloronaphthalene	91-58-7	0.1665	0.0158508	mg/kg	70-130	30	70-130	30	30			
Hexachlorobenzene	118-74-1	0.047952	0.0158841	mg/kg	70-130	30	70-130	30	30			
Bis(2-chloroethyl)ether	111-44-4	0.05994	0.0200133	mg/kg	70-130	30	70-130	30	30			
3,3'-Dichlorobenzidine	91-94-1	0.127872	0.042624	mg/kg	70-130	30	70-130	30	30			
2,4-Dinitrotoluene	121-14-2	0.082917	0.027639	mg/kg	70-130	30	70-130	30	30			
2,6-Dinitrotoluene	606-20-2	0.065934	0.021978	mg/kg	70-130	30	70-130	30	30			
Fluoranthene	206-44-0	0.0999	0.0191142	mg/kg	70-130	30	70-130	30	30			
4-Chlorophenyl phenyl ether	7005-72-3	0.1665	0.013986	mg/kg	70-130	30	70-130	30	30			
Bis(2-chloroisopropyl)ether	108-60-1	0.1998	0.0191475	mg/kg	70-130	30	70-130	30	30			
Bis(2-chloroethoxy)methane	111-91-1	0.17982	0.0158175	mg/kg	70-130	30	70-130	30	30			
Hexachlorobutadiene	87-68-3	0.061938	0.0206793	mg/kg	70-130	30	70-130	30	30			
Hexachlorocyclopentadiene	77-47-4	0.47619	0.105228	mg/kg	20-160	30	20-160	30	30			
Hexachloroethane	67-72-1	0.080919	0.0269397	mg/kg	20-160	30	20-160	30	30			
Isophorone	78-59-1	0.055944	0.0186147	mg/kg	70-130	30	70-130	30	30			
Naphthalene	91-20-3	0.1665	0.0202797	mg/kg	70-130	30	70-130	30	30			
Nitrobenzene	98-95-3	0.073926	0.024642	mg/kg	70-130	30	70-130	30	30			
NitrosoDiPhenylAmine(NDPA)/DPA	86-30-6	0.040959	0.0135531	mg/kg	70-130	30	70-130	30	30			
n-Nitrosodi-n-propylamine	621-64-7	0.041958	0.0139194	mg/kg	70-130	30	70-130	30	30			
Bis(2-Ethylhexyl)phthalate	117-81-7	0.1665	0.0172827	mg/kg	70-130	30	70-130	30	30			
Butyl benzyl phthalate	85-68-7	0.1665	0.0221778	mg/kg	70-130	30	70-130	30	30			
Di-n-butylphthalate	84-74-2	0.1665	0.0147186	mg/kg	70-130	30	70-130	30	30			
Di-n-octylphthalate	117-84-0	0.1665	0.051948	mg/kg	70-130	30	70-130	30	30			
Diethyl phthalate	84-66-2	0.1665	0.0150849	mg/kg	70-130	30	70-130	30	30			
Dimethyl phthalate	131-11-3	0.1665	0.0159507	mg/kg	70-130	30	70-130	30	30			
Benzo(a)anthracene	56-55-3	0.055944	0.0187479	mg/kg	70-130	30	70-130	30	30			
Benzo(a)pyrene	50-32-8	0.121878	0.040626	mg/kg	70-130	30	70-130	30	30			
Benzo(b)fluoranthene	205-99-2	0.041958	0.0138861	mg/kg	70-130	30	70-130	30	30			
Benzo(k)fluoranthene	207-08-9	0.034965	0.011655	mg/kg	70-130	30	70-130	30	30			
Chrysene	218-01-9	0.0999	0.0171162	mg/kg	70-130	30	70-130	30	30			
Acenaphthylene	208-96-8	0.1332	0.018648	mg/kg	70-130	30	70-130	30	30			
Anthracene	120-12-7	0.0999	0.0148185	mg/kg	70-130	30	70-130	30	30			
Benzo(ghi)perylene	191-24-2	0.1332	0.0195804	mg/kg	70-130	30	70-130	30	30			
Fluorene	86-73-7	0.1665	0.0160173	mg/kg	70-130	30	70-130	30	30			
Phenanthrene	85-01-8	0.0999	0.0119547	mg/kg	70-130	30	70-130	30	30			
Dibenzo(a,h)anthracene	53-70-3	0.057942	0.0192474	mg/kg	70-130	30	70-130	30	30			
Indeno(1,2,3-cd)Pyrene	193-39-5	0.06993	0.0232101	mg/kg	70-130	30	70-130	30	30			
Pyrene	129-00-0	0.0999	0.0144522	mg/kg	70-130	30	70-130	30	30			
4-Chloroaniline	106-47-8	0.1665	0.0191808	mg/kg	20-160	30	20-160	30	30			
2-Nitroaniline	88-74-4	0.1665	0.0305694	mg/kg	70-130	30	70-130	30	30			
3-Nitroaniline	99-09-2	0.1665	0.0314019	mg/kg	70-130	30	70-130	30	30			
4-Nitroaniline	100-01-6	0.1665	0.068931	mg/kg	70-130	30	70-130	30	30			

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

ALPHA ANALYTICAL
World Class Chemistry

Date Created: 02/26/20
Created By: Ben Rao
File: PM8104-2
Page: 2

Langan Engineering & Environmental

New Jersey ABN Extractables - EPA 8270D (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria
Dibenzofuran	132-64-9	0.1665	0.0146853	mg/kg	70-130	30	70-130	30	30	
2-Methylnaphthalene	91-57-6	0.1998	0.0176157	mg/kg	70-130	30	70-130	30	30	
2,4,6-Trichlorophenol	88-06-2	0.094905	0.0315684	mg/kg	70-130	30	70-130	30	30	
P-Chloro-M-Cresol	59-50-7	0.1665	0.0248085	mg/kg	70-130	30	70-130	30	30	
2-Chlorophenol	95-57-8	0.054945	0.018315	mg/kg	70-130	30	70-130	30	30	
2,4-Dichlorophenol	120-83-2	0.07992	0.0267732	mg/kg	70-130	30	70-130	30	30	
2,4-Dimethylphenol	105-67-9	0.158841	0.052947	mg/kg	70-130	30	70-130	30	30	
2-Nitrophenol	88-75-5	0.35964	0.027306	mg/kg	70-130	30	70-130	30	30	
2,4-Dinitrophenol	51-28-5	0.23976	0.077589	mg/kg	20-160	30	20-160	30	30	
4,6-Dinitro-o-cresol	534-52-1	0.23976	0.07992	mg/kg	70-130	30	70-130	30	30	
Pentachlorophenol	87-86-5	0.10989	0.03663	mg/kg	20-160	30	20-160	30	30	
Phenol	108-95-2	0.1665	0.0197469	mg/kg	20-160	30	20-160	30	30	
2-Methylphenol	95-48-7	0.1665	0.0258075	mg/kg	70-130	30	70-130	30	30	
3-Methylphenol/4-Methylphenol	108-39-4/106-44-5	0.23976	0.0240426	mg/kg	20-160	30	20-160	30	30	
2,4,5-Trichlorophenol	95-95-4	0.1665	0.0319014	mg/kg	70-130	30	70-130	30	30	
Carbazole	86-74-8	0.1665	0.0106227	mg/kg	70-130	30	70-130	30	30	
4-Nitrophenol	100-02-7	0.2331	0.046287	mg/kg	20-160	30	20-160	30	30	
4-Bromophenyl phenyl ether	101-55-3	0.1665	0.0185148	mg/kg	70-130	30	70-130	30	30	
Acetophenone	98-86-2	0.1665	0.0174159	mg/kg	70-130	30	70-130	30	30	
Biphenyl	92-52-4	0.37962	0.038628	mg/kg	70-130	30	70-130	30	30	
Atrazine	1912-24-9	0.1332	0.058275	mg/kg	70-130	30	70-130	30	30	
2-Fluorophenol	*367-12-4*									*30-130*
Phenol-d6	*13127-88-3*									*30-130*
Nitrobenzene-d5	*4165-60-0*									*30-130*
2-Fluorobiphenyl	*321-60-8*									*30-130*
2,4,6-Tribromophenol	*118-79-6*									*30-130*
4-Terphenyl-d14	*1718-51-0*									*30-130*

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 02/26/20
Created By: Ben Rao
File: PM8104-2
Page: 1

Langan Engineering & Environmental

NJ PCB - EPA 8082A (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Aroclor 1016	12674-11-2	0.0335	0.0029748	mg/kg	40-140	30	40-140	30	30			
Aroclor 1221	11104-28-2	0.0335	0.0033567	mg/kg	40-140	30	40-140	30	30			
Aroclor 1232	11141-16-5	0.0335	0.007102	mg/kg	40-140	30	40-140	30	30			
Aroclor 1242	53469-21-9	0.0335	0.0045158	mg/kg	40-140	30	40-140	30	30			
Aroclor 1248	12672-29-6	0.0335	0.005025	mg/kg	40-140	30	40-140	30	30			
Aroclor 1254	11097-69-1	0.0335	0.0036649	mg/kg	40-140	30	40-140	30	30			
Aroclor 1260	11096-82-5	0.0335	0.0061908	mg/kg	40-140	30	40-140	30	30			
Aroclor 1262	37324-23-5	0.0335	0.0042545	mg/kg	40-140	30	40-140	30	30			
Aroclor 1268	11100-14-4	0.0335	0.0034706	mg/kg	40-140	30	40-140	30	30			
PCBs, Total	1336-36-3	0.0335	0.0029748	mg/kg				30	30			
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*		
Decachlorobiphenyl	*2051-24-3*									*30-150*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 02/26/20
Created By: Ben Rao
File: PM8104-2

Langan Engineering & Environmental

METALS by 6010D (SOIL)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container/Sample Preservation
Aluminum, Total	7429-90-5	4	1.08	mg/kg	48-151		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Antimony, Total	7440-36-0	2	0.152	mg/kg	1-208		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Arsenic, Total	7440-38-2	0.4	0.0832	mg/kg	79-121		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Arsenic, TCLP	7440-38-2	1	0.019	mg/l	75-125	20	75-125	20	20		180 days	1 - Glass 250ml/8oz unpreserved
Barium, TCLP	7440-39-3	0.5	0.021	mg/l	75-125	20	75-125	20	20		180 days	1 - Glass 250ml/8oz unpreserved
Barium, Total	7440-39-3	0.4	0.0696	mg/kg	83-117		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Beryllium, Total	7440-41-7	0.2	0.0132	mg/kg	83-117		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Cadmium, TCLP	7440-43-9	0.1	0.01	mg/l	75-125	20	75-125	20	20		180 days	1 - Glass 250ml/8oz unpreserved
Cadmium, Total	7440-43-9	0.4	0.0392	mg/kg	83-117		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Calcium, Total	7440-70-2	4	1.4	mg/kg	81-119		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Chromium, Total	7440-47-3	0.4	0.0384	mg/kg	80-120		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Chromium, TCLP	7440-47-3	0.2	0.021	mg/l	75-125	20	75-125	20	20		180 days	1 - Glass 250ml/8oz unpreserved
Cobalt, Total	7440-48-4	0.8	0.0664	mg/kg	84-115		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Copper, Total	7440-50-8	0.4	0.1032	mg/kg	81-118		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Iron, Total	7439-89-6	2	0.3612	mg/kg	45-155		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Lead, Total	7439-92-1	2	0.1072	mg/kg	81-117		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Lead, TCLP	7439-92-1	0.5	0.027	mg/l	75-125	20	75-125	20	20		180 days	1 - Glass 250ml/8oz unpreserved
Magnesium, Total	7439-95-4	4	0.616	mg/kg	76-124		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Manganese, Total	7439-96-5	0.4	0.0636	mg/kg	81-117		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Nickel, Total	7440-02-0	1	0.0968	mg/kg	83-117		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Potassium, Total	7440-09-7	100	5.76	mg/kg	71-129		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Selenium, TCLP	7782-49-2	0.5	0.035	mg/l	75-125	20	75-125	20	20		180 days	1 - Glass 250ml/8oz unpreserved
Selenium, Total	7782-49-2	0.8	0.1032	mg/kg	78-122		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Silver, TCLP	7440-22-4	0.1	0.028	mg/l	75-125	20	75-125	20	20		180 days	1 - Glass 250ml/8oz unpreserved
Silver, Total	7440-22-4	0.4	0.1132	mg/kg	75-124		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Sodium, Total	7440-23-5	80	1.26	mg/kg	72-127		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Thallium, Total	7440-28-0	0.8	0.126	mg/kg	80-120		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Vanadium, Total	7440-62-2	0.4	0.0812	mg/kg	78-122		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv
Zinc, Total	7440-66-6	2	0.1172	mg/kg	82-118		75-125	20	20		180 days	Metals Only-Glass 60mL/2oz unpreserv

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 02/26/20
Created By: Ben Rao
File: PM8104-2
Page: 1

Langan Engineering & Environmental

METALS by 7471B (SOIL)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container/Sample Preservation
Mercury, Total	7439-97-6	0.08	0.05216	mg/kg	72-128		80-120	20	20		28 days	Metals Only-Glass 60mL/2oz unpreserv

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 02/26/20
Created By: Ben Rao
File: PM8104-2
Page: 1

Langan Engineering & Environmental

METALS by 7470A (SOIL)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container/Sample Preservation
Mercury, TCLP	7439-97-6	0.000001	4.575E-07	mg/l	85-115		80-120	20	20		28 days	1 - Glass 250ml/8oz unpreserved

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 02/26/20
Created By: Ben Rao
File: PM8104-2
Page: 1

Langan Engineering & Environmental

NJ Pesticides - EPA 8081B (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Delta-BHC	319-86-8	0.0016008	0.00031349	mg/kg	40-140	30	30-150	30	30			
Lindane	58-89-9	0.000667	0.000298149	mg/kg	40-140	30	30-150	30	30			
Alpha-BHC	319-84-6	0.000667	0.000189428	mg/kg	40-140	30	30-150	30	30			
Beta-BHC	319-85-7	0.0016008	0.00060697	mg/kg	40-140	30	30-150	30	30			
Heptachlor	76-44-8	0.0008004	0.000358846	mg/kg	40-140	30	30-150	30	30			
Aldrin	309-00-2	0.0016008	0.000563615	mg/kg	40-140	30	30-150	30	30			
Heptachlor epoxide	1024-57-3	0.0030015	0.00090045	mg/kg	40-140	30	30-150	30	30			
Endrin	72-20-8	0.000667	0.00027347	mg/kg	40-140	30	30-150	30	30			
Endrin aldehyde	7421-93-4	0.002001	0.00070035	mg/kg	40-140	30	30-150	30	30			
Endrin ketone	53494-70-5	0.0016008	0.000412206	mg/kg	40-140	30	30-150	30	30			
Dieldrin	60-57-1	0.0010005	0.00050025	mg/kg	40-140	30	30-150	30	30			
4,4'-DDE	72-55-9	0.0016008	0.000370185	mg/kg	40-140	30	30-150	30	30			
4,4'-DDD	72-54-8	0.0016008	0.000570952	mg/kg	40-140	30	30-150	30	30			
4,4'-DDT	50-29-3	0.0030015	0.00128731	mg/kg	40-140	30	30-150	30	30			
Endosulfan I	959-98-8	0.0016008	0.000378189	mg/kg	40-140	30	30-150	30	30			
Endosulfan II	33213-65-9	0.0016008	0.000534934	mg/kg	40-140	30	30-150	30	30			
Endosulfan sulfate	1031-07-8	0.000667	0.000317492	mg/kg	40-140	30	30-150	30	30			
Methoxychlor	72-43-5	0.0030015	0.0009338	mg/kg	40-140	30	30-150	30	30			
Toxaphene	8001-35-2	0.030015	0.0084042	mg/kg	40-140	30	30-150	30	30			
Chlordane	57-74-9	0.01334	0.00530265	mg/kg	40-140	30	30-150	30	30			
cis-Chlordane	5103-71-9	0.002001	0.000557612	mg/kg	40-140	30	30-150	30	30			
trans-Chlordane	5103-74-2	0.002001	0.000528264	mg/kg	40-140	30	30-150	30	30			
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*		
Decachlorobiphenyl	*2051-24-3*									*30-150*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 02/26/20
Created By: Ben Rao
File: PM8104-2
Page: 1

Langan Engineering & Environmental

NJ Herbicides -EPA 8151A (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
2,4-D	94-75-7	0.1665	0.0104895	mg/kg	30-150	30	30-150	30	30			
2,4,5-T	93-76-5	0.1665	0.0051615	mg/kg	30-150	30	30-150	30	30			
2,4,5-TP (Silvex)	93-72-1	0.1665	0.0044289	mg/kg	30-150	30	30-150	30	30			
DCAA	*19719-28-9*									*30-150*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 02/26/20
Created By: Ben Rao
File: PM8104-2

Langan Engineering & Environmental

WETCHEM (SOIL)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Method	Holding Time	Container/Sample Preservation
Cyanide, Reactive	57-12-5	10	10	mg/kg	30-125	40		40	40	7.3	14 days	1 - Glass 250ml/8oz unpreserved
Sulfide, Reactive	NONE	10	10	mg/kg	60-125	40		40	40	7.3	14 days	1 - Glass 250ml/8oz unpreserved
pH	12408-02-5	0		SU	99-101			5	5	9045D	24 hours	1 - Glass 250ml/8oz unpreserved
Chromium, Hexavalent	18540-29-9	0.8	0.16	mg/kg	80-120	20	75-125	20	20	7196A	30 days	1 - Glass 120ml/4oz unpreserved
Cyanide, Total	57-12-5	1	0.212	mg/kg	80-120	35	75-125	35	35	9010C/9012B	14 days	1 - Glass 250ml/8oz unpreserved

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Langan Engineering & Environmental

Date Created: 02/26/20
Created By: Ben Rao
File: PM8104-2
Page: 1

TCLP Volatile Organics - EPA 8260C/1311 (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Vial Large Septa unpreserved (4

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Chloroform	67-66-3	7.5	2.22	ug/l	70-130	20	70-130	20	20			
Carbon tetrachloride	56-23-5	5	1.34	ug/l	63-132	20	63-132	20	20			
Tetrachloroethene	127-18-4	5	1.81	ug/l	70-130	20	70-130	20	20			
Chlorobenzene	108-90-7	5	1.78	ug/l	75-130	25	75-130	25	25			
1,2-Dichloroethane	107-06-2	5	1.32	ug/l	70-130	20	70-130	20	20			
Benzene	71-43-2	5	1.59	ug/l	70-130	25	70-130	25	25			
Vinyl chloride	75-01-4	10	0.714	ug/l	55-140	20	55-140	20	20			
1,1-Dichloroethene	75-35-4	5	1.69	ug/l	61-145	25	61-145	25	25			
Trichloroethene	79-01-6	5	1.75	ug/l	70-130	25	70-130	25	25			
1,4-Dichlorobenzene	106-46-7	25	1.87	ug/l	70-130	20	70-130	20	20			
2-Butanone	78-93-3	50	19.4	ug/l	63-138	20	63-138	20	20			
1,2-Dichloroethane-d4	*17060-07-0*									*70-130*		
Toluene-d8	*2037-26-5*									*70-130*		
4-Bromofluorobenzene	*460-00-4*									*70-130*		
Dibromofluoromethane	[illegible]									[illegible]		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 02/26/20
Created By: Ben Rao
File: PM8104-2
Page: 1

Langan Engineering & Environmental

TCLP ABN Compounds - EPA 8270D/1311 (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Hexachlorobenzene	118-74-1	10	2.895	ug/l	40-140	30	40-140	30	30			
2,4-Dinitrotoluene	121-14-2	25	4.225	ug/l	40-132	30	40-132	30	30			
Hexachlorobutadiene	87-68-3	10	3.585	ug/l	28-111	30	28-111	30	30			
Hexachloroethane	67-72-1	10	3.41	ug/l	21-105	30	21-105	30	30			
Nitrobenzene	98-95-3	10	3.765	ug/l	40-140	30	40-140	30	30			
2,4,6-Trichlorophenol	88-06-2	25	3.405	ug/l	30-130	30	30-130	30	30			
Pentachlorophenol	87-86-5	50	17.15	ug/l	9-103	30	9-103	30	30			
2-Methylphenol	95-48-7	25	5.1	ug/l	30-130	30	30-130	30	30			
3-Methylphenol/4-Methylphenol	108-39-4/106-44-5	25	5.55	ug/l	30-130	30	30-130	30	30			
2,4,5-Trichlorophenol	95-95-4	25	3.575	ug/l	30-130	30	30-130	30	30			
Pyridine	110-86-1	17.5	9.35	ug/l	10-66	30	10-66	30	30			
2-Fluorophenol	*367-12-4*									*21-120*		
Phenol-d6	*13127-88-3*									*10-120*		
Nitrobenzene-d5	*4165-60-0*									*23-120*		
2-Fluorobiphenyl	*321-60-8*									*15-120*		
2,4,6-Tribromophenol	*118-79-6*									*10-120*		
4-Terphenyl-d14	*1718-51-0*									*33-120*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 02/26/20
Created By: Ben Rao
File: PM8104-2
Page: 1

Langan Engineering & Environmental

TCLP Pesticides - EPA 8081B/1311 (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Lindane	58-89-9	0.1	0.0217	ug/l	30-150	20	30-150	30	30			
Heptachlor	76-44-8	0.1	0.0155	ug/l	30-150	20	30-150	30	30			
Heptachlor epoxide	1024-57-3	0.1	0.02075	ug/l	30-150	20	30-150	30	30			
Endrin	72-20-8	0.2	0.02145	ug/l	30-150	20	30-150	30	30			
Methoxychlor	72-43-5	1	0.0342	ug/l	30-150	20	30-150	30	30			
Toxaphene	8001-35-2	1	0.3135	ug/l	30-150	20	30-150	30	30			
Chlordane	57-74-9	1	0.2315	ug/l	30-150	20	30-150	30	30			
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*		
Decachlorobiphenyl	*2051-24-3*									*30-150*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Langan Engineering & Environmental

Date Created: 02/26/20
Created By: Ben Rao
File: PM8104-2
Page: 1

TCLP Herbicides - EPA 8151A/1311 (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
2,4-D	94-75-7	0.025	0.001245	mg/l	30-150	25	30-150	25	25			
2,4,5-TP (Silvex)	93-72-1	0.005	0.0013475	mg/l	30-150	25	30-150	25	25			
DCAA	*19719-28-9*									*30-150*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Langan Engineering & Environmental

Date Created: 01/29/20
Created By: Ben Rao
File: PM7986-1
Page: 1

TCL Volatiles - EPA 8260C (WATER)

Holding Time: 14 days
Container/Sample Preservation: 3 - Vial HCl preserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Methylene chloride	75-09-2	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,1-Dichloroethane	75-34-3	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Chloroform	67-66-3	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Carbon tetrachloride	56-23-5	0.5	0.134	ug/l	63-132	20	63-132	20	20			
1,2-Dichloropropane	78-87-5	1	0.137	ug/l	70-130	20	70-130	20	20			
Dibromochloromethane	124-48-1	0.5	0.149	ug/l	63-130	20	63-130	20	20			
1,1,2-Trichloroethane	79-00-5	1.5	0.5	ug/l	70-130	20	70-130	20	20			
Tetrachloroethene	127-18-4	0.5	0.181	ug/l	70-130	20	70-130	20	20			
Chlorobenzene	108-90-7	2.5	0.7	ug/l	75-130	20	75-130	20	20			
Trichlorofluoromethane	75-69-4	2.5	0.7	ug/l	62-150	20	62-150	20	20			
1,2-Dichloroethane	107-06-2	0.5	0.132	ug/l	70-130	20	70-130	20	20			
1,1,1-Trichloroethane	71-55-6	2.5	0.7	ug/l	67-130	20	67-130	20	20			
Bromodichloromethane	75-27-4	0.5	0.192	ug/l	67-130	20	67-130	20	20			
trans-1,3-Dichloropropene	10061-02-6	0.5	0.164	ug/l	70-130	20	70-130	20	20			
cis-1,3-Dichloropropene	10061-01-5	0.5	0.144	ug/l	70-130	20	70-130	20	20			
1,3-Dichloropropene, Total	542-75-6	0.5	0.144	ug/l				20	20			
1,1-Dichloropropene	563-58-6	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Bromoform	75-25-2	2	0.65	ug/l	54-136	20	54-136	20	20			
1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.167	ug/l	67-130	20	67-130	20	20			
Benzene	71-43-2	0.5	0.159	ug/l	70-130	20	70-130	20	20			
Toluene	108-88-3	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Ethylbenzene	100-41-4	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Chloromethane	74-87-3	2.5	0.7	ug/l	64-130	20	64-130	20	20			
Bromomethane	74-83-9	2.5	0.7	ug/l	39-139	20	39-139	20	20			
Vinyl chloride	75-01-4	1	0.0714	ug/l	55-140	20	55-140	20	20			
Chloroethane	75-00-3	2.5	0.7	ug/l	55-138	20	55-138	20	20			
1,1-Dichloroethene	75-35-4	0.5	0.169	ug/l	61-145	20	61-145	20	20			
trans-1,2-Dichloroethene	156-60-5	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Trichloroethene	79-01-6	0.5	0.175	ug/l	70-130	20	70-130	20	20			
1,2-Dichlorobenzene	95-50-1	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,3-Dichlorobenzene	541-73-1	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,4-Dichlorobenzene	106-46-7	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Methyl tert butyl ether	1634-04-4	2.5	0.7	ug/l	63-130	20	63-130	20	20			
p/m-Xylene	179601-23-1	2.5	0.7	ug/l	70-130	20	70-130	20	20			
o-Xylene	95-47-6	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Xylene (Total)	1330-20-7	2.5	0.7	ug/l				20	20			
cis-1,2-Dichloroethene	156-59-2	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,2-Dichloroethene (total)	540-59-0	2.5	0.7	ug/l				20	20			
Dibromomethane	74-95-3	5	1	ug/l	70-130	20	70-130	20	20			
1,2,3-Trichloropropane	96-18-4	2.5	0.7	ug/l	64-130	20	64-130	20	20			
Acrylonitrile	107-13-1	5	1.5	ug/l	70-130	20	70-130	20	20			
Styrene	100-42-5	2.5	0.7	ug/l	70-130	20	70-130	20	20			

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)

Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7986-1
Page: 2

Langan Engineering & Environmental

TCL Volatiles - EPA 8260C (WATER)

Holding Time: 14 days
Container/Sample Preservation: 3 - Vial HCl preserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Dichlorodifluoromethane	75-71-8	5	1	ug/l	36-147	20	36-147	20	20			
Acetone	67-64-1	5	1.46	ug/l	58-148	20	58-148	20	20			
Carbon disulfide	75-15-0	5	1	ug/l	51-130	20	51-130	20	20			
2-Butanone	78-93-3	5	1.94	ug/l	63-138	20	63-138	20	20			
Vinyl acetate	108-05-4	5	1	ug/l	70-130	20	70-130	20	20			
4-Methyl-2-pentanone	108-10-1	5	1	ug/l	59-130	20	59-130	20	20			
2-Hexanone	591-78-6	5	1	ug/l	57-130	20	57-130	20	20			
Bromochloromethane	74-97-5	2.5	0.7	ug/l	70-130	20	70-130	20	20			
2,2-Dichloropropane	594-20-7	2.5	0.7	ug/l	63-133	20	63-133	20	20			
1,2-Dibromoethane	106-93-4	2	0.65	ug/l	70-130	20	70-130	20	20			
1,3-Dichloropropane	142-28-9	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,1,1,2-Tetrachloroethane	630-20-6	2.5	0.7	ug/l	64-130	20	64-130	20	20			
Bromobenzene	108-86-1	2.5	0.7	ug/l	70-130	20	70-130	20	20			
n-Butylbenzene	104-51-8	2.5	0.7	ug/l	53-136	20	53-136	20	20			
sec-Butylbenzene	135-98-8	2.5	0.7	ug/l	70-130	20	70-130	20	20			
tert-Butylbenzene	98-06-6	2.5	0.7	ug/l	70-130	20	70-130	20	20			
o-Chlorotoluene	95-49-8	2.5	0.7	ug/l	70-130	20	70-130	20	20			
p-Chlorotoluene	106-43-4	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,2-Dibromo-3-chloropropane	96-12-8	2.5	0.7	ug/l	41-144	20	41-144	20	20			
Hexachlorobutadiene	87-68-3	2.5	0.7	ug/l	63-130	20	63-130	20	20			
Isopropylbenzene	98-82-8	2.5	0.7	ug/l	70-130	20	70-130	20	20			
p-Isopropyltoluene	99-87-6	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Naphthalene	91-20-3	2.5	0.7	ug/l	70-130	20	70-130	20	20			
n-Propylbenzene	103-65-1	2.5	0.7	ug/l	69-130	20	69-130	20	20			
1,2,3-Trichlorobenzene	87-61-6	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,2,4-Trichlorobenzene	120-82-1	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,3,5-Trimethylbenzene	108-67-8	2.5	0.7	ug/l	64-130	20	64-130	20	20			
1,2,4-Trimethylbenzene	95-63-6	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,4-Dioxane	123-91-1	250	60.8	ug/l	56-162	20	56-162	20	20			
1,4-Diethylbenzene	105-05-5	2	0.7	ug/l	70-130	20	70-130	20	20			
4-Ethyltoluene	622-96-8	2	0.7	ug/l	70-130	20	70-130	20	20			
1,2,4,5-Tetramethylbenzene	95-93-2	2	0.542	ug/l	70-130	20	70-130	20	20			
Ethyl ether	60-29-7	2.5	0.7	ug/l	59-134	20	59-134	20	20			
trans-1,4-Dichloro-2-butene	110-57-6	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,2-Dichloroethane-d4	*17060-07-0*									*70-130*		
Toluene-d8	*2037-26-5*									*70-130*		
4-Bromofluorobenzene	*460-00-4*									*70-130*		
Dibromofluoromethane	*1868-53-7*									*70-130*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7986-1
Page: 1

Langan Engineering & Environmental

New Jersey ABN Extractables - EPA 8270D (LVI) (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 250ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Acenaphthene	83-32-9	2.002	0.44408	ug/l	70-130	20	70-130	20	20			
3-Methylphenol/4-Methylphenol	108-39-4/106-44-5	5.0232	0.48048	ug/l	20-160	20	20-160	20	20			
Hexachlorobenzene	118-74-1	2.002	0.46592	ug/l	70-130	20	70-130	20	20			
Bis(2-chloroethyl)ether	111-44-4	2.002	0.50596	ug/l	70-130	20	70-130	20	20			
2-Chloronaphthalene	91-58-7	2.002	0.4368	ug/l	70-130	20	70-130	20	20			
2,4-Dinitrotoluene	121-14-2	5.0232	1.1648	ug/l	70-130	20	70-130	20	20			
2,6-Dinitrotoluene	606-20-2	5.0232	0.93184	ug/l	70-130	20	70-130	20	20			
Fluoranthene	206-44-0	2.002	0.257348	ug/l	70-130	20	70-130	20	20			
4-Chlorophenyl phenyl ether	7005-72-3	2.002	0.48776	ug/l	70-130	20	70-130	20	20			
Bis(2-chloroisopropyl)ether	108-60-1	2.002	0.5278	ug/l	70-130	20	70-130	20	20			
Bis(2-chloroethoxy)methane	111-91-1	5.0232	0.50232	ug/l	70-130	20	70-130	20	20			
Hexachlorobutadiene	87-68-3	2.002	0.65884	ug/l	70-130	20	70-130	20	20			
Hexachlorocyclopentadiene	77-47-4	20.02	0.68796	ug/l	20-160	20	20-160	20	20			
Hexachloroethane	67-72-1	2.002	0.58604	ug/l	20-160	20	20-160	20	20			
Isophorone	78-59-1	5.0232	1.20484	ug/l	70-130	20	70-130	20	20			
Naphthalene	91-20-3	2.002	0.46592	ug/l	70-130	20	70-130	20	20			
Nitrobenzene	98-95-3	2.002	0.77168	ug/l	70-130	20	70-130	20	20			
NitrosoDiPhenylAmine(NDPA)/DPA	86-30-6	2.002	0.4186	ug/l	70-130	20	70-130	20	20			
n-Nitrosodi-n-propylamine	621-64-7	5.0232	0.64428	ug/l	70-130	20	70-130	20	20			
Bis(2-Ethylhexyl)phthalate	117-81-7	3.003	1.53608	ug/l	70-130	20	70-130	20	20			
Butyl benzyl phthalate	85-68-7	5.0232	1.17208	ug/l	70-130	20	70-130	20	20			
Di-n-butylphthalate	84-74-2	5.0232	0.38948	ug/l	70-130	20	70-130	20	20			
Di-n-octylphthalate	117-84-0	5.0232	1.274	ug/l	70-130	20	70-130	20	20			
Diethyl phthalate	84-66-2	5.0232	0.3822	ug/l	70-130	20	70-130	20	20			
Dimethyl phthalate	131-11-3	5.0232	1.82	ug/l	70-130	20	70-130	20	20			
Benzo(a)anthracene	56-55-3	2.002	0.32578	ug/l	70-130	20	70-130	20	20			
Benzo(a)pyrene	50-32-8	2.002	0.40768	ug/l	70-130	20	70-130	20	20			
Benzo(b)fluoranthene	205-99-2	2.002	0.355264	ug/l	70-130	20	70-130	20	20			
Benzo(k)fluoranthene	207-08-9	2.002	0.37492	ug/l	70-130	20	70-130	20	20			
Chrysene	218-01-9	2.002	0.341068	ug/l	70-130	20	70-130	20	20			
Acenaphthylene	208-96-8	2.002	0.46592	ug/l	70-130	20	70-130	20	20			
Anthracene	120-12-7	2.002	0.32942	ug/l	70-130	20	70-130	20	20			
Benzo(ghi)perylene	191-24-2	2.002	0.296296	ug/l	70-130	20	70-130	20	20			
Fluorene	86-73-7	2.002	0.41496	ug/l	70-130	20	70-130	20	20			
Phenanthrene	85-01-8	2.002	0.33124	ug/l	70-130	20	70-130	20	20			
Dibenzo(a,h)anthracene	53-70-3	2.002	0.323232	ug/l	70-130	20	70-130	20	20			
Indeno(1,2,3-cd)Pyrene	193-39-5	2.002	0.39676	ug/l	70-130	20	70-130	20	20			
Pyrene	129-00-0	2.002	0.279552	ug/l	70-130	20	70-130	20	20			
4-Chloroaniline	106-47-8	5.0232	1.07016	ug/l	20-160	20	20-160	20	20			
2-Nitroaniline	88-74-4	5.0232	0.49868	ug/l	70-130	20	70-130	20	20			
3-Nitroaniline	99-09-2	5.0232	0.81536	ug/l	70-130	20	70-130	20	20			
4-Nitroaniline	100-01-6	5.0232	0.8008	ug/l	70-130	20	70-130	20	20			

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7986-1
Page: 2

Langan Engineering & Environmental

New Jersey ABN Extractables - EPA 8270D (LVI) (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 250ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Dibenzofuran	132-64-9	2.002	0.49868	ug/l	70-130	20	70-130	20	20			
2-Methylnaphthalene	91-57-6	2.002	0.455	ug/l	70-130	20	70-130	20	20			
2,4,6-Trichlorophenol	88-06-2	5.0232	0.61152	ug/l	70-130	20	70-130	20	20			
P-Chloro-M-Cresol	59-50-7	2.002	0.35126	ug/l	70-130	20	70-130	20	20			
2-Chlorophenol	95-57-8	2.002	0.48048	ug/l	70-130	20	70-130	20	20			
2,4-Dichlorophenol	120-83-2	5.0232	0.41132	ug/l	70-130	20	70-130	20	20			
2,4-Dimethylphenol	105-67-9	5.0232	1.77996	ug/l	70-130	20	70-130	20	20			
2-Nitrophenol	88-75-5	10.01	0.84812	ug/l	70-130	20	70-130	20	20			
4-Nitrophenol	100-02-7	10.01	0.6734	ug/l	20-160	20	20-160	20	20			
2,4-Dinitrophenol	51-28-5	20.02	6.6612	ug/l	20-130	20	20-160	20	20			
4,6-Dinitro-o-cresol	534-52-1	10.01	1.81636	ug/l	70-130	20	70-130	20	20			
Pentachlorophenol	87-86-5	10.01	1.79452	ug/l	20-160	20	20-160	20	20			
Phenol	108-95-2	5.0232	0.56784	ug/l	20-160	20	20-160	20	20			
2-Methylphenol	95-48-7	5.0232	0.4914	ug/l	70-130	20	70-130	20	20			
2,4,5-Trichlorophenol	95-95-4	5.0232	0.77532	ug/l	70-130	20	70-130	20	20			
Carbazole	86-74-8	2.002	0.4914	ug/l	70-130	20	70-130	20	20			
4-Bromophenyl phenyl ether	101-55-3	2.002	0.37856	ug/l	70-130	20	70-130	20	20			
3,3'-Dichlorobenzidine	91-94-1	5.0232	1.62344	ug/l	70-130	20	70-130	20	20			
Acetophenone	98-86-2	5.0232	0.5278	ug/l	70-130	20	70-130	20	20			
Biphenyl	92-52-4	2.002	0.45864	ug/l	70-130	20	70-130	20	20			
2-Fluorophenol	*367-12-4*									*15-110*		
Phenol-d6	*13127-88-3*									*15-110*		
Nitrobenzene-d5	*4165-60-0*									*30-130*		
2-Fluorobiphenyl	*321-60-8*									*30-130*		
2,4,6-Tribromophenol	*118-79-6*									*15-110*		
4-Terphenyl-d14	*1718-51-0*									*30-130*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7986-1

Langan Engineering & Environmental

NJ - EPA 8270D-SIM Low Level (LVI) (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 250ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
4,6-Dinitro-o-cresol	534-52-1	0.70252	0.09327136	ug/l	70-130	20	70-130	20	20			
Benzo(a)anthracene	56-55-3	0.1001	0.0198198	ug/l	70-130	20	70-130	20	20			
Benzo(a)pyrene	50-32-8	0.1001	0.01493856	ug/l	70-130	20	70-130	20	20			
Benzo(b)fluoranthene	205-99-2	0.1001	0.01156792	ug/l	70-130	20	70-130	20	20			
Benzo(k)fluoranthene	207-08-9	0.1001	0.00889616	ug/l	70-130	20	70-130	20	20			
Dibenzo(a,h)anthracene	53-70-3	0.1001	0.0127218	ug/l	70-130	20	70-130	20	20			
Indeno(1,2,3-cd)Pyrene	193-39-5	0.1001	0.01217216	ug/l	70-130	20	70-130	20	20			
Hexachlorobenzene	118-74-1	0.02002	0.00938028	ug/l	70-130	20	70-130	20	20			
Pentachlorophenol	87-86-5	0.3003	0.0143416	ug/l	20-160	20	20-160	20	20			
Hexachlorobutadiene	87-68-3	1.001	0.04674852	ug/l	70-130	20	70-130	20	20			
2-Fluorophenol	*367-12-4*									*15-110*		
Phenol-d6	*13127-88-3*									*15-110*		
Nitrobenzene-d5	*4165-60-0*									*30-130*		
2-Fluorobiphenyl	*321-60-8*									*30-130*		
2,4,6-Tribromophenol	*118-79-6*									*15-110*		
4-Terphenyl-d14	*1718-51-0*									*30-130*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7986-1
Page: 1

Langan Engineering & Environmental

1,4 Dioxane via EPA 8270D-SIM (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 250ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria
1,4-Dioxane	123-91-1	150	33.9	ng/l	40-140	30	40-140	30	30	
1,4-Dioxane-d8	*17647-74-4*									*15-110*
1,4-Dioxane-d8 (IS)	17647-74-4			ng/l						

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7986-1
Page: 1

Langan Engineering & Environmental

TCL Pesticides - EPA 8081B (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 120ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Delta-BHC	319-86-8	0.02	0.00467	ug/l	30-150	20	30-150	30	30			
Lindane	58-89-9	0.02	0.00434	ug/l	30-150	20	30-150	30	30			
Alpha-BHC	319-84-6	0.02	0.00439	ug/l	30-150	20	30-150	30	30			
Beta-BHC	319-85-7	0.02	0.0056	ug/l	30-150	20	30-150	30	30			
Heptachlor	76-44-8	0.02	0.0031	ug/l	30-150	20	30-150	30	30			
Aldrin	309-00-2	0.02	0.00216	ug/l	30-150	20	30-150	30	30			
Heptachlor epoxide	1024-57-3	0.02	0.00415	ug/l	30-150	20	30-150	30	30			
Endrin	72-20-8	0.04	0.00429	ug/l	30-150	20	30-150	30	30			
Endrin aldehyde	7421-93-4	0.04	0.0081	ug/l	30-150	20	30-150	30	30			
Endrin ketone	53494-70-5	0.04	0.00477	ug/l	30-150	20	30-150	30	30			
Dieldrin	60-57-1	0.04	0.00429	ug/l	30-150	20	30-150	30	30			
4,4'-DDE	72-55-9	0.04	0.00381	ug/l	30-150	20	30-150	30	30			
4,4'-DDD	72-54-8	0.04	0.00464	ug/l	30-150	20	30-150	30	30			
4,4'-DDT	50-29-3	0.04	0.00432	ug/l	30-150	20	30-150	30	30			
Endosulfan I	959-98-8	0.02	0.00345	ug/l	30-150	20	30-150	30	30			
Endosulfan II	33213-65-9	0.04	0.00519	ug/l	30-150	20	30-150	30	30			
Endosulfan sulfate	1031-07-8	0.04	0.00481	ug/l	30-150	20	30-150	30	30			
Methoxychlor	72-43-5	0.2	0.00684	ug/l	30-150	20	30-150	30	30			
Toxaphene	8001-35-2	0.2	0.0627	ug/l	30-150	20	30-150	30	30			
cis-Chlordane	5103-71-9	0.02	0.00666	ug/l	30-150	20	30-150	30	30			
trans-Chlordane	5103-74-2	0.02	0.00627	ug/l	30-150	20	30-150	30	30			
Chlordane	57-74-9	0.2	0.0463	ug/l	30-150	20	30-150	30	30			
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*		
Decachlorobiphenyl	*2051-24-3*									*30-150*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7986-1
Page: 1

Langan Engineering & Environmental

TCL PCBs - EPA 8082A (LVI) (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 120ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Aroclor 1016	12674-11-2	0.082824	0.0344148	ug/l	40-140	50	40-140	50	50			
Aroclor 1221	11104-28-2	0.082824	0.0664734	ug/l	40-140	50	40-140	50	50			
Aroclor 1232	11141-16-5	0.082824	0.0455532	ug/l	40-140	50	40-140	50	50			
Aroclor 1242	53469-21-9	0.082824	0.0387702	ug/l	40-140	50	40-140	50	50			
Aroclor 1248	12672-29-6	0.082824	0.048909	ug/l	40-140	50	40-140	50	50			
Aroclor 1254	11097-69-1	0.082824	0.0390558	ug/l	40-140	50	40-140	50	50			
Aroclor 1260	11096-82-5	0.082824	0.0320586	ug/l	40-140	50	40-140	50	50			
Aroclor 1262	37324-23-5	0.082824	0.0347718	ug/l	40-140	50	40-140	50	50			
Aroclor 1268	11100-14-4	0.082824	0.0334866	ug/l	40-140	50	40-140	50	50			
PCBs, Total	1336-36-3	0.082824	0.0320586	ug/l				50	50			
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*		
Decachlorobiphenyl	*2051-24-3*									*30-150*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7986-1
Page: 1

Langan Engineering & Environmental

Herbicides -EPA 8151A (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 1000ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
2,4-D	94-75-7	10	0.498	ug/l	30-150	25	30-150	25	25			
2,4,5-T	93-76-5	2	0.531	ug/l	30-150	25	30-150	25	25			
2,4,5-TP (Silvex)	93-72-1	2	0.539	ug/l	30-150	25	30-150	25	25			
DCAA	*19719-28-9*									*30-150*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7986-1
Page: 1

Langan Engineering & Environmental

METALS by 6020B (WATER)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container/Sample Preservation
Aluminum, Total	7429-90-5	0.01	0.00327	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Antimony, Total	7440-36-0	0.004	0.000429	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Arsenic, Total	7440-38-2	0.0005	0.000165	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Barium, Total	7440-39-3	0.0005	0.000173	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Beryllium, Total	7440-41-7	0.0005	0.000107	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Cadmium, Total	7440-43-9	0.0002	0.0000599	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Calcium, Total	7440-70-2	0.1	0.0394	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Chromium, Total	7440-47-3	0.001	0.000178	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Cobalt, Total	7440-48-4	0.0005	0.000163	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Copper, Total	7440-50-8	0.001	0.000384	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Iron, Total	7439-89-6	0.05	0.0191	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Lead, Total	7439-92-1	0.001	0.000343	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Magnesium, Total	7439-95-4	0.07	0.0242	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Manganese, Total	7439-96-5	0.001	0.00044	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Nickel, Total	7440-02-0	0.002	0.000556	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Potassium, Total	7440-09-7	0.1	0.0309	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Selenium, Total	7782-49-2	0.005	0.00173	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Silver, Total	7440-22-4	0.0004	0.000163	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Sodium, Total	7440-23-5	0.1	0.0293	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Thallium, Total	7440-28-0	0.0005	0.000143	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Vanadium, Total	7440-62-2	0.005	0.00157	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Zinc, Total	7440-66-6	0.01	0.00341	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7986-1
Page: 1

Langan Engineering & Environmental

METALS by 7470A (WATER)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container/Sample Preservation
Mercury, Total	7439-97-6	0.0002	0.0000915	mg/l	80-120		75-125	20	20		28 days	1 - Plastic 500ml HNO3 preserved

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

ALPHA ANALYTICAL
World Class Chemistry

Date Created: 01/29/20
Created By: Ben Rao
File: PM7986-1
Page: 1

Langan Engineering & Environmental

WETCHEM (WATER)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Method	Holding Time	Container/Sample Preservation
Chromium, Hexavalent	18540-29-9	0.01	0.003	mg/l	85-115	20	85-115	20	20	7196A	24 hours	1 - Plastic 500ml unpreserved
Cyanide, Total	57-12-5	0.005	0.0018	mg/l	85-115	20	80-120	20	20	9010C/9012B	14 days	1 - Plastic 250ml NaOH preserved

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created: 01/29/20
Created By: Ben Rao
File: PM7987-1

Langan Engineering & Environmental

Volatile Organics in Air: TO-15 (SOIL_VAPOR)

Holding Time: 30 days
Container/Sample Preservation: 1 - Canister - 2.7 Liter

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
1,1,1-Trichloroethane	71-55-6	0.2	0.0501	ppbV	70-130			25	25			
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.0614	ppbV	70-130			25	25			
1,1,2-Trichloroethane	79-00-5	0.2	0.067	ppbV	70-130			25	25			
1,1-Dichloroethane	75-34-3	0.2	0.0628	ppbV	70-130			25	25			
1,1-Dichloroethene	75-35-4	0.2	0.0643	ppbV	70-130			25	25			
1,2,3-Trimethylbenzene	526-73-8	0.2	0.0576	ppbV	70-130			25	25			
1,2,4-Trichlorobenzene	120-82-1	0.2	0.0674	ppbV	70-130			25	25			
1,2,4-Trimethylbenzene	95-63-6	0.2	0.0368	ppbV	70-130			25	25			
1,2,4,5-Tetramethylbenzene	95-93-2	0.2	0.0604	ppbV	70-130			25	25			
1,2-Dibromoethane	106-93-4	0.2	0.0561	ppbV	70-130			25	25			
1,2-Dichlorobenzene	95-50-1	0.2	0.0628	ppbV	70-130			25	25			
1,2-Dichloroethane	107-06-2	0.2	0.0602	ppbV	70-130			25	25			
1,2-Dichloropropane	78-87-5	0.2	0.061	ppbV	70-130			25	25			
1,3,5-Trimethylbenzene	108-67-8	0.2	0.0675	ppbV	70-130			25	25			
1,3-Butadiene	106-99-0	0.2	0.067	ppbV	70-130			25	25			
1,3-Dichlorobenzene	541-73-1	0.2	0.0627	ppbV	70-130			25	25			
1,4-Dichlorobenzene	106-46-7	0.2	0.0636	ppbV	70-130			25	25			
1,4-Dioxane	123-91-1	0.2	0.0805	ppbV	70-130			25	25			
2,2,4-Trimethylpentane	540-84-1	0.2	0.0361	ppbV	70-130			25	25			
2-Butanone	78-93-3	0.5	0.0482	ppbV	70-130			25	25			
2-Hexanone	591-78-6	0.2	0.0648	ppbV	70-130			25	25			
2-Methylthiophene	554-14-3	0.2	0.0524	ppbV	70-130			25	25			
3-Methylthiophene	616-44-4	0.2	0.0393	ppbV	70-130			25	25			
3-Chloropropene	107-05-1	0.2	0.0585	ppbV	70-130			25	25			
2-Ethylthiophene	872-55-9	0.2	0.0407	ppbV	70-130			25	25			
4-Ethyltoluene	622-96-8	0.2	0.037	ppbV	70-130			25	25			
Acetone	67-64-1	1	0.689	ppbV	40-160			25	25			
Benzene	71-43-2	0.2	0.0487	ppbV	70-130			25	25			
Benzyl chloride	100-44-7	0.2	0.0482	ppbV	70-130			25	25			
Benzothiophene	95-15-8	0.5	0.077	ppbV	70-130			25	25			
Bromodichloromethane	75-27-4	0.2	0.0504	ppbV	70-130			25	25			
Bromoform	75-25-2	0.2	0.0641	ppbV	70-130			25	25			
Bromomethane	74-83-9	0.2	0.0773	ppbV	70-130			25	25			
Carbon disulfide	75-15-0	0.2	0.0559	ppbV	70-130			25	25			
Carbon tetrachloride	56-23-5	0.2	0.0499	ppbV	70-130			25	25			
Chlorobenzene	108-90-7	0.2	0.0624	ppbV	70-130			25	25			
Chloroethane	75-00-3	0.2	0.0805	ppbV	70-130			25	25			
Chloroform	67-66-3	0.2	0.0633	ppbV	70-130			25	25			
Chloromethane	74-87-3	0.2	0.0689	ppbV	70-130			25	25			
cis-1,2-Dichloroethene	156-59-2	0.2	0.117	ppbV	70-130			25	25			
cis-1,3-Dichloropropene	10061-01-5	0.2	0.0409	ppbV	70-130			25	25			
Cyclohexane	110-82-7	0.2	0.0368	ppbV	70-130			25	25			

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

ALPHA ANALYTICAL
World Class Chemistry

Date Created: 01/29/20
Created By: Ben Rao
File: PM7987-1
Page: 2

Langan Engineering & Environmental

Volatile Organics in Air: TO-15 (SOIL_VAPOR)

Holding Time: 30 days
Container/Sample Preservation: 1 - Canister - 2.7 Liter

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Dibromochloromethane	124-48-1	0.2	0.0614	ppbV	70-130			25	25			
Dichlorodifluoromethane	75-71-8	0.2	0.0583	ppbV	70-130			25	25			
Ethyl Alcohol	64-17-5	5	0.733	ppbV	40-160			25	25			
Ethyl Acetate	141-78-6	0.5	0.122	ppbV	70-130			25	25			
Ethylbenzene	100-41-4	0.2	0.0432	ppbV	70-130			25	25			
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	0.2	0.0656	ppbV	70-130			25	25			
1,2-Dichloro-1,1,2,2-tetrafluoroethane	76-14-2	0.2	0.0591	ppbV	70-130			25	25			
Hexachlorobutadiene	87-68-3	0.2	0.0529	ppbV	70-130			25	25			
iso-Propyl Alcohol	67-63-0	0.5	0.478	ppbV	40-160			25	25			
Methylene chloride	75-09-2	0.5	0.134	ppbV	70-130			25	25			
4-Methyl-2-pentanone	108-10-1	0.5	0.0421	ppbV	70-130			25	25			
Methyl tert butyl ether	1634-04-4	0.2	0.0525	ppbV	70-130			25	25			
Methyl Methacrylate	80-62-6	0.5	0.0697	ppbV	40-160			25	25			
p/m-Xylene	179601-23-1	0.4	0.091	ppbV	70-130			25	25			
o-Xylene	95-47-6	0.2	0.0453	ppbV	70-130			25	25			
Xylene (Total)	1330-20-7	0.2	0.0453	ppbV				25	25			
Heptane	142-82-5	0.2	0.047	ppbV	70-130			25	25			
n-Heptane	142-82-5	0.2	0.047	ppbV	70-130			25	25			
n-Hexane	110-54-3	0.2	0.0364	ppbV	70-130			25	25			
Propylene	115-07-1	0.5	0.0599	ppbV	70-130			25	25			
Styrene	100-42-5	0.2	0.0434	ppbV	70-130			25	25			
Tetrachloroethene	127-18-4	0.2	0.0655	ppbV	70-130			25	25			
Thiophene	110-02-1	0.2	0.0389	ppbV	70-130			25	25			
Tetrahydrofuran	109-99-9	0.5	0.0568	ppbV	70-130			25	25			
Toluene	108-88-3	0.2	0.052	ppbV	70-130			25	25			
trans-1,2-Dichloroethene	156-60-5	0.2	0.0643	ppbV	70-130			25	25			
1,2-Dichloroethene (total)	540-59-0	0.2	0.0643	ppbV				25	25			
trans-1,3-Dichloropropene	10061-02-6	0.2	0.0436	ppbV	70-130			25	25			
1,3-Dichloropropene, Total	542-75-6	0.2	0.0409	ppbV				25	25			
Trichloroethene	79-01-6	0.2	0.0505	ppbV	70-130			25	25			
Trichlorofluoromethane	75-69-4	0.2	0.0686	ppbV	70-130			25	25			
Vinyl acetate	108-05-4	1	0.0479	ppbV	70-130			25	25			
Vinyl bromide	593-60-2	0.2	0.0717	ppbV	70-130			25	25			
Vinyl chloride	75-01-4	0.2	0.0627	ppbV	70-130			25	25			
Naphthalene	91-20-3	0.2	0.0885	ppbV	70-130			25	25			
Total HC As Hexane	NONE	10	0.0364	ppbV	70-130			25	25			
Total VOCs As Toluene	NONE	10	0.052	ppbV	70-130			25	25			
Propane	74-98-6	0.5	0.132	ppbV	70-130			25	25			
Acrylonitrile	107-13-1	0.5	0.0555	ppbV	70-130			25	25			
Acrolein	107-02-8	0.5	0.0596	ppbV	70-130			25	25			
1,1,1,2-Tetrachloroethane	630-20-6	0.2	0.0561	ppbV	70-130			25	25			
Isopropylbenzene	98-82-8	0.2	0.0491	ppbV	70-130			25	25			

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)

Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Date Created:	01/29/20
Created By:	Ben Rao
File:	PM7987-1
Page:	3

Langan Engineering & Environmental

Volatile Organics in Air: TO-15 (SOIL_VAPOR)

Holding Time: 30 days
Container/Sample Preservation: 1 - Canister - 2.7 Liter

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
1,2,3-Trichloropropane	96-18-4	0.2	0.061	ppbV	70-130			25	25			
Acetonitrile	75-05-8	0.2	0.082	ppbV	70-130			25	25			
Bromobenzene	108-86-1	0.2	0.0613	ppbV	70-130			25	25			
Chlorodifluoromethane	75-45-6	0.2	0.0584	ppbV	70-130			25	25			
Dichlorofluoromethane	75-43-4	0.2	0.0807	ppbV	70-130			25	25			
Dibromomethane	74-95-3	0.2	0.0563	ppbV	70-130			25	25			
Pentane	109-66-0	0.2	0.0659	ppbV	70-130			25	25			
Octane	111-65-9	0.2	0.0445	ppbV	70-130			25	25			
Tertiary-Amyl Methyl Ether	994-05-8	0.2	0.0476	ppbV	70-130			25	25			
o-Chlorotoluene	95-49-8	0.2	0.0486	ppbV	70-130			25	25			
p-Chlorotoluene	106-43-4	0.2	0.056	ppbV	70-130			25	25			
2,2-Dichloropropane	594-20-7	0.2	0.0458	ppbV	70-130			25	25			
1,1-Dichloropropene	563-58-6	0.2	0.0457	ppbV	70-130			25	25			
Isopropyl Ether	108-20-3	0.2	0.0621	ppbV	70-130			25	25			
Ethyl-Tert-Butyl-Ether	637-92-3	0.2	0.0422	ppbV	70-130			25	25			
1,2,3-Trichlorobenzene	87-61-6	0.2	0.0715	ppbV	70-130			25	25			
Ethyl ether	60-29-7	0.2	0.0737	ppbV	70-130			25	25			
n-Butylbenzene	104-51-8	0.2	0.044	ppbV	70-130			25	25			
sec-Butylbenzene	135-98-8	0.2	0.0429	ppbV	70-130			25	25			
tert-Butylbenzene	98-06-6	0.2	0.042	ppbV	70-130			25	25			
1,2-Dibromo-3-chloropropane	96-12-8	0.2	0.0495	ppbV	70-130			25	25			
p-Isopropyltoluene	99-87-6	0.2	0.052	ppbV	70-130			25	25			
n-Propylbenzene	103-65-1	0.2	0.0419	ppbV	70-130			25	25			
1,3-Dichloropropane	142-28-9	0.2	0.106	ppbV	70-130			25	25			
Methanol	67-56-1	5	1.84	ppbV	70-130			25	25			
Acetaldehyde	75-07-0	2.5	0.444	ppbV	70-130			25	25			
Butane	106-97-8	0.2	0.0646	ppbV	70-130			25	25			
Nonane (C9)	111-84-2	0.2	0.0463	ppbV	70-130			25	25			
Decane (C10)	124-18-5	0.2	0.0404	ppbV	70-130			25	25			
Undecane	1120-21-4	0.2	0.0427	ppbV	70-130			25	25			
Indane	496-11-7	0.2	0.0507	ppbV	70-130			25	25			
Indene	95-13-6	0.2	0.0433	ppbV	70-130			25	25			
1-Methylnaphthalene	90-12-0	1	0.466	ppbV	70-130			25	25			
Dodecane (C12)	112-40-3	0.2	0.0658	ppbV	70-130			25	25			
Butyl Acetate	123-86-4	0.5	0.126	ppbV	70-130			25	25			
tert-Butyl Alcohol	75-65-0	0.5	0.0466	ppbV	70-130			25	25			
2-Methylnaphthalene	91-57-6	1	0.393	ppbV	70-130			25	25			
1,2-Dichloroethane-d4	*17060-07-0*									*70-130*		
Toluene-d8	*2037-26-5*									*70-130*		
Bromofluorobenzene	*460-00-4*									*70-130*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Table 6. Pooled MDL_s and ML values from the Single-laboratory Validation Study, by Matrix[1]

Compound	Aqueous (ng/L)		Solid (ng/g)		Tissue (ng/g)	
	MDL_s	ML[2]	MDL_s	ML	MDL_s	ML
PFBA	0.330	6.4	0.401	0.8	0.593	2.0
PFPeA	0.196	3.2	0.021	0.4	0.083	1.0
PFHxA	0.318	1.6	0.020	0.2	0.096	0.5
PFHpA	0.221	1.6	0.029	0.2	0.088	0.5
PFOA	0.302	1.6	0.037	0.2	0.086	0.5
PFNA	0.221	1.6	0.086	0.2	0.160	0.5
PFDA	0.333	1.6	0.031	0.2	0.124	0.5
PFUnA	0.264	1.6	0.033	0.2	0.152	0.5
PFDoA	0.379	1.6	0.059	0.2	0.130	0.5
PFTrDA	0.238	1.6	0.038	0.2	0.086	0.5
PFTeDA	0.264	1.6	0.032	0.2	0.185	0.5
PFBS	0.245	1.6	0.014	0.2	0.070	0.5
PFPeS	0.204	1.6	0.015	0.2	0.032	0.5
PFHxS[1]	0.217	1.6	0.018	0.2	0.083	0.5
PFHpS	0.137	1.6	0.057	0.2	0.043	0.5
PFOS[1]	0.327	1.6	0.067	0.2	0.294	0.5
PFNS	0.303	1.6	0.046	0.2	0.114	0.5
PFDS	0.334	1.6	0.040	0.2	0.101	0.5
PFDoS	0.179	1.6	0.038	0.2	0.177	0.5
4:2FTS	2.281	6.4	0.282	0.8	0.740	2.0
6:2FTS	3.973	6.4	0.116	0.8	1.149	2.0
8:2FTS	1.566	6.4	0.225	0.8	0.373	2.0
PFOSA	0.227	1.6	0.068	0.2	0.094	0.5
NMeFOSA	0.196	1.6	0.049	0.2	0.161	0.5
NEtFOSA	0.585	1.6	0.038	0.2	0.169	0.5
NMeFOSAA[1]	0.586	1.6	0.030	0.2	0.093	0.5
NEtFOSAA[1]	0.324	1.6	0.044	0.2	0.138	0.5
NMeFOSE	1.191	16	0.203	2.0	9.978	5.0
NEtFOSE	1.022	16	0.247	2.0	1.501	5.0
HFPO-DA	0.406	6.4	0.136	0.8	0.161	2.0
ADONA	0.779	6.4	0.057	0.8	0.082	2.0
PFEESA	0.137	3.2	0.018	0.4	0.045	1.0
PFMPA	0.177	3.2	0.033	0.4	0.070	1.0
PFMBA	0.117	3.2	0.029	0.4	0.069	1.0
NFDHA	1.384	3.2	0.084	0.4	0.294	1.0
9CL-PF3ONS	0.871	6.4	0.038	0.8	0.152	2.0
11CL-PF3OUDS	0.819	6.4	0.071	0.8	0.312	2.0
3:3FTCA	0.721	8.0	0.060	1.0	0.247	2.5
5:3FTCA	5.066	40	0.363	5.0	1.537	12.5
7:3FTCA	5.942	40	0.308	5.0	0.845	12.5

[1] A standard containing a mixture of branched and linear isomer of suitable quality to be used for quantitation is currently available and required to be used for all calibration, calibration verifications, and QC samples. If more become commercially available for other target analytes, they must be utilized in the same manner.

[2] The ML values in this table were derived from the concentrations of the lowest calibration standard in Table 4, based on the alternative described in the Glossary, using the nominal sample volume (aqueous) or weight (all other matrices) described in the method.

Data for this table are derived from the single-laboratory validation study, and are only provided as examples for this draft method. The data will be updated with the pooled MDLs from the interlaboratory study results in a subsequent revision.

ATTACHMENT C

Analytical Methods / Quality Assurance Summary Table

LANGAN

ATTACHMENT C
ANALYTICAL METHODS/QUALITY ASSURANCE SUMMARY TABLE

Matrix Type	Field Parameters	Laboratory Parameters	Analytical Methods	Sample Preservation	Sample Container Volume and Type	Sample Hold Time	Number of Samples to be Collected	Field Duplicate Samples	Equipment Blank Samples	Trip Blank Samples	Ambient Air Samples	MS/MSD Samples
Soil	Total VOCs via PID	Part 375 + TCL VOCs / CP-51 VOCs	EPA 8260C	Cool to 4°C	Two 40-ml VOC vials with 5ml H_2O, one with MeOH or 3 Encore Samplers (separate container for % solids)	14 days, freeze at lab within 48 hours	12	1 per 20 samples (minimum 1)	1 per 20 samples, if needed (minimum 1, if needed)	1 per shipment of VOC samples	NA	1 per 20 samples (minimum 1)
		Part 375 + TCL SVOCs / CP-51 SVOCs	EPA 8270D	Cool to 4°C	4 oz. jar*	14 days extract, 40 days after extraction to analysis						
		1,4-Dioxane	EPA 8270D	Cool to 4°C	8 oz. jar	14 days extract, 40 days after extraction to analysis						
		Part 375 + TAL Metals	EPA 6010C, EPA 7470, EPA 7196A, EPA 9014/9010C	Cool to 4°C	2 oz. jar*	6 months, except Mercury 28 days						
		Hexavalent Chromium	EPA 7196A	Cool to 4°C	2 oz. jar*	28 days						
		Perfluoroalkyl Substances (PFAs)	EPA 1633	Cool to 4°C	8 oz HDPE bottle	90 days						
		Part 375 + TCL Herbicides	EPA 8151A	Cool to 4°C	4 oz. jar*	14 days extract, 40 days after extraction to analysis						
		Part 375 + TCL Pesticides	EPA 8081B	Cool to 4°C	4 oz. jar*	14 days extract, 40 days after extraction to analysis						
		Part 375 + TCL PCBs	EPA 8082A	Cool to 4°C	4 oz. jar*	14 days extract, 40 days after extraction to analysis						
Groundwater	Headspace VOCs via PID, synoptic groundwater level measurement, Temperature, Turbidity, pH, ORP, Conductivity	Part 375 + TCL VOCs	EPA 8260C	Cool to 4°C; HCl to pH <2;no headspace	Three 40-mL VOC vials with Teflon®-lined cap	14 days	0	1 per 20 samples (minimum 1)	1 per 20 samples, if needed (minimum 1, if needed)	1 per shipment of VOC samples	NA	1 per 20 samples (minimum 1)
		Part 375 + TCL SVOCs / CP-51 SVOCs	EPA 8270D	Cool to 4°C	Two 1-Liter Amber Glass	7 days to extract, 40 days after extraction to analysis						
		1,4-Dioxane	EPA 8270D SIM	Cool to 4°C	1-L Amber Glass	7 days to extract, 40 days after extraction to analysis						
		Part 375 + TAL Metals	EPA 6010C, EPA 7470, EPA 7196A, EPA 9014/9010C	Cool to 4°C	Two 1-Liter Amber Glass	6 months, except Mercury 28 days						
		Hexavalent Chromium	EPA 7196A	Cool to 4°C	250 mL Plastic	24 hours						
		Perfluoroalkyl Substances (PFAs)	EPA 1633	Cool to 4°C	Three 500mL HDPE containers	28 days						
		Part 375 + TCL Herbicides	EPA 8151A	Cool to 4°C	Two 1-Liter Amber Glass	7 days to extraction, 40 days after extraction to analysis						
		Part 375 + TCL Pesticides	EPA 8081B	Cool to 4°C	Two 1-Liter Amber Glass	7 days extract, 40 days after extraction to analysis						
		Part 375 + TCL PCBs	EPA 8082A	Cool to 4°C	Two 1-Liter Amber Glass	7 days extract, 40 days after extraction to analysis						
Soil Vapor	Total VOCs via PID	Part 375 + TCL VOCs	EPA TO-15	NA	6L Summa Cannister	30 days	0	1 per 20 samples (minimum 1)	NA	NA	1 per day	NA

Notes:
*can be combined in one or more 8 oz. jars
mL = milliliter
VOC = Volatile organic compound
SVOC = Semi-volatile organic compound
PCB = Polychlorinated biphenyls
TAL = Total Analyte List
TCL = Target Criteria List
PID = Photoionization detector
Part 375 = New York State Department of Environmental Conservation (NYSDEC) Title 6 New York City Rules and Regulation (NYCRR) Part 375 List.
ORP = Oxidation reduction potential
EPA = U.S. Environmental Protection Agency
NA = Not applicable
°C = degree Celsius

The PFAS compounds to be analyzed includes the expanded PFAS Analyte 40-list under the EPA's Draft Method 1633 that went into effect 1 November 2022.

ATTACHMENT D

Sample Nomenclature

Recommendations for Sample Nomenclature

The recommendations for sample nomenclature outlined below provide for consistency between sample events and projects but, most importantly, establish unique sample IDs that will avoid confusion months or years after the sample has been collected. Furthermore, unique sample IDs are required for any data submitted to the NYSDEC in EDD format or being uploaded to an EQuIS database.

Soil and Sediment Samples

SBxx_y-y

Sample Location + Number (two digits minimum)

Sampling Interval (y-y)

Sample Type	Sample Location	Sample Depth (feet bgs)	Sample Name
Phase II/Remedial Investigation			
Grab	SB01	2 to 4	**SB01_2-4**
	SB02	4	**SB02_4**
Waste Characterization			
Grab	WC01	2 to 4	**WC01_2-4**
	WC02	4	**WC02_4**
Composite	WC01 + WC02	0 to 10	**COMP01_0-10**
Endpoint Sampling			
Grab	EPSW01_N	5	**EPSW01_N_5**
	EPSW01_S	5	**EPSW01_S_5**
	EPSW01_E	5	**EPSW01_E_5**
	EPSW01_W	5	**EPSW01_W_5**
	EPB01	6	**EPB01_6**

- Boring ID (**SB01**_0-0.5) is a sequential number (starting with 01) and should be a minimum of two digits.
- Sample Interval (SB01_**0-0.5**) is separated from the boring ID with an underscore, and the top and bottom interval with a dash. Soil and sediment sample intervals should always be in feet.

Groundwater and Surface Water Samples

MWxx_MMDDYY

Sample Location + Number (two digits minimum)

Sample Date (MMDDYY)

Sample Type	Sample Location	Sample Date	Sample Name
Groundwater Sample	MW01	02/21/2013	**MW01_022113**
Surface Water Sample	SW01	02/21/2013	**SW01_022113**

- Well ID or surface water gauge ID (**MW01**_022113) is the common well name and should be a minimum of two digits.
- Sample date (MW01_**022113**) is separated from the well ID (or gauge location) with an underscore and should be provided in MMDDYY format [the date should contain no "/" or "-"].
- If groundwater samples are collected from multiple intervals within one well, you may assign a letter designation (in lower case) to the well ID to differentiate between intervals (i.e., MW01a_022113, MW01b_022113, and MW01c_022113). The letter "a" would indicate the shallowest interval and "c" the deepest. The actual depth intervals should be documented in the project field book or field sheets and the letter designations should be used consistently between sampling events.

Vapor Investigation Samples

IAxx_MMDDYY

Sample Location + Number (two digits minimum)

Sample Date (MMDDYY)

Sample Type	Sample Location	Sample Date	Sample Name
Air Sample	IA01	02/21/2013	**IA01_022113**
Soil Vapor Sample	SV01	02/21/2013	**SV01_022113**
Vapor Extraction Well Sample	SVE01 (Inlet/Midpoint/Outlet)	02/21/2013	**SVE01_IN_022113** **SVE01_ MID_022113** **SVE01_ OUT_022113**

- Sample number (**IA01**_022113) should be separated from the sample date by an underscore. Sample numbers should be sequential in order and be a minimum of two digits. The location of each sequential sample number should be documented/ illustrated in project field books or field sheets.
- Sample date (IA01_**022113**) is separated from the sample number with an underscore and should be provided in MMDDYY format [the date should contain no "/" or "-"].

Duplicate Samples

Sample Type	Parent Sample Code	Date	Sample Name
Groundwater Duplicate Sample (DUP)	MW01_022113	02/21/2013	**DUP01_022113**

Field Blanks and Trip Blanks

Sample Type	Date	Sample Name
Equipment Blank (EB)	02/21/2013	**EB01_022113**
Field Blank (FB)	02/21/2013	**FB01_022113**
Trip Blank (TB)	02/21/2013	**TB01_022113**

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Sample Type	Sample Location	Parent Sample Name	Sample Name
Matrix Spike (MS)	SB01	SB01_2-4	**SB01_2-4_MS**
Matrix Spike Duplicate (MSD)	SB01	SB01_2-4	**SB01_2-4_MSD**

1.0 NOTES

1. Spaces should not be used in sample names.
2. Special characters should not be used in report naming with the exception of – and _.
3. Letter designations should be used consistently between sampling events.
4. According to USEPA's Contract Laboratory Program (CLP) Guidance for Field Samplers (January 2011), field duplicate samples should remain "blind" to the laboratory (i.e., they should have separate CLP Sample numbers). Assign two separate (unique) CLP sample numbers (i.e., one number to the field sample and one to the duplicate). Submit blind to the laboratory.

ATTACHMENT E

Laboratory Standard Operating Procedures for PFAS Analysis

Method 1633 Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids and Tissue Samples by LC-MS/MS

References: Method 1633 - Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids, and Tissue Samples by LC-MS/MS (2nd Draft - June 2022)

DOD QSM (US Department of Defense Quality Systems Manual for Environmental Laboratories, version 5.4, 20221)

1. Scope and Application

Matrices: Drinking water, Non-potable Water, Tissues, Biosolids and Soil Matrices

Definitions: Refer to Alpha Analytical Quality Manual.

1.1 Method 1633 is for use in the Clean Water Act (CWA) for the determination of the per- and polyfluoroalkyl substances (PFAS) in Table 1 in aqueous, solid (soil, biosolids, sediment) and tissue samples by liquid chromatography/mass spectrometry (LC-MS/MS).

1.2 The method calibrates and quantifies PFAS analytes using isotopically labeled standards. Where linear and branched isomers are present in the sample and either qualitative or quantitative standards containing branched and linear isomers are commercially available, the PFAS analyte is reported as a single analyte consisting of the sum of the linear and branched isomer concentrations

1.3 This is a liquid chromatography/tandem mass spectrometry (LC/MS/MS) method for the determination of selected perfluorinated alkyl substances (PFAS) in Non-Drinking Water, tissue soil and biosolid Matrices. Accuracy and precision data have been generated for the compounds listed in Table 1.

1.4 The data report packages present the documentation of any method modification related to the samples tested. Depending upon the nature of the modification and the extent of intended use, the laboratory may be required to demonstrate that the modifications will produce equivalent results for the matrix. Approval of all method modifications is by one or more of the following laboratory personnel before performing the modification: Area Supervisor, Department Supervisor, Laboratory Director, or Quality Assurance Officer.

1.5 This method is restricted to use by or under the supervision of analysts experienced in the operation of the LC/MS/MS and in the interpretation of LC/MS/MS data. Each analyst must demonstrate the ability to generate acceptable results with this method by performing an initial demonstration of capability.

2. Summary of Method

2.1 Environmental samples are prepared and extracted using method-specific procedures. Sample extracts are subjected to cleanup procedures designed to remove interferences. Analyses of the sample extracts are conducted by LC-MS/MS in the multiple reaction monitoring (MRM) mode. Sample concentrations are determined by isotope dilution or extracted internal standard quantification using isotopically labeled compounds added to the samples before extraction.

2.2 Aqueous samples are spiked with isotopically labeled standards, extracted using solid-phase extraction (SPE) cartridges and undergo cleanup using carbon before analysis.

2.3 Solid samples are spiked with isotopically labeled standards, extracted into basic methanol, and cleaned up by carbon and SPE cartridges before analysis

2.4 Tissue samples are spiked with isotopically labeled standards, extracted in potassium hydroxide and acetonitrile followed by basic methanol, and cleaned up by carbon and SPE cartridges before analysis.

2.5 A sample extract is injected into an LC equipped with a C18 column that is interfaced to an MS/MS). The analytes are separated and identified by comparing the acquired mass spectra and retention times to reference spectra and retention times for calibration standards acquired under identical LC/MS/MS conditions. The concentration of each analyte is determined by using the isotope dilution technique. Extracted Internal Standards (EIS) analytes are used to monitor the extraction efficiency of the method analytes.

2.6 Method Modifications from Reference

N/A

3. Reporting Limits

The reporting limit for PFAS's are listed in Table 8.

4. Interferences

4.1 PFAS standards, extracts and samples should not come in contact with any glass containers or pipettes as these analytes can potentially adsorb to glass surfaces. PFAS analyte and EIS standards commercially purchased in glass ampoules are acceptable; however, all subsequent transfers or dilutions performed by the analyst must be prepared and stored in polypropylene containers.

4.2 Method interferences may be caused by contaminants in solvents, reagents (including reagent water), sample bottles and caps, and other sample processing hardware that lead to discrete artifacts and/or elevated baselines in the chromatograms. The method analytes in this method can also be found in many common laboratory supplies and equipment, such as PTFE (polytetrafluoroethylene) products, LC solvent lines, methanol, aluminum foil, SPE sample transfer lines, etc. All items such as these must be routinely demonstrated to be free from interferences (less than 1/2 the RL for each method analyte) under the conditions of the analysis by analyzing laboratory reagent blanks as described in Section 9.1. Subtracting blank values from sample results is not permitted.

4.3 Matrix interferences may be caused by contaminants that are co-extracted from the sample. The extent of matrix interferences will vary considerably from source to source, depending upon the nature of the water. Humic and/or fulvic material can be co-extracted during SPE and high levels can cause enhancement and/or suppression in the electrospray ionization source or low recoveries on the SPE sorbent. Total organic carbon (TOC) is a good indicator of humic content of the sample.

4.4 SPE cartridges can be a source of interferences. The analysis of field and laboratory reagent blanks can provide important information regarding the presence or absence of such interferences. Brands and lots of SPE devices should be tested to ensure that contamination does not preclude analyte identification and quantitation.

5. Health and Safety

5.1 The toxicity or carcinogenicity of each reagent and standard used in this method is not fully established; however, each chemical compound should be treated as a potential health hazard. From this viewpoint, exposure to these chemicals must be reduced to the lowest possible level by whatever means available. A reference file of material safety data sheets is available to all personnel involved in the chemical analysis. Additional references to laboratory safety are available in the Chemical Hygiene Plan.

5.2 All personnel handling environmental samples known to contain or to have been in contact with municipal waste must follow safety practices for handling known disease causative agents.

5.3 PFOA has been described as “likely to be carcinogenic to humans.” Pure standard materials and stock standard solutions of these method analytes should be handled with suitable protection to skin and eyes, and care should be taken not to breathe the vapors or ingest the materials.

6. Sample Collection, Preservation, Shipping and Handling

6.1 Sample Collection for Aqueous Samples

6.1.1 Samples must be collected in two (2) 500-mL or 250-mL high density polyethylene (HDPE) container with an unlined plastic screw cap. All sample containers must have linerless HDPE or polypropylene caps.

6.1.2 The sample handler must wash their hands before sampling and wear nitrile gloves while filling and sealing the sample bottles. PFAS contamination during sampling can occur from a number of common sources, such as food packaging and certain foods and beverages. Proper hand washing and wearing nitrile gloves will aid in minimizing this type of accidental contamination of the samples.

6.1.3 Open the tap and allow the system to flush until the water temperature has stabilized (approximately 3 to 5 min). Collect samples from the flowing system.

6.1.4 Fill sample bottles. Samples do not need to be collected headspace free.

6.1.5 After collecting the sample and cap the bottle. Keep the sample sealed from time of collection until extraction.

6.1.6 Maintain all aqueous samples protected from light at 0 - 6 ºC from the time of collection until shipped to the laboratory. Samples must be shipped as soon as practical with sufficient ice to maintain the sample temperature below 6 ºC during transport and be received by the laboratory within 48 hours of collection. The laboratory must confirm that the sample temperature is 0 - 6 ºC upon receipt. Once received by the laboratory, the samples must be stored at ≤ -20 ºC until sample preparation.

6.2 Sample Collection for Soil and Sediment samples.

6.2.1 Grab samples are collected in polypropylene containers. Sample containers and contact surfaces containing PTFE shall be avoided. Samples should fill no more than ¾ full.

6.2.2 Maintain solid samples protected from light (in HDPE containers) at 0 - 6 ºC from the time of collection until receipt at the laboratory. The laboratory must confirm that the sample temperature is 0 - 6 ºC upon receipt. Once received by the laboratory, the samples must be stored at ≤ -20 ºC until sample preparation.

6.3 Sample Collection for fish and other tissue samples

6.3.1 Once received by the laboratory, the samples must be maintained protected from light at ≤ -20 ºC until prepared. Store unused samples in HDPE containers or wrapped in aluminum foil at ≤ -20 ºC.

6.3.2 The nature of the tissues of interest may vary by project. Field sampling plans and protocols should explicitly state the samples to be collected and if any processing will be conducted in the field (e.g., filleting of whole fish or removal of organs). All field procedures must involve materials and equipment that have been shown to be free of PFAS.

6.4 Sample Preservation

Not applicable.

6.5 Sample Shipping

Samples must be chilled during shipment and must not exceed 0 – 6 °C during the first 48 hours after collection. Sample temperature must be confirmed to be at or below 0 – 6 °C when the samples are received at the laboratory. Samples stored in the lab must be held at or below 6 °C until extraction but should not be frozen.

NOTE: Samples that are significantly above 0 – 6 ° C, at the time of collection, may need to be iced or refrigerated for a period of time, in order to chill them prior to shipping. This will allow them to be shipped with sufficient ice to meet the above requirements.

6.6 Sample Handling

6.6.1 Aqueous samples (including leachates) should be analyzed as soon as possible; however, samples may be held in the laboratory for up to 90 days from collection, when stored at ≤ -20 ºC and protected from the light. When stored at 0 - 6 ºC and protected from the light, aqueous samples may be held for up to 28 days, with the caveat that issues were observed with certain perfluorooctane sulfonamide ethanols and perfluorooctane sulfonamidoacetic acids after 7 days. These issues are more likely to elevate the observed concentrations of other PFAS compounds via the transformation of these precursors if they are present in the sample.

6.6.2 Solid samples (soils and sediments) and tissue samples may be held for up to 90 days, if stored by the laboratory in the dark at either 0 - 6 ºC or ≤ -20 ºC, with the caveat that samples may need to be extracted as soon as possible if NFDHA is an important analyte.

6.6.3 Biosolids samples may be held for up to 90 days, if stored by the laboratory in the dark at 0 - 6 ºC or at -20 ºC. Because microbiological activity in biosolids samples at 0 - 6 ºC may lead to production of gases which may cause the sample to be expelled from the container when it is opened, as well as producing noxious odors, EPA recommends that samples be frozen if they need to be stored for more than a few days before extraction. Store sample extracts in the dark at less than 0 - 4 ºC until analyzed. If stored in the dark at less than 0 - 4 ºC, sample extracts may be stored for up to 90 days, with the caveat that issues were observed for some ether sulfonates after 28 days. These issues may elevate the observed concentrations of the ether sulfonates in the extract over time. Samples may need to be extracted as soon as possible if NFDHA is an important analyte.

7. Equipment and Supplies

7.1 SAMPLE CONTAINERS – 500-mL or 250-mL high density polyethylene (HDPE) bottles fitted with unlined screw caps. Sample bottles must be discarded after use.

7.2 SAMPLE JARS – 8-ounce wide mouth high density polyethylene (HDPE) bottles fitted with unlined screw caps. Sample bottles must be discarded after use.

7.3 POLYPROPYLENE BOTTLES – 4-mL narrow-mouth polypropylene bottles.

7.4 CENTRIFUGE TUBES – 50-mL conical polypropylene tubes with polypropylene screw caps for storing standard solutions and for collection of the extracts.

7.5 AUTOSAMPLER VIALS – Polypropylene 0.7-mL autosampler vials with polypropylene caps.

7.5.1 NOTE: Polypropylene vials and caps are necessary to prevent contamination of the sample from PTFE coated septa. However, polypropylene caps do not reseal, so evaporation occurs after injection. Thus, multiple injections from the same vial are not possible.

7.6 POLYPROPYLENE GRADUATED CYLINDERS – Suggested sizes include 25, 50, 100 and 1000-mL cylinders.

7.7 Auto Pipets – Suggested sizes include 5, 10, 25, 50, 100, 250, 500, 1000, 5000 and 10,000-µls.

7.8 PLASTIC PIPETS – Polypropylene or polyethylene disposable pipets.

7.9 Silanized glass wool (Sigma-Aldrich, Cat # 20411 or equivalent) – store in a clean glass jar and rinsed with methanol (2 times) prior to use.

7.10 Disposable syringe filter, 25-mm, 0.2-µm Nylon membrane, PALL/Acrodisc or equivalent

7.11 Variable volume pipettes with disposable HDPE or polypropylene tips (10 µL to 5 mL) used for preparation of calibration standards and spiked samples.

7.12 ANALYTICAL BALANCE – Capable of weighing to the nearest 0.0001 g.

7.13 ANALYTICAL BALANCE – Capable of weighing to the nearest 0.1 g.

7.14 SOLID PHASE EXTRACTION (SPE) APPARATUS FOR USING CARTRIDGES

7.14.1 SPE CARTRIDGES – (Waters Oasis WAX 150 mg, Cat # 186002493 or equivalent). The SPE sorbent must have a pKa above 8 so that it remains positively charged during the extraction.

7.14.1.1 Note: SPE cartridges with different bed volume (e.g., 500 mg) may be used; however, the laboratory must demonstrate that the bed volume does not negatively affect analyte absorption and elution, by performing the initial demonstration of capability analyses described in Section.

7.14.2 VACUUM EXTRACTION MANIFOLD – A manual vacuum manifold with large volume sampler for cartridge extractions, or an automatic/robotic sample preparation system designed for use with SPE cartridges, may be used if all QC requirements discussed in Section 9 are met. Extraction and/or elution steps may not be changed or omitted to accommodate the use of an automated system. Care must be taken with automated SPE systems to ensure the PTFE commonly used in these systems does not contribute to unacceptable analyte concentrations in the MB.

7.14.3 SAMPLE DELIVERY SYSTEM – Use of a polypropylene transfer tube system, which transfers the sample directly from the sample container to the SPE cartridge, is recommended, but not mandatory. Standard extraction manifolds come equipped with PTFE transfer tube systems. These can be replaced with 1/8” O.D. x 1/16” I.D. polypropylene or polyethylene tubing cut to an appropriate length to ensure no sample contamination from the sample transfer lines. Other types of non-PTFE tubing may be used provided it meets the MB and LCS QC requirements.

7.15 EXTRACT CONCENTRATION SYSTEM – Extracts are concentrated by evaporation with nitrogen using a water bath set no higher than 55 °C.

7.16 LABORATORY OR ASPIRATOR VACUUM SYSTEM – Sufficient capacity to maintain a vacuum of approximately 10 to 15 inches of mercury for extraction cartridges.

7.17 LIQUID CHROMATOGRAPHY (LC)/TANDEM MASS SPECTROMETER (MS/MS) WITH DATA SYSTEM

7.17.1 LC SYSTEM – Instrument capable of reproducibly injecting up to 10-µL aliquots and performing binary linear gradients at a constant flow rate near the flow rate used for development of this method (0.4 mL/min). The LC must be capable of pumping the water/methanol mobile phase without the use of a degasser which pulls vacuum on the mobile phase bottle (other types of degassers are acceptable). Degassers which pull vacuum on the mobile phase bottle will volatilize the ammonium acetate mobile phase causing the analyte peaks to shift to earlier retention times over the course of the analysis batch. The usage of a column heater is optional.

7.17.2 LC/TANDEM MASS SPECTROMETER – The LC/MS/MS must be capable of negative ion electrospray ionization (ESI) near the suggested LC flow rate of 0.4 mL/min. The system must be capable of performing MS/MS to produce unique product ions for the method analytes within specified retention time segments. A minimum of 10 scans across the chromatographic peak is required to ensure adequate precision.

7.17.3 DATA SYSTEM – An interfaced data system is required to acquire, store, reduce, and output mass spectral data. The computer software should have the capability of processing stored LC/MS/MS data by recognizing an LC peak within any given retention time window. The software must allow integration of the ion abundance of any specific ion within specified time or scan number limits. The software must be able to calculate relative response factors, construct linear regressions or quadratic calibration curves, and calculate analyte concentrations.

7.17.4 INSTRUMENT COLUMNS

7.17.4.1 ANALYTICAL: C18 column, 1.7 µm, 50 x 2.1 mm (Waters Acquity UPLC® BEH or equivalent)

7.17.4.2 OPTIONAL GUARD COLUMN: (Phenomenex Kinetex® Evo C18 or equivalent)

8. Reagents and Standards

8.1 GASES, REAGENTS, AND SOLVENTS – Reagent grade or better chemicals must be used.

8.1.1 REAGENT WATER – Purified water which does not contain any measurable quantities of any method analytes or interfering compounds greater than 1/2 the RL for each method analyte of interest. Prior to daily use, at least 3 L of reagent water should be flushed from the purification system to rinse out any build-up of analytes in the system's tubing.

8.1.2 METHANOL (CH_3OH, CAS#: 67-56-1) – High purity, demonstrated to be free of analytes and interferences.

8.1.3 AMMONIUM ACETATE ($NH_4C_2H_3O_2$, CAS#: 631-61-8) – High purity, demonstrated to be free of analytes and interferences.

8.1.4 ACETIC ACID (H_3CCOOH, CAS#: 64-19-7) - High purity, demonstrated to be free of analytes and interferences.

8.1.5 1M AMMONIUM ACETATE/REAGENT WATER – High purity, demonstrated to be free of analytes and interferences.

8.1.6 2mM AMMONIUM ACETATE/METHANOL:WATER (5:95) – To prepare, mix 2 ml of 1M AMMONIUM ACETATE,1 ml ACETIC ACID and 50 ml METHANOL into I Liter of REAGENT WATER.

8.1.7 ACETONITRILE – UPLC grade or equivalent, store at room temperature

8.1.8 TOLUENE – HPLC grade or equivalent.

8.1.9 ACETONE – pesticide grade or equivalent

8.1.10 AMMONIUM ACETATE – (Caledon Ultra LC/MS grade or equivalent

8.1.11 AMMONIUM HYDROXIDE (NH_3, CAS#: 1336-21-6) – High purity, demonstrated to be free of analytes and interferences.

8.1.12 METHANOLIC AMMONIUM HYDROXIDE (0.3%) - add ammonium hydroxide (1 mL, 30%) to methanol (99 mL), store at room temperature, replace after 1 month

8.1.13 METHANOLIC AMMONIUM HYDROXIDE (1%) - add ammonium hydroxide (3.3 mL, 30%) to methanol (97 mL), store at room temperature, replace after 1 month

8.1.14 METHANOLIC AMMONIUM HYDROXIDE (2%) - add ammonium hydroxide (6.6 mL, 30%) to methanol (93.4 mL), store at room temperature, replace after 1 month

8.1.15 METHANOLIC POTASSIUM HYDROXIDE (0.05 M) – add 3.3 g of potassium hydroxide to 1 L of methanol, store at room temperature, replace after 3 months

8.1.16 METHANOL WITH 4% WATER, 1% AMMONIUM HYDROXIDE AND 0.625% ACETIC ACID - add ammonium hydroxide (3.3 mL, 30%), reagent water (1.7 mL) and acetic acid (0.625 mL) to methanol (92 mL), store at room temperature, replace after 1 month. This solution is used to prepare the instrument blank and calibration standards (Section 8.3.2).

8.1.17 FORMIC ACID – (greater than 96% purity or equivalent).

8.1.18 FORMIC ACID (aqueous, 0.1 M) - dissolve formic acid (4.6 g) in reagent water (1 L), store at room temperature, replace after 2 years

8.1.19 FORMIC ACID (aqueous, 0.3 M) - dissolve formic acid (13.8 g) in reagent water (1 L), store at room temperature, replace after 2 years

8.1.20 FORMIC ACID (aqueous, 5% v/v) - mix 5 mL formic acid with 95 mL reagent water, store at room temperature, replace after 2 years

8.1.21 FORMIC ACID (methanolic 1:1, 0.1 M formic acid/methanol) - mix equal volumes of methanol and 0.1 M formic acid, store at room temperature, replace after 2 years

8.1.22 FORMIC ACID (aqueous, 50% v/v) - mix 50 mL formic acid with 50 mL reagent water, store at room temperature, replace after 2 years

8.1.23 POTASSIUM HYDROXIDE – certified ACS or equivalent

8.1.24 CARBON - – EnviCarb® 1-M-USP or equivalent, verified by lot number before use, store at room temperature. Loose carbon allows for better adsorption of interferent organics. Note: The single-laboratory validation laboratory achieved better performance with loose carbon than carbon cartridges. Loose carbon will be used for the multi-laboratory validation to set statistically based method criteria.

8.1.25 NITROGEN – Used for the following purposes: Nitrogen aids in aerosol generation of the ESI liquid spray and is used as collision gas in some MS/MS instruments. The nitrogen used should meet or exceed instrument manufacturer's specifications. In addition, Nitrogen is used to concentrate sample extracts (Ultra High Purity or equivalent).

8.1.26 ARGON – Used as collision gas in some MS/MS instruments. Argon should meet or exceed instrument manufacturer's specifications. Nitrogen gas may be used as the collision gas provided sufficient sensitivity (product ion formation) is achieved.

8.2 REFERENCE MATRICES - Matrices in which PFAS and interfering compounds are not detected by this method. These matrices are to be used to prepare the batch QC samples.

8.2.1 Reagent water - purified water, Type I

8.2.2 Solid reference matrix Ottawa Sand or equivalent

8.2.3 Tissue Reference matrix – Cod loin or other animal tissue demonstrated to be PFAS free

8.3 STANDARD SOLUTIONS – When a compound purity is assayed to be 96% or greater, the weight can be used without correction to calculate the concentration of the stock standard. PFAS analyte and IS standards commercially purchased in glass ampoules are acceptable; however, all subsequent transfers or dilutions performed by the analyst must be prepared and stored in polypropylene containers and are stored at ≤4 °C. Standards for sample fortification generally should be prepared in the smallest volume that can be accurately measured to minimize the addition of excess organic solvent to aqueous samples.

8.3.1 Stock standards and diluted stock standards are stored at ≤4 °C. Prepare a spiking solution, containing the method analytes listed in Table 1, in methanol from prime stocks. The solution is used to prepare the calibration standards and to spike the known reference QC samples that are analyzed with every batch. Quantitative standards containing a mixture of branched and linear isomers must be used for method analytes if they are commercially available. Currently, these include PFOS, PFHxS, NEtFOSAA, and NMeFOSAA.

8.3.2 Calibration standard solutions – A series of calibration solutions containing the target analytes and the Labeled extracted internal standards (EIS) and non-extracted internal standards (NIS) is used to establish the initial calibration of the analytical instrument. Table 4 represents the concentrations of the native, EIS and NIS analytes of the calibration curve. Calibration standard solutions are made using the solution described in section 8.1.16.

8.3.3 ISOTOPE DILUTION EXTRACTED INTERNAL STANDARD (EIS) – Isotopically labelled analogs of the target analytes to be used for the quantification of target analytes. EIS stock standard solutions are purchased in glass ampoules and are stored in accordance with the manufacturer's recommendations. The EIS stock solution to be used for the fortification of samples and QC in accordance with the isotope dilution procedure. Table 2 represents the EIS concentrations and nominal sample amounts added to each field sample and QC element.

8.3.4 ISOTOPE DILUTION NON-EXTRACTED INTERNAL STANDARDS (NIS) – Isotopically labelled analogs to be added post extraction for the measurement of EIS extraction efficiency and is added to the final volume of all extractions. Table 3 represents the EIS concentrations and nominal sample amounts added to each field sample and QC element.

9. Quality Control

9.1 Method Blank

9.1.1 A Method Blank (MB) is required with each extraction batch to confirm that potential background contaminants are not interfering with the identification or quantitation of method analytes. An aliquot of reagent water that is treated exactly as a sample including exposure to all glassware, equipment, solvents, reagents and standards. Prep and analyze a MB for every 20 samples. If the MB produces a peak within the retention time window of any analyte that would prevent the determination of that analyte, determine the source of contamination, and eliminate the interference before processing samples. Background contamination must be reduced to an acceptable level before proceeding. Background from method analytes or other contaminants that interfere with the measurement of method analytes must be below the RL. If the method analytes are detected in the MB at concentrations equal to or greater than this level, then all data for the problem analyte(s) must be considered invalid for all samples in the extraction batch.

9.2 Laboratory Control Sample (LCS)

9.2.1 Low Level LCS or OPR (Ongoing Precision Recovery) sample is required with each extraction batch. A LLCS or OPR samples is a method blank spiked with known quantities of analytes. The fortified concentration of the LCS is spiked at 2X the LOQ. Default limits of 70-130% of the true value may be used for analytes until sufficient replicates have been analyzed to generate proper control limits. Calculate the percent recovery (%*R*) for each analyte using the equation:

9.2.2 An LCS or OPR (Ongoing Precision Recovery) sample is required with each extraction batch. A LCS or OPR samples is a method blank spiked with known quantities of analytes. The fortified concentration of the LCS is spiked at the midpoint of the calibration curve. Default limits of 70-130% of the true value may be used for analytes until sufficient replicates have been analyzed to generate proper control limits. Calculate the percent recovery (%*R*) for each analyte using the equation:

$$\%R = \frac{A \times 100}{B}$$

Where:

A = measured concentration in the fortified sample
B =fortification concentration.

9.1.1 Where applicable, in the absence of additional sample volume required to perform matrix specific QC, LCSD's are to be extracted and analyzed. The concentration and analyte recovery criteria for the LCSD must be the same as the batch LCS The RSD's must fall within ≤30% of the true value for medium and high-level replicates, and ≤50% for low level replicates. Calculate the relative percent difference (RPD) for duplicate MSs (MS and MSD) using the equation:

$$\text{RPD} = \frac{|\text{LCS} - \text{LCSD}|}{(\text{LCS} + \text{LCSD})\ /\ 2} \times 100$$

9.1.2 If the LCS and or LCSD results do not meet these criteria for method analytes, then all data for the problem analyte(s) must be considered invalid for all samples in the extraction batch.

9.3 Non-extracted Internal Standard Area (NIS)

Each time an initial calibration is performed, use the data from all the initial calibration standards used to meet the linearity test in Section 10.3.3.3 to calculate the mean area response for each of the NIS compounds, using the equation below.

$$\text{Mean Area}_{\text{NISi}} = \sum \text{AREA}_{\text{NISi}}\ /\ \text{n}$$

where:

AreaNISi = Area counts for the ith NIS, where i ranges from 1 to 7, for the seven NIS compounds listed in Table 1
n = The number of ICAL standards (the default value is n = 6). If a different number of standards is used for the ICAL, for example, to increase the calibration range or by dropping a point at either end of the range to meet the linearity criterion, change 6 to match the actual number of standards used)
Record the mean areas for each NIS for use in evaluating results for sample analyses. There is no acceptance criterion associated with the mean NIS area data.

9.4 Extracted Internal Standards (EIS)

9.4.1 The EIS standard is fortified into all samples, CCVs, MBs, LCSs, MSs, MSDs, FD, and FRB prior to extraction. It is also added to the CAL standards. The EIS is a means of assessing method performance from extraction to final chromatographic measurement. Calculate the recovery (%R) for the EIS using the following equation:

$$\%R = (A\ /\ B) \times 100$$

Where:
A = calculated EIS concentration for the QC or Field Sample
B = fortified concentration of the EIS.

9.4.2 Default limits of 50-150% may be used for analytes until sufficient replicates have been analyzed to generate proper control limits. A low or high percent recovery for a sample, blank, or CCV does not require discarding the analytical data but it may indicate a potential problem with future analytical data. When EIS recovery from a sample, blank, or CCV are outside control limits, check 1) calculations to locate possible errors, 2) standard solutions for degradation, 3) contamination, and 4) instrument performance. For CCVs and QC elements spiked with all target analytes, if the recovery of the corresponding target analytes meet the acceptance criteria for the EIS in question, the data can be used but all potential biases in the recovery of the EIS must be documented in the sample report. If the associated target analytes do not meet the acceptance criteria, the data must be reanalyzed.

9.5 Matrix Spike (MS/MSD)

9.5.1 Analysis of an MS is prepared one per preparation batch (if required).

9.5.2 Aliquots of field samples that have been fortified with a known concentration of target compounds, prior to sample preparation and extraction, and analyzed to measure the effect of matrix interferences. The use of MS/MSD samples is generally not required in isotope dilution methods because the labeled compounds added to every sample provide more performance data than spiking a single sample in each preparation batch. Aliquots of field samples

9.5.3 Analyte recoveries may exhibit matrix bias. For samples fortified at or above their native concentration, recoveries should range between 50-150%. If the accuracy of any analyte falls outside the designated range, and the laboratory performance for that analyte is shown to be in control in the LCS, the recovery is judged to be matrix biased. The result for that analyte in the unfortified sample is labeled suspect/matrix to inform the data user that the results are suspect due to matrix effects.

9.6 Laboratory Duplicate

9.6.1 FIELD DUPLICATE OR LABORATORY FORTIFIED SAMPLE MATRIX DUPLICATE (FD or MSD) – Within each extraction batch (not to exceed 20 Field Samples), a minimum of one FD or MSD must be analyzed. Duplicates check the precision associated with sample collection, preservation, storage, and laboratory procedures. If method analytes are not routinely observed in Field Samples, an MSD should be analyzed rather than an FD.

9.6.2 Calculate the relative percent difference (*RPD*) for duplicate measurements (*FD1* and *FD2*) using the equation:

$$\text{RPD} = \frac{|\text{FD1} - \text{FD2}|}{(\text{FD1} + \text{FD2}) / 2} \times 100$$

9.6.3 RPDs for FDs should be ≤30%. Greater variability may be observed when FDs have analyte concentrations that are within a factor of 2 of the RL. At these concentrations, FDs should have RPDs that are ≤50%. If the RPD of any analyte falls outside the designated range, and the laboratory performance for that analyte is shown to be in control in the CCV, the recovery is judged to be matrix biased. The result for that analyte in the unfortified sample is labeled suspect/matrix to inform the data user that the results are suspect due to matrix effects.

9.6.4 If an MSD is analyzed instead of a FD, calculate the relative percent difference (RPD) for duplicate MSs (MS and MSD) using the equation:

$$\text{RPD} = \frac{|\text{MS} - \text{MSD}|}{(\text{MS} + \text{MSD}) / 2} \times 100$$

9.6.5 RPDs for duplicate MSs should be ≤30% for samples fortified at or above their native concentration. Greater variability may be observed when MSs are fortified at analyte concentrations that are within a factor of 2 of the RL. MSs fortified at these concentrations should have RPDs that are ≤50% for samples fortified at or above their native concentration. If the RPD of any analyte falls outside the designated range, and the laboratory performance for that analyte is shown to be in control in the LCSD where applicable, the result is judged to be matrix biased. If no LCSD is present, the associated MS and MSD are to be re-analyzed to determine if any analytical has occurred. If the resulting RPDs are still outside control limits, the result for that analyte in the unfortified sample is labeled suspect/matrix to inform the data user that the results are suspect due to matrix effects.

9.7 Bile Salt Interference Check

9.7.1 The laboratory must analyze a TDCA standard after the initial calibration, prior to the analysis of tissue samples, to check for interferences caused by bile salts. If an interference is present, the chromatographic conditions must be modified to eliminate the interference from TDCA (e.g., changing the retention time of TDCA such that it falls outside the

9.8 Initial Calibration Verification (ICV)

9.8.1 After each ICAL, analyze a QCS sample from a source different from the source of the CAL standards. If a second vendor is not available, then a different lot of the standard should be used. The QCS should be prepared and analyzed just like a CCV. Acceptance criteria for the QCS are identical to the CCVs; the calculated amount for each analyte must be ± 30% of the expected value. If measured analyte concentrations are not of acceptable accuracy, check the entire analytical procedure to locate and correct the problem.

9.9 Instrument Sensitivity Check (ISC)

9.9.1 At the start of each 12-hour shift, analyze a standard at the LOQ. The signal-to-noise ratio of the ISC standard must be greater than or equal to 3:1. If the requirements cannot be met, the problem must be corrected before analyses can proceed

9.10 Continuing Calibration Verification (CCV)

9.10.1 CCV Standards must be analyzed at the beginning of each analysis batch, after every 10 Field Samples, and at the end of the analysis batch.

9.10.2 The recovery of native and isotopically labeled compounds for the CVs must be within 70 - 130%

9.10.3

9.11 Method-specific Quality Control Samples

9.11.1 Instrument Blank – During the analysis of a batch of samples, a solvent blank is analyzed after samples containing high level of target compounds (e.g., calibration, CV) to monitor carryover from the previous injection. The injection blank consists of the solution in

Section 8.1.16 fortified with the EIS and NIS for quantitation purposes.

9.12 Example Method Sequence

- INSTRUMENT BLANK
- INSTRUMENT SENSITIVITY CHECK
- CALIBRATION VERIFICATION STANDARD
- QUALITATIVE IDENTIFICATION STANDARDS
- TDCA STANDARD (only if analyzing tissues)
- INSTRUMENT BLANK
- METHOD BLANK
- LOW-LEVEL LCS/OPR
- OPR/LCS
- SAMPLE (10 or fewer)
- CALIBRATION VERIFICATION STANDARD
- INSTRUMENT BLANK
- SAMPLE (10 or fewer)
- CALIBRATION VERIFICATION STANDARD
- INSTRUMENT BLANK

10. Procedure

10.1 Equipment Set-up

10.1.1 This procedure may be performed manually or in an automated mode using a robotic or automatic sample preparation device. If an automated system is used to prepare samples, follow the manufacturer's operating instructions, but all extraction and elution steps must be the same as in the manual procedure. Extraction and/or elution steps may not be changed or omitted to accommodate the use of an automated system. If an automated system is used, the MBs should be rotated among the ports to ensure that all the valves and tubing meet the MB requirements.

10.1.2 Some of the PFAS's adsorb to surfaces, including polypropylene. Therefore, the aqueous sample bottles must be rinsed with the elution solvent whether extractions are performed manually or by automation. The bottle rinse is passed through the cartridge to elute the method analytes and is then collected.

10.1.3 The SPE cartridges and sample bottles described in this section are designed as single use items and should be discarded after use. They may not be refurbished for reuse in subsequent analyses.

10.1.4 All SPE apparatus, including manifolds, tubing and sample ports must be thoroughly rinsed following each use with 1% methanolic ammonium hydroxide, followed by Methanol and then DI water. Additionally, sample manifold ports and transfer tubing should be inspected regularly for signs of wear and/or discoloration. When such observations are made, the associated components should be replaced.

10.1.5 Prior to the start of any extraction, sample site information must be evaluated for any potentially high level PFAS concentrations or sample matrix irregularities that may impact the extraction process. If such samples are identified, aqueous samples may be pre-screened via direct aqueous injection prior to analysis to estimate the potential PFAS concentrations present.

10.1.6 To perform a direct aqueous injection (DAI) screen, the sample should be inverted several times to try and evenly disperse any organic matter present. A 1 ml aliquot (or less depending on the matrix) is to be taken from the parent sample, volume adjusted to 1 ml with reagent water if less than 1ml, fortified with EIS and NIS spiking solutions to match the concentrations of an extracted sample (typically 5 µl per 1 ml DAI), and then analyzed under the same analytical conditions as field samples.

10.2 Sample Preparation of Aqueous Samples

10.2.1 Samples are preserved, collected, and stored as presented in Section 6.

10.2.2 Determine sample volume. Weigh all samples to the nearest 1g. If visible sediment is present, centrifuge and decant into a new HDPE bottle and record the weight of the new container.

NOTE: Some of the PFAS's adsorb to surfaces, thus the sample volume may not be transferred to a graduated cylinder for volume measurement.

10.2.3 The MB, LCS and FRB may be prepared by measuring reagent water with a polypropylene graduated cylinder or filling an HDPE sample bottle to near the top.

10.2.4 Check that the pH is 6.5 ± 0.5. If necessary, adjust pH with 50% formic acid or ammonium hydroxide and 3% aqueous ammonium hydroxide. The extract is now ready for solid-phase extraction (SPE) and cleanup.

10.2.5 Add 20 µL of the EIS to each sample and QC, cap and invert to mix.

10.2.6 If the sample is an LCS, LCSD, MS, or MSD, add the necessary amount of analyte PDS. Cap and invert each sample to mix.

10.3 Sample Prep and Extraction Protocol for Soils, Solids and Sediments.

10.3.1 Homogenize and weigh 5 grams of sample (measured to the nearest hundredth of a gram) into a 50 ml polypropylene centrifuge tube. For laboratory control blanks and spikes, 5 grams of clean sand is used.

10.3.1.1 For Biosolids and other complex matrices, a small aliquot may be required due to co-extracted matrix interferences.

10.3.1.2 For batch QC samples using 5 g of reference solid, add 2.5 g of reagent water. The addition of reagent water to the sand provides a matrix closer in composition to real-world samples.

10.3.2 Add 20 µL of the EIS to each sample and QC.

10.3.3 If the sample is an LCS, LCSD, MS, or MSD, add the necessary amount of analyte PDS. Cap and invert each sample to mix.

10.3.4 Vortex the samples to evenly disperse the spiking solutions and allow to equilibrate for 30 minutes.

10.3.5 To all samples, add 10 ml of 0.3% methanolic ammonium hydroxide, cap, vortex for 25 seconds.

10.3.6 Following mixing, shake each sample for 30 minutes on a shaker table.

10.3.7 Centrifuge each sample at 2800RPM for 10 minutes.

10.3.8 Remove the supernatant and transfer to a clean 50 ml polypropylene centrifuge tube.

10.3.9 Repeat steps 10.3.4 to 10.3.7, with 15 ml of 0.3% methanolic ammonium hydroxide, combining the supernatants.

10.3.10 Add 5ml of 0.3% methanolic ammonium hydroxide to the sample, vortex for 25 seconds and centrifuge each sample at 2800RPM for 10 minutes.

10.3.11 Remove the supernatant and transfer to the same 50 ml polypropylene centrifuge tube containing eluates from the previous cycles.

10.3.12 Add 10 mg of carbon to the combined extract, mix by occasional hand shaking for no more than five minutes and then centrifuge at 2800 rpm for 10 minutes. Immediately decant the extract into a 50 ml polypropylene centrifuge tube.

10.3.13 Dilute to approximately 35 mL with reagent water. Samples containing more than 50% water may yield extracts that are greater than 35 mL in volume; therefore, do not add water to these. Determine the water content in the sample as follows (percent moisture is determined from the % solids):

Water Content in Sample = (Sample Weight * Percent moisture) / 100

10.3.14 Concentrate each extract at approximately 55 ºC with a gentle N2 flow to a final volume that is based on the water content of the sample (see table below). Allow extracts to concentrate for 10 minutes, then mix (by vortex if the volume is < 20. Continue concentrating and mixing every 5 minutes until the extract has been reduced to the required volume as specified in the table below. If the extract volume appears to stop dropping, the concentration must be stopped and the volume at which it was stopped recorded.

Water Content in Sample	Concentrated Final Volume
< 5 grams	15 ml
5-8 grams	15-20 ml
8-9 grams	20-22.5 ml
9-10 grams	22.5-25 ml

10.3.15 Add 40 - 50 mL of reagent water to the extract and vortex. Check that the pH is 6.5 ±0.5 and adjust as necessary with 50% formic acid or 30% ammonium hydroxide, or with 5% formic acid and 3% aqueous ammonium hydroxide. The extracts are ready for SPE and cleanup.

10.4 Sample Prep and Extraction Protocol for Tissues.

10.4.1 Homogenize and weigh 2 grams of sample (measured to the nearest hundredth of a gram) into a 50 ml polypropylene centrifuge tube. For laboratory control blanks and spikes, 2 grams of clean tissue is used.

10.4.2 Add 20 µL of the EIS PDS to each sample and QC.

10.4.3 If the sample is an LCS, LCSD, MS, or MSD, add the necessary amount of analyte PDS. Cap and invert each sample to mix.

10.4.4 Add 10 mL of 0.05M KOH in methanol to each sample. Vortex to disperse the tissue then place tubes on a mixing table to extract for at 16 hours. Centrifuge at 2800 rpm for 10 minutes and collect the supernatant in a 50-mL polypropylene centrifuge tube.

10.4.5 Add 10 mL of acetonitrile to remaining tissue in the 50-mL centrifuge tube, vortex to mix and disperse the tissue. Sonicate for 30 minutes. Centrifuge at 2800 rpm for 10 minutes and collect the supernatant, adding it to the 50-mL centrifuge tube containing the initial extract.

10.4.6 Add 5 mL of 0.05M KOH in methanol to the remaining sample in each centrifuge tube. Vortex to disperse the tissue and hand mix briefly. Centrifuge at 2800 rpm for 10 minutes and collect the supernatant, adding it to the 50-mL centrifuge tube containing the first two extracts.

10.4.7 Add 10 mg of carbon to the combined extract, mix by occasional hand shaking over a period of no more than five minutes and then centrifuge at 2800 rpm for 10 minutes. Immediately decant the extract into a 50-mL centrifuge tube.

10.4.8 Add 1 mL of reagent water to each tube and concentrate each extract at approximately 55 ºC with a gentle N2 flow to a final volume of 2.5 ml.

10.4.9 Add reagent water to each evaporation/concentrator tube to dilute the extracts to 50 mL. Check that the pH = 6.5 ± 0.5 and adjust as needed with 50% formic acid, or ammonium hydroxide or with 5% formic acid and 3% aqueous ammonium hydroxide. The extracts are ready for SPE and cleanup.

10.5 SPE Extract: All matrices

10.5.1 Pack clean silanized glass wool to half the height of the WAX SPE cartridge barrel.

10.5.2 Pre-condition the cartridges by washing them with 3 X 5 mL of 1% methanolic ammonium hydroxide, discarding the wash volumes.

10.5.3 Rinse the cartridge with 5 mL of 0.3M formic acid, allowing the cartridge to drain using gravity only, discarding the rinse volume. Do not allow the cartridge to go dry

10.5.4 Adjust the vacuum so that the approximate flow rate is ~5 mL/min and load the sample across the cartridge. Do not allow the cartridge to go dry before all the sample has passed through.

10.5.5 Once all the sample has passed across the cartridge, rinse the walls of the reservoir with 2 X 5 mL reagent water, loading the rinse across the cartridge.

10.5.6 Rinse the walls of the reservoir with 5 mL of 1:1 0.1M formic acid/methanol and pass the rinse through the cartridge using vacuum. Dry the cartridge by pulling air through for 15 seconds.

10.5.7 Rinse the inside of the sample bottle with 5 mL of 1% methanolic ammonium hydroxide. Use vacuum to pull the elution solvent through the cartridge and into the collection tubes. When the cartridge bed and glass wool are submerged, stop the cartridge flow by closing the valve, keeping the sorbent bed and wool submerged.

10.5.8 Let the wetted sorbent bed and wool soak for 1 minute.

10.5.9 Open the cartridge valve and collect the eluate into a 15 ml polypropylene collection tube.

10.5.10 Add 25 µL of concentrated acetic acid to each sample eluted in the collection tubes and vortex to mix.

10.5.11 Add 10 mg of carbon to each sample and batch QC extract, using a 10-mg scoop. Handshake occasionally for no more than 5 minutes. It is important to minimize the time the sample extract is in contact with the carbon. Immediately vortex (30 seconds) and centrifuge at 2800 rpm for 10 minutes.

10.5.12 Add NIS solution to a clean collection tube. Place a syringe filter (25-mm filter, 0.2-µm nylon membrane) on a 5-mL polypropylene syringe. Take the plunger out and carefully decant the sample supernatant into the syringe barrel. Replace the plunger and filter the entire extract into the new collection tube containing the NIS.

10.5.13 Vortex to mix and transfer a portion of the extract into a .7-mL polypropylene LC vial for LC-MS/MS analysis. Cap the collection tube containing the remaining extract and store at 4 °C

10.6 Sample Volume Determination

10.6.1 If using weight to determine volume, weigh the empty bottle to the nearest 1 g and determine the sample weight by subtraction of the empty bottle weight from the original sample weight. Assume a sample density of 1.0 g/mL. In either case, the sample volume will be used in the final calculations of the analyte concentration.

10.7 Initial Calibration - Demonstration and documentation of acceptable initial calibration is required before any samples are analyzed. After the initial calibration is successful, a CCV is required at the beginning and end of each period in which analyses are performed, and after every tenth Field Sample.

10.7.1 ESI-MS/MS TUNE

10.7.1.1 Calibrate the mass scale of the MS with the calibration compounds and procedures prescribed by the manufacturer.

10.7.1.2 Optimize the [M-H]- or [M-CO_2]- for each method analyte by infusing approximately 0.5-1.0 µg/mL of each analyte (prepared in the initial mobile phase conditions) directly into the MS at the chosen LC mobile phase flow rate (0.4 mL/min). This tune can be done on a mix of the method analytes. The MS parameters (voltages, temperatures, gas flows, etc.) are varied until optimal analyte responses are determined.

The method analytes may have different optima requiring some compromise between the optima.

The Mass spec conditions found in Table 7 show the Sciex Triple Quad 5500+ operation conditions used in this method.

10.7.1.3 Optimize the product ion for each analyte by infusing approximately 0.5-1.0 µg/mL of each analyte (prepared in the initial mobile phase conditions) directly into the MS at the chosen LC mobile phase flow rate (approximately 0.4 mL/min). This tune can be done on a mix of the method analytes. The MS/MS parameters (collision gas pressure, collision energy, etc.) are varied until optimal analyte responses are determined. Typically, the carboxylic acids have very similar MS/MS conditions, and the sulfonic acids have similar MS/MS conditions.

The conditions found on table 5 are representative of expected tune optimizations for each analyte. If conditions other the ones close to the values provided in table 5 are achieved, the process should be re-performed and/or instrument maintenance performed to resolve the problem.

10.7.2 Establish LC operating parameters that optimize resolution and peak shape. Modifying the standard or extract composition to more aqueous content to prevent poor shape is not permitted.

Table 6 represents the operation conditions of a Sciex Exion LC system when running this method.

10.7.3 Inject 2µl of a mid-level CAL standard under LC/MS conditions to obtain the retention times of each method analyte. Divide the chromatogram into retention time windows each of which contains one or more chromatographic peaks. During MS/MS analysis, fragment a small number of selected precursor ions ([M-H]-) for the analytes in each window and choose the most abundant product ion. For maximum sensitivity, small mass windows of ±0.5 daltons around the product ion mass were used for quantitation.

10.7.4 Inject a mid-level CAL standard under optimized LC/MS/MS conditions to ensure that each method analyte is observed in its MS/MS window and that there are at least 10 scans across the peak for optimum precision.

NOTE: PFHxS, PFOS, NMeFOSAA, and NEtFOSAA have multiple chromatographic peaks using the LC conditions in Table 7 due to chromatographic resolution of the linear and branched isomers of these compounds. Most PFAS's are produced by two different processes. One process gives rise to linear PFAS's only while the other process produces both linear and branched isomers. Thus, both branched and linear PFAS's can potentially be found in the environment. For the aforementioned compounds that give rise to more than one peak, all the chromatographic peaks observed in the standard must be integrated and the areas totaled. Chromatographic peaks in a sample must be integrated in the same way as the CAL standard.

10.7.5 Prepare a set of CAL standards as outlined in table 5. The lowest concentration CAL standard must be at or below the LOQ.

10.7.6 The LC/MS/MS system is calibrated using the isotope dilution technique. Target analytes are quantitated against their isotopically labeled analog (Extracted Internal Standard) where commercially available. If a labeled analog is not commercially available, the extracted internal standard with the closest retention time and /or closest chemical similarity is to be used. Use the LC/MS/MS data system software to generate a linear regression or quadratic calibration curve for each of the analytes. This curve must always be forced through zero and may be concentration weighted, if necessary. Forcing zero allows for a better estimate of the background levels of method analytes. A minimum of 5 levels are required for a linear calibration model and a minimum of 6 levels are required for a quadratic calibration model.

10.7.7 **CALIBRATION ACCEPTANCE CRITERIA** – A linear fit is acceptable if the calculated RSD or RSE for each target analyte is ≤20%. If linear or Quadratic regressions are used, coefficient of determination (r^2) values must be greater than 0.99. When quantitated using the initial calibration curve, each calibration point at or above the LOQ for each analyte must calculate to be within 70-130% of its true value. The calculate value of each EIS analyte must be within 50-150% of its true value. If these criteria cannot be met, corrective action is taken to reanalyze the CAL standards, restrict the range of calibration.

10.7.8 **Bile salts interference check -** The laboratory must analyze a TDCA standard after the initial calibration, prior to the analysis of tissue samples, to check for interferences caused by bile salts. If an interference is present, the chromatographic conditions must be modified to eliminate the interference from TDCA (e.g., changing the retention time of TDCA such that it falls outside the retention window for PFOS by at least one minute), and the initial calibration repeated.

10.8 CONTINUING CALIBRATION CHECK (CCV)

– Minimum daily calibration verification is as follows. Verify the initial calibration at the beginning and end of each group of analyses, and after every tenth sample during analyses. In this context, a “sample” is considered to be a Field Sample. MBs, CCVs, LCSs, MSs, FDs FRBs and MSDs are not counted as samples. The beginning CCV of each analysis batch must be at or below the RL in order to verify instrument sensitivity prior to any analyses. If standards have been prepared such that all low CAL points are not in the same CAL solution, it may be necessary to analyze two CAL standards to meet this requirement. Alternatively, the analyte concentrations in the analyte PDS may be customized to meet these criteria. Subsequent CCVs should alternate between a medium and Low concentration CAL standard.

10.8.1 Inject an aliquot of the appropriate concentration CAL standard and analyze with the same conditions used during the initial calibration.

10.8.2 Calculate the concentration of each analyte and EIS in the CCV. The calculated amount for each native and EIS analyte for medium level CCVs must be within ± 30% of the true. If these conditions do not exist, then all data for the problem analyte must be considered invalid, and remedial action should be taken which may require recalibration. Any Field or QC Samples that have been analyzed since the last acceptable calibration verification should be reanalyzed after adequate calibration has been restored, with the following exception. If the CCV fails because the calculated concentration is greater than 130% for a particular method analyte, and Field Sample extracts show no detection for that method analyte, non-detects may be reported without re-analysis.

10.8.3 REMEDIAL ACTION – Failure to meet CCV QC performance criteria may require remedial action. Major maintenance, such as cleaning the electrospray probe, atmospheric pressure ionization source, cleaning the mass analyzer, replacing the LC column, etc., requires recalibration and verification of sensitivity by analyzing a CCV at or below the LOQ.

10.9 EXTRACT ANALYSIS

10.9.1 The same operating conditions used for the initial calibration and summarized in Tables 6 and 7 are to be used.

10.9.2 Prior to analysis of sample extracts, the Instrument mass calibration verification must be performed using standards whose mass range brackets the masses of interest and performed in the negative ion mode. The mass calibration is verified if the calculated mass is within ± .2 daltons of the specified mass.

10.9.3 Establish an appropriate retention time window for each analyte. This should be based on measurements of actual retention time variation for each method analyte in CAL standard solutions analyzed on the LC over the course of time. A value of plus or minus three times the standard deviation of the retention time obtained for each method analyte while establishing the initial calibration can be used to calculate a suggested window size. However, the experience of the analyst should weigh heavily on the determination of the appropriate retention window size.

10.9.4 Calibrate the system by either the analysis of a calibration curve or by confirming the initial calibration is still valid by analyzing a CCV.

10.9.5 Begin analyzing Field Samples, including QC samples, at their appropriate frequency by injecting the same size aliquots under the same conditions used to analyze the CAL standards.

10.9.6 For concentrations at or above the method LOQ, the total (branched and linear isomer) quantification ion response to the total (branched and linear isomer) confirmation ion response ratio must fall within ± 50% of the ratio observed in the midpoint initial calibration standard.

10.9.7 At the conclusion of data acquisition, use the same software that was used in the calibration procedure to identify peaks of interest in predetermined retention time windows. Use the data system software to examine the ion abundances of the peaks in the chromatogram. Identify an analyte by comparison of its retention time with that of the corresponding method analyte peak in a reference standard.

10.9.8 The analyst must not extrapolate beyond the established calibration range. If an analyte peak area exceeds the range of the initial calibration curve, the sample should be re-extracted with a reduced sample volume in order to bring the out of range target analytes into the calibration range. If a smaller sample size would not be representative of the entire sample, the following options are recommended. Re-extract an additional aliquot of sufficient size to ensure that it is representative of the entire sample. Spike it with a higher concentration of internal standard. Prior to LC/MS analysis, dilute the sample so that it has a concentration of internal standard equivalent to that present in the calibration standard. Then, analyze the diluted extract.3

10.9.9 In instances where re-extraction is not an option, dilute a subsample of the sample extract with 0.1% acetic acid by a factor no greater than 10x adjust the amount of the NIS in the diluted extract, and analyze the diluted extract. If the responses for each EIS in the diluted extract meet the S/N and retention time, and the EIS recoveries from the analysis of the diluted extract are greater than 5%, then the compounds associated with those EISs may be quantified using isotope dilution. Use the EIS recoveries from the original analysis to select the dilution factor, with the objective of keeping the EIS recoveries in the dilution above that 5% lower limit. If the adjusted EIS recoveries are below 5%, the dilution is assumed invalid. If the adjusted EIS recoveries are greater than 5%, adjust the compound concentrations, detection limits, and minimum levels to account for the dilution.

11. Data Evaluation, Calculations and Reporting

11.1 Complete chromatographic resolution is not necessary for accurate and precise measurements of analyte concentrations using MS/MS. In validating this method, concentrations were calculated by measuring the product ions listed in Table 9.

11.2 Calculate analyte concentrations using the multipoint calibration established in Section 10.9. Do not use daily calibration verification data to quantitate analytes in samples. Adjust final analyte concentrations to reflect the actual sample volume determined in Section 10.8

C_{ex} = (Area of target analyte * Concentration of Labeled analog) / (area of labeled analog * CF)

C_s = (C_{ex} / sample volume in ml) * 1000

C_{ex} = The concentration of the analyte in the extract
CF = calibration factor from calibration.

11.3 Prior to reporting the data, the chromatogram should be reviewed for any incorrect peak identification or poor integration.

11.4 PFHxS, PFOS, PFOA, NMeFOSAA, and NEtFOSAA have multiple chromatographic peaks using the LC conditions in Table 7 due to the linear and branch isomers of these compounds (Sect. 10.10.4.). The areas of all the linear and branched isomer peaks observed in the CAL standards for each of these analytes must be summed and the concentrations reported as a total for each of these analytes.

11.5 Calculations must utilize all available digits of precision, but final reported concentrations should be rounded to an appropriate number of significant figures (one digit of uncertainty), typically two, and not more than three significant figures.

12. Contingencies for Handling Out-of-Control Data or Unacceptable Data

12.1 Section 9.0 outlines sample batch QC acceptance criteria. If non-compliant organic compound results are to be reported, the Organic Section Head and/or the Laboratory Director, and the Operations Manager must approve the reporting of these results. The laboratory Project Manager shall be notified and may choose to relay the non-compliance to the client, for approval, or other corrective action, such as re-sampling and re-analysis. The analyst, Data Reviewer, or Department Supervisor performing the secondary review initiates the project narrative, and the narrative must clearly document the non-compliance and provide a reason for acceptance of these results.

12.2 All results for the organic compounds of interest are reportable without qualification if extraction and analytical holding times are met, preservation requirements (including cooler temperatures) are met, all QC criteria are met, and matrix interference is not suspected during extraction or analysis of the samples. If any of the below QC parameters are not met, all associated samples must be evaluated for re-extraction and/or re-analysis.

13. Method Performance

13.1 Detection Limit Study (DL) / Limit of Detection Study (LOD) / Limit of Quantitation (LOQ)

13.1.1 The laboratory follows the procedure to determine the DL, LOD, and/or LOQ as outlined in Alpha SOP ID 1732. These studies performed by the laboratory are maintained on file for review.

13.2 Demonstration of Capability Studies

13.2.1 Refer to Alpha SOP ID 1739 for further information regarding IDC/DOC Generation.

13.2.2 The analyst must make a continuing, annual, demonstration of the ability to generate acceptable accuracy and precision with this method.

14. Pollution Prevention and Waste Management

14.1 Refer to Alpha's Chemical Hygiene Plan and Hazardous Waste Management and Disposal SOP for further pollution prevention and waste management information.

14.2 This method utilizes SPE to extract analytes from water. It requires the use of very small volumes of organic solvent and very small quantities of pure analytes, thereby minimizing the potential hazards to both the analyst and the environment as compared to the use of large volumes of organic solvents in conventional liquid-liquid extractions.

14.3 The analytical procedures described in this method generate relatively small amounts of waste since only small amounts of reagents and solvents are used. The matrices of concern are finished drinking water or source water. However, laboratory waste management practices must be conducted consistent with all applicable rules and regulations, and that laboratories protect the air, water, and land by minimizing and controlling all releases from fume hoods and bench operations. Also, compliance is required with any sewage discharge permits and regulations, particularly the hazardous waste identification rules and land disposal restrictions.

15. Referenced Documents

Chemical Hygiene Plan – ID 2124

SOP ID 1732 Detection Limit (DL), Limit of Detection (LOD) & Limit of Quantitation (LOQ) SOP

SOP ID 1739 Demonstration of Capability (DOC) Generation SOP

SOP ID 1728 Hazardous Waste Management and Disposal SOP

16. Attachments

Table 1: Names, Abbreviations, and CAS Registry Numbers for Target PFAS, Extracted Internal Standards and Non-extracted Internal Standards

Parameter	Acronym	CAS
PER- and POLYFLUOROALKYLETHER CARBOXYLIC ACIDS (PFECAs)		
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid	HFPO-DA	13252-13-6
4,8-dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6
PERFLUOROALKYLCARBOXILIC ACIDS (PFCAs)		

Perfluorobutanoic acid	PFBA	375-22-4
Perfluoropentanoic acid	PFPeA	2706-90-3
Perfluorohexanoic acid	PFHxA	307-24-4
Perfluoroheptanoic acid	PFHpA	375-85-9
Perfluorooctanoic acid	PFOA	335-67-1
Perfluorononanoic acid	PFNA	375-95-1
Perfluorodecanoic acid	PFDA	335-76-2
Perfluoroundecanoic acid	PFUnA	2058-94-8
Perfluorododecanoic acid	PFDoA	307-55-1
Perfluorotridecanoic acid	PFTrDA	72629-94-8
Perfluoorotetradecanoic acid	PFTeDA	376-06-7
PERFLUOROALKYL SULFONIC ACIDS (PFASs)		
Perfluorobutanesulfonic acid	PFBS	375-73-5
Perfluoropentanesulfonic acid	PFPeS	2706-91-4
Perfluorohexanesulfonic acid	PFHxS	355-46-4
Perfluoroheptanesulfonic acid	PFHpS	375-92-8
Perfluorooctanesulfonic acid	PFOS	1763-23-1
Perfluorononanesulfonic acid	PFNS	68259-12-1

Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluorododecanesulfonic acid	PFDoS	79780-39-5
CHLORO-PERFLUOROALKYLSULFONATE		
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUdS	763051-92-9
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid	9Cl-PF3ONS	756426-58-1
FLUOROTELOMER CARBOXYLIC ACIDS		
3-Perfluoropropyl propanoic acid	3:3FTCA	356-02-5
2H,2H,3H,3H-Perfluorooctanoic acid	5:3FTCA	914637-49-3
Perfluoroheptyl propanoic acid	7:3FTCA	812-70-4
PERFLUOROOCTANESULFONAMIDES		
Perfluorooctanesulfonamide	PFOSA	754-91-6
N-methylperfluoro-1-octanesulfonamide	NMeFOSA	31506-32-8
N-ethylperfluoro-1-octanesulfonamide	NEtFOSA	4151-50-2
PERFLUOROCTANE SULFONAMIDE ETHANOLS		
N-Methyl perfluorooctanesulfonamidoethanol	NMeFOSE	24448-09-7
N-ethyl perfluorooctanesulfonamidoethanol	NEtFOSE	1691-99-2
TELOMER SULFONIC ACIDS		

1H,1H,2H,2H-perfluorohexanesulfonic acid (4:2)	4:2FTS	757124-72-4
1H,1H,2H,2H-perfluorooctanesulfonic acid (6:2)	6:2FTS	27619-97-2
1H,1H,2H,2H-perfluorodecanesulfonic acid (8:2)	8:2FTS	39108-34-4
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS		
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6
PERFLUOROETHER AND POLYETHER CARBOXYLIC ACIDS		
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6

Table 2: Stock and Nominal Extracted Internal Standard Concentrations

Isotope Labeled Standard	Conc. of EIS Stock (ng/mL)	Nominal amount of EIS added to extracts (ng)
M4PFBA	2000	40
M5PFPeA	1000	20
M5PFHxA	500	10
M4PFHpA	500	10
M8PFOA	500	10
M9PFNA	250	5
M6PFDA	250	5
M7PFUdA	250	5
MPFDoA	250	5
M2PFTeDA	250	5
M3PFBS	466	9.32
M3PFHxS	474	9.48
M8PFOS	479	9.58
M2-4:2FTS	938	18.8

Isotope Labeled Standard	Conc. of EIS Stock (ng/mL)	Nominal amount of EIS added to extracts (ng)
M2-6:2FTS	951	19
M2-8:2FTS	960	19.2
M8FOSA	500	10
d3-N-MeFOSA	500	10
d5-N-EtFOSA	500	10
d3-N-MeFOSAA	1000	20
d5-N-EtFOSAA	1000	20
d7-N-MeFOSE	5000	100
d9-N-EtFOSE	5000	100
M3HFPO-DA	2000	40

Table 3: Stock and Nominal Non-Extracted Internal Standard Concentrations

Isotope Labeled Standard	Conc. of EIS Stock (ng/mL)	Nominal amount of EIS added to extracts (ng)
M3PFBA	1000	40
M2PFHxA	500	10
M4PFOA	500	10
M5PFNA	250	5
M2PFDA	250	5
18O2PFHxS	474	9.48
M4PFOS	479	9.58

Table 4: Initial Calibration levels and Concentrations

Analyte	Cal A	Cal B (LOQ)	CAL C	Cal D	Cal E (CCV)	Cal F	Cal G	Cal H	Cal I
PFBA	.4	.8	2	5	10	20	50	250	500
PFPeA	.2	.4	1	2.5	5	10	25	125	250
PFHxA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFHpA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFOA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFNA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFDA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFUnA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFDoA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFTrDA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFTA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
PFBS	0.089	0.177	0.444	1.11	2.22	4.44	11.1	55.4	111
PFPeS	0.094	0.188	0.471	1.18	2.35	4.71	11.8	58.8	118

PFHxS	0.091	0.183	0.457	1.14	2.29	4.57	11.4	57.1	114
PFHpS	0.095	0.191	0.477	1.19	2.38	4.77	11.9	59.6	119
PFOS	0.093	0.186	0.464	1.16	2.32	4.64	11.6	58	116
PFNS	0.096	0.192	0.481	1.20	2.41	4.81	12	60.1	120
PFDS	0.097	0.193	0.483	1.21	2.41	4.83	12.1	60.3	121
PFDOS	0.097	0.194	0.485	1.21	2.43	4.85	12.1	60.6	121.
4:2FTS	0.375	0.75	1.88	4.69	9.38	18.8	46.9	234	469
6:2FTS	0.38	0.76	1.9	4.75	9.5	19	47.5	238	475
8:2FTS	0.384	0.768	1.92	4.8	9.6	19.2	48	240	480
PFOSA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
NMeFOSA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
NEtFOSA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
NMeFOSAA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
NEtFOSAA	.1	.2	.5	1.25	2.5	5	12.5	62.5	125
NMeFOSE	1	2	5	12.5	25	50	125	625	1250
NEtFOSE	1	2	5	12.5	25	50	125	625	1250
HFPO-DA	.4	.8	2	5	10	20	50	250	500
ADONA	0.378	0.756	1.89	4.73	9.45	18.9	47.3	236	473
9Cl-PFONS	0.374	0.748	1.87	4.68	9.35	18.7	46.8	234	468
11Cl-PFOUdS	0.378	0.756	1.89	4.73	9.45	18.9	47.3	236	473
PFMPA	.2	.4	1	2.5	5	10	25	125	250
PFMBA	.2	.4	1	2.5	5	10	25	125	250
PFEESA	0.178	0.356	0.89	2.23	4.45	8.9	22.3	111	223
NFDHA	.2	.4	1	2.5	5	10	25	125	250
3:3FTCA	.5	1	2.5	6.25	12.5	25	62.5	312	624
5:3FTCA	2.5	5	12.5	31.3	62.5	125	312	1560	3120
7:3FTCA	2.5	5	12.5	31.3	62.5	125	312	1560	3125
M4PFBA	10	10	10	10	10	10	10	10	10
M5PFPeA	5	5	5	5	5	5	5	5	5
M5PFHxA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
M4PFHpA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
M8PFOA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
M9PFNA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
M6PFDA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
M7PFUdA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
MPFDoA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25

M2PFTeDA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
M3PFBS	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33
M3PFHxS	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37
M8PFOS	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
M2-4:2FTS	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69
M2-6:2FTS	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76
M2-8:2FTS	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
M8FOSA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
d3-N-MeFOSA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
d5-N-EtFOSA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
d3-N-MeFOSAA	5	5	5	5	5	5	5	5	5
d5-N-EtFOSAA	5	5	5	5	5	5	5	5	5
d7-N-MeFOSE	25	25	25	25	25	25	25	25	25
d9-N-EtFOSE	25	25	25	25	25	25	25	25	25
M3HFPO-DA	10	10	10	10	10	10	10	10	10
M3PFBA	5	5	5	5	5	5	5	5	5
M2PFHxA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
M4PFOA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
M5PFNA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
M2PFDA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
18O2PFHxS	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37
M4PFOS	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4

Table 5: Expected Mass Transitions and instrument conditions.

Q1	Q2	Analyte	DP Volts	CE Volts
213.032	169.022	PFBA	-50	-14
263.039	219.03	PFPeA	-55	-12
263.039	68.9	PFPeA_2	-55	-55
313.047	269.037	PFHxA	-45	-12
313.047	119	PFHxA_2	-45	-28
363.055	319.045	PFHpA	-60	-12
363.055	169.022	PFHpA_2	-60	-24
413.063	369.053	PFOA	-65	-14
413.063	169.022	PFOA_2	-65	-23
463.071	419.061	PFNA	-70	-14
463.071	219.03	PFNA_2	-70	-24

513.078	469.069	PFDA	-80	-16
513.078	219.03	PFDA_2	-80	-30
563.086	519.076	PFUnA	-85	-18
563.086	269.037	PFUnA_2	-85	-25
613.094	569.084	PFDoA	-85	-18
613.094	319.045	PFDoA_2	-85	-28
663.102	619.092	PFTrDA	-85	-20
663.102	169.022	PFTrDA_2	-85	-36
713.11	669.1	PFTA	-70	-22
713.11	169.022	PFTA_2	-70	-38
299.092	80.062	PFBS	-100	-65
299.092	99.061	PFBS_2	-100	-40
349.1	80.062	PFPeS	-100	-75
349.1	99.061	PFPeS_2	-100	-60
399.107	80.062	PFHxS	-120	-75
399.107	99.061	PFHxS_2	-120	-80
449.115	80.062	PFHpS	-140	-95
449.115	99.061	PFHpS_2	-140	-80
499.113	80.062	PFOS	-145	-108
499.113	99.061	PFOS_2	-145	-85
549.131	80.062	PFNS	-180	-100
549.131	99.061	PFNS_2	-180	-100
599.139	80.062	PFDS	-170	-110
599.138	99.061	PFDS_2	-170	-100
699.154	80.062	PFDoS	-160	-150
699.154	99.061	PFDoS_2	-160	-130
327.146	307.139	4:2FTS	-100	-28
327.146	81.07	4:2FTS_2	-100	-50
427.161	407.155	6:2FTS	-120	-33
427.161	81.07	6:2FTS_2	-120	-65
527.177	507.17	8:2FTS	-140	-39
527.177	81.07	8:2FTS_2	-140	-85
498.146	78.07	FOSA	-150	-90
498.146	478	FOSA_2	-150	-35
512.163	219.03	NMeFOSA	-130	-35
512.163	169.022	NMeFOSA_2	-130	-40
526.192	219.03	NEtFOSA	-140	-35
526.192	169.022	NEtFOSA_2	-140	-35
570.202	419.061	NMeFOSAA	-100	-28

570.202	483	NMeFOSAA_2	-100	-22
584.229	419.061	NEtFOSAA	-100	-28
584.229	526.192	NEtFOSAA_2	-100	-38
616.1	58.9	NMeFOSE	-90	-70
630	58.9	NEtFOSE	-80	-75
285.035	169.022	HFPO-DA	-60	-12
285.035	184.9	HFPO-DA_2	-60	-18
377.06	251.028	ADONA	-65	-18
377.06	84.8	ADONA_2	-65	-48
530.8	351.05	9Cl-PFONS	-130	-38
532.8	353	9Cl-PFONS_2	-130	-38
630.9	451.031	11Cl-PFOUdS	-145	-41
632.9	452.9	11Cl-PFOUdS_2	-145	-41
241.085	177.069	3:3FTCA	-60	-12
241.085	117	3:3FTCA_2	-60	-50
341.101	237.072	5:3FTCA	-70	-20
341.101	217	5:3FTCA_2	-70	-35
441.117	316.9	7:3FTCA	-85	-30
441.117	337.088	7:3FTCA_2	-85	-20
315.093	135.013	PFEESA	-100	-35
315.093	82.9	PFEESA_2	-100	-25
229.032	85.006	PFMPA	-40	-25
279.042	85.006	PFMBA	-45	-25
295.032	201	NFDHA	-30	-15
295.032	84.9	NFDHA_2	-30	-40
217.001	171.999	MPFBA	-50	-14
268.001	222.999	M5PFPeA	-55	-12
318.009	273.007	M5PFHxA	-45	-12
367.024	322.022	M4PFHpA	-60	-12
421.002	376	M8PFOA	-65	-14
472.002	427	M9PFNA	-70	-14
519.033	474.03	M6PFDA	-80	-16
570.033	525.031	M7-PFUdA	-85	-18
615.079	570.033	MPFDoA	-85	-18
715.094	670.092	M2PFTeDA	-70	-22
302.069	80.062	M3PFBS	-100	-65
402.084	80.062	M3PFHxS	-120	-74
507.062	80.062	M8PFOS	-145	-85
329.13	81.07	M2-4:2FTS	-100	-50

429.162	81.07	M2-6:2FTS	-120	-65
529.162	81.07	M2-8:2FTS	-140	-85
506.077	78.07	M8FOSA	-150	-90
515.183	219.03	d3-NMeFOSA	-130	-35
531.222	219.03	d5-NEtFOSA	-140	-35
573.22	419.061	d3-NMeFOSAA	-75	-28
589.259	419.061	d5-NEtFOSAA	-90	-28
623.2	58.9	d7-NMeFOSE	-100	-28
639.2	58.9	d9-NEtFOSE	-100	-28
287.02	169.022	M3HFPO-DA	-60	-12
216.009	171.999	M3PFBA	-50	-14
315.032	270.03	M2PFHxA	-45	-12
417.032	372.03	M4PFOA	-65	-14
468.032	423.03	M5PFNA	-70	-14
515.063	470.061	M2PFDA	-80	-16
403.107	84.062	18O2-PFHxS	-120	-74
503.093	80.062	M4PFOS	-145	-85

Table 6: LC Method Conditions

Time (min)	2 mM Ammonium Acetate (5:95 CH/H_2O)	100% Acetonitrile	Gradient Curve
Initial	100.0	0.0	0
.2	100.0	0.0	2
4	70	30	7
7	45	55	8
9	25	80	8
10	5	95	6
10.4	98	2	10
11.8	100	0	7
12	100	0	1
Waters Aquity UPLC ® BEHC_{18} 2.1 x 50 mm packed with 1.7 µm BEH C_{18} stationary phase Flow rate of 0.4 mL/min 2 µL injection			

Table 7: ESI-MS Method Conditions

ESI Conditions	
Polarity	Negative ion
Curtain Gas	30
Collision gas	9
Ion Spray Voltage	-4500
Desolvation gas temp.	500 ºC
Ion Source Gas 1	30
Ion Source Gas 2	50
Entrance Poitential	-10
Exic Cell Potential	-11

Table 8. Reporting limits by Matrix

Compound	Aqueous (ng/L)	Solid (ng/g)	Tissue (ng/g)
PFBA	6.4	0.8	2
PFPeA	3.2	0.4	1
PFHxA	1.6	0.2	0.5
PFHpA	1.6	0.2	0.5
PFOA	1.6	0.2	0.5
PFNA	1.6	0.2	0.5
PFDA	1.6	0.2	0.5
PFUnA	1.6	0.2	0.5
PFDoA	1.6	0.2	0.5
PFTrDA	1.6	0.2	0.5
PFTA	1.6	0.2	0.5
PFBS	1.6	0.2	0.5
PFPeS	1.6	0.2	0.5
PFHxS	1.6	0.2	0.5
PFHpS	1.6	0.2	0.5
PFOS	1.6	0.2	0.5
PFNS	1.6	0.2	0.5
PFDS	1.6	0.2	0.5
PFDoS	1.6	0.2	0.5
4:2FTS	6.4	0.8	2
6:2FTS	6.4	0.8	2
8:2FTS	6.4	0.8	2
FOSA	1.6	0.2	2
NMeFOSA	1.6	0.2	0.5

NEtFOSA	1.6	0.2	0.5
NMeFOSAA	1.6	0.2	0.5
NEtFOSAA	1.6	0.2	0.5
NMeFOSE	16	2	5
NEtFOSE	16	2	5
HFPO-DA	6.4	0.8	2
ADONA	6.4	0.8	2
9Cl-PFONS	6.4	0.8	2
11Cl-PFOUdS	6.4	0.8	2
3:3FTCA	8	1	2.5
5:3FTCA	40	5	12.5
7:3FTCA	40	5	12.5
PFEESA	3.2	0.4	1
PFMPA	3.2	0.4	1
PFMBA	3.2	0.4	1
NFDHA	3.2	0.4	1

ATTACHMENT F

ELAP Certifications

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category
ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Bacteriology

Coliform, Total / E. coli (Qualitative)	SM 20, 21-23 9223B (-04) (Colilert)
E. coli (Enumeration)	SM 20, 21-23 9223B (-04) (Colilert)
Heterotrophic Plate Count	SM 20, 21-23 9215B (-04)

Fuel Additives

Methyl tert-butyl ether	EPA 524.2
Naphthalene	EPA 524.2

Microextractables

1,2,3-Trichloropropane, Low Level	EPA 504.1
1,2-Dibromo-3-chloropropane, Low Level	EPA 504.1
1,2-Dibromoethane, Low Level	EPA 504.1

Miscellaneous

Odor	SM 21-23 2150 B (-97)
Organic Carbon, Dissolved	SM 21-23 5310C (-00)
Organic Carbon, Total	SM 21-23 5310C (-00)
Perchlorate	EPA 332.0 Rev. 1
Turbidity	SM 21-23 2130 B (-01)
	EPA 180.1 Rev. 2.0

Non-Metals

Alkalinity	SM 21-23 2320B (-97)
Chloride	EPA 300.0 Rev. 2.1
Color	SM 21-23 2120B (-01)
Cyanide	SM 20, 21-23 4500-CN E
Fluoride, Total	EPA 300.0 Rev. 2.1

Non-Metals

Fluoride, Total	SM 21-23 4500-F C (-97)
Nitrate (as N)	EPA 353.2 Rev. 2.0
	EPA 300.0 Rev. 2.1
	SM 21-23 4500-NO3 F (-00)
Nitrite (as N)	EPA 353.2 Rev. 2.0
	SM 21-23 4500-NO3 F (-00)
	SM 21-23 4500-NO2 B (-00)
Orthophosphate (as P)	SM 19, 21-23 4500-P E (-99)
Solids, Total Dissolved	SM 21-23 2540C (-97)
Specific Conductance	SM 21-23 2510B (-97)
Sulfate (as SO4)	EPA 300.0 Rev. 2.1

Trihalomethanes

Bromodichloromethane	EPA 524.2
Bromoform	EPA 524.2
Chloroform	EPA 524.2
Dibromochloromethane	EPA 524.2
Total Trihalomethanes	EPA 524.2

Volatile Aromatics

1,2,3-Trichlorobenzene	EPA 524.2
1,2,4-Trichlorobenzene	EPA 524.2
1,2,4-Trimethylbenzene	EPA 524.2
1,2-Dichlorobenzene	EPA 524.2
1,3,5-Trimethylbenzene	EPA 524.2
1,3-Dichlorobenzene	EPA 524.2

Serial No.: 64580

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Volatile Aromatics

1,4-Dichlorobenzene	EPA 524.2
2-Chlorotoluene	EPA 524.2
4-Chlorotoluene	EPA 524.2
Benzene	EPA 524.2
Bromobenzene	EPA 524.2
Chlorobenzene	EPA 524.2
Ethyl benzene	EPA 524.2
Hexachlorobutadiene	EPA 524.2
Isopropylbenzene	EPA 524.2
n-Butylbenzene	EPA 524.2
n-Propylbenzene	EPA 524.2
p-Isopropyltoluene (P-Cymene)	EPA 524.2
sec-Butylbenzene	EPA 524.2
Styrene	EPA 524.2
tert-Butylbenzene	EPA 524.2
Toluene	EPA 524.2
Total Xylenes	EPA 524.2

Volatile Halocarbons

1,1,1,2-Tetrachloroethane	EPA 524.2
1,1,1-Trichloroethane	EPA 524.2
1,1,2,2-Tetrachloroethane	EPA 524.2
1,1,2-Trichloroethane	EPA 524.2
1,1-Dichloroethane	EPA 524.2
1,1-Dichloroethene	EPA 524.2

Volatile Halocarbons

1,1-Dichloropropene	EPA 524.2
1,2,3-Trichloropropane	EPA 524.2
1,2-Dichloroethane	EPA 524.2
1,2-Dichloropropane	EPA 524.2
1,3-Dichloropropane	EPA 524.2
2,2-Dichloropropane	EPA 524.2
Bromochloromethane	EPA 524.2
Bromomethane	EPA 524.2
Carbon tetrachloride	EPA 524.2
Chloroethane	EPA 524.2
Chloromethane	EPA 524.2
cis-1,2-Dichloroethene	EPA 524.2
cis-1,3-Dichloropropene	EPA 524.2
Dibromomethane	EPA 524.2
Dichlorodifluoromethane	EPA 524.2
Methylene chloride	EPA 524.2
Tetrachloroethene	EPA 524.2
trans-1,2-Dichloroethene	EPA 524.2
trans-1,3-Dichloropropene	EPA 524.2
Trichloroethene	EPA 524.2
Trichlorofluoromethane	EPA 524.2
Vinyl chloride	EPA 524.2

Sample Preparation Methods

SM 20, 21-23 4500-CN C (-99)

Serial No.: 64580

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER All approved analytes are listed below:

Acrylates

Acrolein (Propenal)	EPA 8260D
	EPA 8260C
	EPA 624.1
Acrylonitrile	EPA 8260D
	EPA 8260C
	EPA 624.1
Ethyl methacrylate	EPA 8260D
	EPA 8260C
Methyl methacrylate	EPA 8260D
	EPA 8260C

Amines

1,2-Diphenylhydrazine	EPA 625.1
	EPA 8270D
	EPA 8270E
2-Naphthylamine	EPA 8270D
	EPA 8270E
2-Nitroaniline	EPA 8270D
	EPA 8270E
3-Nitroaniline	EPA 8270D
	EPA 8270E
4-Chloroaniline	EPA 8270D
	EPA 8270E
4-Nitroaniline	EPA 8270D
	EPA 8270E

Amines

Aniline	EPA 625.1
	EPA 8270D
	EPA 8270E
Carbazole	EPA 625.1
	EPA 8270D
	EPA 8270E
Diphenylamine	EPA 8270D
	EPA 8270E
Pyridine	EPA 625.1
	EPA 8270D
	EPA 8270E

Bacteriology

Coliform, Fecal	SM 9221 E-2014
E. coli (Enumeration)	SM 9223B-2016
Heterotrophic Plate Count	SM 18-21 9215B

Benzidines

3,3'-Dichlorobenzidine	EPA 625.1
	EPA 8270D
	EPA 8270E
Benzidine	EPA 625.1
	EPA 8270D
	EPA 8270E

Serial No.: 64581

Property of the New York State Department of Health. Certificates are valid only at the address shown, must be conspicuously posted, and are printed on secure paper. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify the laboratory's accreditation status.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category
ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Chlorinated Hydrocarbon Pesticides

4,4'-DDD	EPA 8081B
	EPA 608.3
4,4'-DDE	EPA 8081B
	EPA 608.3
4,4'-DDT	EPA 8081B
	EPA 608.3
Aldrin	EPA 8081B
	EPA 608.3
alpha-BHC	EPA 8081B
	EPA 608.3
alpha-Chlordane	EPA 8081B
	EPA 608.3
beta-BHC	EPA 8081B
	EPA 608.3
Chlordane Total	EPA 8081B
	EPA 608.3
delta-BHC	EPA 8081B
	EPA 608.3
Dieldrin	EPA 8081B
	EPA 608.3
Endosulfan I	EPA 8081B
	EPA 608.3
Endosulfan II	EPA 8081B
	EPA 608.3

Chlorinated Hydrocarbon Pesticides

Endosulfan sulfate	EPA 8081B
	EPA 608.3
Endrin	EPA 8081B
	EPA 608.3
Endrin aldehyde	EPA 8081B
	EPA 608.3
Endrin Ketone	EPA 8081B
gamma-Chlordane	EPA 8081B
	EPA 608.3
Heptachlor	EPA 8081B
	EPA 608.3
Heptachlor epoxide	EPA 8081B
	EPA 608.3
Lindane	EPA 8081B
	EPA 608.3
Methoxychlor	EPA 8081B
	EPA 608.3
Mirex	EPA 608.3
PCNB	EPA 8270D
	EPA 8270E
Toxaphene	EPA 8081B
	EPA 608.3

Chlorinated Hydrocarbons

1,2,3-Trichlorobenzene	EPA 8260D

Serial No.: 64581

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category
ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Chlorinated Hydrocarbons

1,2,3-Trichlorobenzene	EPA 8260C
1,2,4,5-Tetrachlorobenzene	EPA 8270D
	EPA 8270E
1,2,4-Trichlorobenzene	EPA 625.1
	EPA 8270D
	EPA 8270E
2-Chloronaphthalene	EPA 625.1
	EPA 8270D
	EPA 8270E
Hexachlorobenzene	EPA 625.1
	EPA 8270D
	EPA 8270E
Hexachlorobutadiene	EPA 625.1
	EPA 8270D
	EPA 8270E
Hexachlorocyclopentadiene	EPA 625.1
	EPA 8270D
	EPA 8270E
Hexachloroethane	EPA 625.1
	EPA 8270D
	EPA 8270E

Chlorophenoxy Acid Pesticides

2,4,5-T	EPA 8151A
2,4,5-TP (Silvex)	EPA 8151A
2,4-D	EPA 8151A
2,4-DB	EPA 8151A
Dalapon	EPA 8151A
Dicamba	EPA 8151A
Dichloroprop	EPA 8151A
Dinoseb	EPA 8151A

Demand

Biochemical Oxygen Demand	SM 5210B-2016
Carbonaceous BOD	SM 5210B-2016
Chemical Oxygen Demand	EPA 410.4, Rev. 2.0 (1993)
	SM 5220D-2011

Fuel Oxygenates

Di-isopropyl ether	EPA 8260D
	EPA 8260C
Ethanol	EPA 8260D
	EPA 8260C
	EPA 624.1
Methyl tert-butyl ether	EPA 8260D
	EPA 8260C
	EPA 624.1
tert-amyl methyl ether (TAME)	EPA 8260D
	EPA 8260C
tert-butyl alcohol	EPA 8260D
	EPA 8260C

Serial No.: 64581

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category
ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Fuel Oxygenates

tert-butyl alcohol	EPA 624.1
tert-butyl ethyl ether (ETBE)	EPA 8260D
	EPA 8260C

Haloethers

2,2'-Oxybis(1-chloropropane)	EPA 625.1
	EPA 8270D
	EPA 8270E
4-Bromophenylphenyl ether	EPA 625.1
	EPA 8270D
	EPA 8270E
4-Chlorophenylphenyl ether	EPA 625.1
	EPA 8270D
	EPA 8270E
Bis(2-chloroethoxy)methane	EPA 625.1
	EPA 8270D
	EPA 8270E
Bis(2-chloroethyl)ether	EPA 625.1
	EPA 8270D
	EPA 8270E

Low Level Halocarbons

1,2,3-Trichloropropane, Low Level	EPA 8011
1,2-Dibromo-3-chloropropane, Low Level	EPA 8011
1,2-Dibromoethane, Low Level	EPA 8011

Low Level Polynuclear Aromatics

Acenaphthene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Acenaphthylene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Anthracene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Benzo(a)anthracene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Benzo(a)pyrene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Benzo(b)fluoranthene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Benzo(g,h,i)perylene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Benzo(k)fluoranthene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Chrysene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Dibenzo(a,h)anthracene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Fluoranthene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Fluorene Low Level	EPA 8270D SIM
	EPA 8270E SIM

Serial No.: 64581

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER All approved analytes are listed below:

Low Level Polynuclear Aromatics	
Indeno(1,2,3-cd)pyrene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Naphthalene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Phenanthrene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Pyrene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Metals I	
Iron, Total	SM 3500-Fe B-2011
Metals II	
Chromium VI	EPA 7196A
	SM 3500-Cr B-2011
Mineral	
Acidity	SM 2310B-2011
Alkalinity	SM 2320B-2011
Chloride	EPA 300.0, Rev. 2.1 (1993)
	SM 4500-Cl- E-2011
	EPA 9056A
Fluoride, Total	EPA 300.0, Rev. 2.1 (1993)
	SM 4500-F- C-2011
	EPA 9056A
Sulfate (as SO4)	EPA 300.0, Rev. 2.1 (1993)

Mineral	
Sulfate (as SO4)	SM 4500-SO4- E-2011
	EPA 9056A
Miscellaneous	
Bromide	EPA 300.0, Rev. 2.1 (1993)
Color	SM 2120B-2011
Cyanide, Total	LACHAT QuikChem 10-204-00-
	EPA 9014
	SM 4500-CN E-2016
	EPA 9012B
Formaldehyde	EPA 8315A
non-Polar Extractable Material (TPH)	EPA 1664B
Oil and Grease Total Recoverable	EPA 1664B
Organic Carbon, Total	SM 5310C-2011
	EPA 9060A
Perchlorate	EPA 6860
Phenols	EPA 420.1 (Rev. 1978)
	EPA 9065
Specific Conductance	EPA 120.1 (Rev. 1982)
	SM 2510B-2011
	EPA 9050A
Sulfide (as S)	SM 4500-S2- D-2011
Surfactant (MBAS)	SM 5540C-2011
Turbidity	SM 2130 B-2011
	EPA 180.1, Rev. 2.0 (1993)

Serial No.: 64581

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category
ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Nitroaromatics and Isophorone	
1,3-Dinitrobenzene	EPA 8270D
	EPA 8270E
2,4-Dinitrotoluene	EPA 625.1
	EPA 8270D
	EPA 8270E
2,6-Dinitrotoluene	EPA 625.1
	EPA 8270D
	EPA 8270E
Isophorone	EPA 625.1
	EPA 8270D
	EPA 8270E
Nitrobenzene	EPA 625.1
	EPA 8270D
	EPA 8270E
Nitrosoamines	
N-Nitrosodimethylamine	EPA 625.1
	EPA 8270D
	EPA 8270E
N-Nitrosodi-n-propylamine	EPA 625.1
	EPA 8270D
	EPA 8270E
N-Nitrosodiphenylamine	EPA 625.1
	EPA 8270D
	EPA 8270E

Nutrient	
Ammonia (as N)	SM 4500-NH3 H-2011
	EPA 350.1, Rev. 2.0 (1993)
Kjeldahl Nitrogen, Total	EPA 351.1 (Rev. 1978)
	SM 4500-NH3 H-2011
Nitrate (as N)	EPA 353.2, Rev. 2.0 (1993)
	EPA 300.0, Rev. 2.1 (1993)
	SM 4500-NO3 F-2016
	EPA 9056A
Nitrate-Nitrite (as N)	EPA 353.2, Rev. 2.0 (1993)
	SM 4500-NO3 F-2016
Nitrite (as N)	EPA 353.2, Rev. 2.0 (1993)
	SM 4500-NO3 F-2016
	SM 4500-NO2 B-2011
Orthophosphate (as P)	SM 4500-P E-2011
Phosphorus, Total	SM 4500-P E-2011
Organophosphate Pesticides	
Atrazine	EPA 625.1
	EPA 8270D
	EPA 8270E
Parathion ethyl	EPA 8270D
	EPA 8270E
Thionazin	EPA 8270D
	EPA 8270E

Serial No.: 64581

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category
ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Petroleum Hydrocarbons	
Diesel Range Organics	EPA 8015D
Gasoline Range Organics	EPA 8015D
Phthalate Esters	
Benzyl butyl phthalate	EPA 625.1
	EPA 8270D
	EPA 8270E
Bis(2-ethylhexyl) phthalate	EPA 625.1
	EPA 8270D
	EPA 8270E
Diethyl phthalate	EPA 625.1
	EPA 8270D
	EPA 8270E
Dimethyl phthalate	EPA 625.1
	EPA 8270D
	EPA 8270E
Di-n-butyl phthalate	EPA 625.1
	EPA 8270D
	EPA 8270E
Di-n-octyl phthalate	EPA 625.1
	EPA 8270D
	EPA 8270E
Polychlorinated Biphenyls	
Aroclor 1016 (PCB-1016)	EPA 8082A
	EPA 608.3
Polychlorinated Biphenyls	
Aroclor 1221 (PCB-1221)	EPA 8082A
	EPA 608.3
Aroclor 1232 (PCB-1232)	EPA 8082A
	EPA 608.3
Aroclor 1242 (PCB-1242)	EPA 8082A
	EPA 608.3
Aroclor 1248 (PCB-1248)	EPA 8082A
	EPA 608.3
Aroclor 1254 (PCB-1254)	EPA 8082A
	EPA 608.3
Aroclor 1260 (PCB-1260)	EPA 8082A
	EPA 608.3
Aroclor 1262 (PCB-1262)	EPA 8082A
Aroclor 1268 (PCB-1268)	EPA 8082A
Polynuclear Aromatics	
Acenaphthene	EPA 625.1
	EPA 8270D
	EPA 8270E
Acenaphthylene	EPA 625.1
	EPA 8270D
	EPA 8270E
Anthracene	EPA 625.1
	EPA 8270D
	EPA 8270E

Serial No.: 64581

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Polynuclear Aromatics

Benzo(a)anthracene	EPA 625.1
	EPA 8270D
	EPA 8270E
Benzo(a)pyrene	EPA 625.1
	EPA 8270D
	EPA 8270E
Benzo(b)fluoranthene	EPA 625.1
	EPA 8270D
	EPA 8270E
Benzo(g,h,i)perylene	EPA 625.1
	EPA 8270D
	EPA 8270E
Benzo(k)fluoranthene	EPA 625.1
	EPA 8270D
	EPA 8270E
Chrysene	EPA 625.1
	EPA 8270D
	EPA 8270E
Dibenzo(a,h)anthracene	EPA 625.1
	EPA 8270D
	EPA 8270E
Fluoranthene	EPA 625.1
	EPA 8270D
	EPA 8270E

Polynuclear Aromatics

Fluorene	EPA 625.1
	EPA 8270D
	EPA 8270E
Indeno(1,2,3-cd)pyrene	EPA 625.1
	EPA 8270D
	EPA 8270E
Naphthalene	EPA 625.1
	EPA 8270D
	EPA 8270E
Phenanthrene	EPA 625.1
	EPA 8270D
	EPA 8270E
Pyrene	EPA 625.1
	EPA 8270D
	EPA 8270E

Priority Pollutant Phenols

2,3,4,6 Tetrachlorophenol	EPA 8270D
	EPA 8270E
2,4,5-Trichlorophenol	EPA 625.1
	EPA 8270D
	EPA 8270E
2,4,6-Trichlorophenol	EPA 625.1
	EPA 8270D
	EPA 8270E

Serial No.: 64581

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category
ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Priority Pollutant Phenols

2,4-Dichlorophenol	EPA 625.1
	EPA 8270D
	EPA 8270E
2,4-Dimethylphenol	EPA 625.1
	EPA 8270D
	EPA 8270E
2,4-Dinitrophenol	EPA 625.1
	EPA 8270D
	EPA 8270E
2-Chlorophenol	EPA 625.1
	EPA 8270D
	EPA 8270E
2-Methyl-4,6-dinitrophenol	EPA 625.1
	EPA 8270D
	EPA 8270E
2-Methylphenol	EPA 625.1
	EPA 8270D
	EPA 8270E
2-Nitrophenol	EPA 625.1
	EPA 8270D
	EPA 8270E
3-Methylphenol	EPA 625.1
	EPA 8270D
	EPA 8270E

Priority Pollutant Phenols

4-Chloro-3-methylphenol	EPA 625.1
	EPA 8270D
	EPA 8270E
4-Methylphenol	EPA 625.1
	EPA 8270D
	EPA 8270E
4-Nitrophenol	EPA 625.1
	EPA 8270D
	EPA 8270E
Cresols, Total	EPA 8270D
	EPA 8270E
Pentachlorophenol	EPA 625.1
	EPA 8270D
	EPA 8270E
Phenol	EPA 625.1
	EPA 8270D
	EPA 8270E

Residue

Settleable Solids	SM 2540 F-2015
Solids, Total	SM 2540 B-2015
Solids, Total Dissolved	SM 2540 C-2015
Solids, Total Suspended	SM 2540 D-2015
Solids, Volatile	SM 2540 E-2015

Serial No.: 64581

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Semi-Volatile Organics

1,1'-Biphenyl	EPA 8270D
	EPA 8270E
1,2-Dichlorobenzene, Semi-volatile	EPA 8270D
	EPA 8270E
1,3-Dichlorobenzene, Semi-volatile	EPA 8270D
	EPA 8270E
1,4-Dichlorobenzene, Semi-volatile	EPA 8270D
	EPA 8270E
2-Methylnaphthalene	EPA 625.1
	EPA 8270D
	EPA 8270E
Acetophenone	EPA 625.1
	EPA 8270D
	EPA 8270E
Benzaldehyde	EPA 8270D
	EPA 8270E
Benzoic Acid	EPA 8270D
	EPA 8270E
Benzyl alcohol	EPA 8270D
	EPA 8270E
Caprolactam	EPA 8270D
	EPA 8270E
Dibenzofuran	EPA 8270D
	EPA 8270E

Semi-Volatile Organics

n-Decane	EPA 625.1
n-Octadecane	EPA 625.1

Volatile Aromatics

1,2,4-Trichlorobenzene, Volatile	EPA 8260D
	EPA 8260C
1,2,4-Trimethylbenzene	EPA 8260D
	EPA 8260C
1,2-Dichlorobenzene	EPA 8260D
	EPA 8260C
	EPA 624.1
1,3,5-Trimethylbenzene	EPA 8260D
	EPA 8260C
1,3-Dichlorobenzene	EPA 8260D
	EPA 8260C
	EPA 624.1
1,4-Dichlorobenzene	EPA 8260D
	EPA 8260C
	EPA 624.1
2-Chlorotoluene	EPA 8260D
	EPA 8260C
4-Chlorotoluene	EPA 8260D
	EPA 8260C
Benzene	EPA 8260D
	EPA 8260C

Serial No.: 64581

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Volatile Aromatics

Benzene	EPA 624.1
Bromobenzene	EPA 8260D
	EPA 8260C
Chlorobenzene	EPA 8260D
	EPA 8260C
	EPA 624.1
Ethyl benzene	EPA 8260D
	EPA 8260C
	EPA 624.1
Isopropylbenzene	EPA 8260D
	EPA 8260C
m/p-Xylenes	EPA 8260D
	EPA 8260C
Naphthalene, Volatile	EPA 8260D
	EPA 8260C
n-Butylbenzene	EPA 8260D
	EPA 8260C
n-Propylbenzene	EPA 8260D
	EPA 8260C
o-Xylene	EPA 8260D
	EPA 8260C
p-Isopropyltoluene (P-Cymene)	EPA 8260D
	EPA 8260C
sec-Butylbenzene	EPA 8260D

Volatile Aromatics

sec-Butylbenzene	EPA 8260C
Styrene	EPA 8260D
	EPA 8260C
	EPA 624.1
tert-Butylbenzene	EPA 8260D
	EPA 8260C
Toluene	EPA 8260D
	EPA 8260C
	EPA 624.1
Total Xylenes	EPA 8260D
	EPA 8260C
	EPA 624.1

Volatile Halocarbons

1,1,1,2-Tetrachloroethane	EPA 8260D
	EPA 8260C
1,1,1-Trichloroethane	EPA 8260D
	EPA 8260C
	EPA 624.1
1,1,2,2-Tetrachloroethane	EPA 8260D
	EPA 8260C
	EPA 624.1
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA 8260D
	EPA 8260C
	EPA 624.1

Serial No.: 64581

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Volatile Halocarbons		Volatile Halocarbons	
1,1,2-Trichloroethane	EPA 8260D	1,3-Dichloropropane	EPA 8260C
	EPA 8260C	2,2-Dichloropropane	EPA 8260D
	EPA 624.1		EPA 8260C
1,1-Dichloroethane	EPA 8260D	2-Chloroethylvinyl ether	EPA 8260D
	EPA 8260C		EPA 8260C
	EPA 624.1		EPA 624.1
1,1-Dichloroethene	EPA 8260D	Bromochloromethane	EPA 8260D
	EPA 8260C		EPA 8260C
	EPA 624.1	Bromodichloromethane	EPA 8260D
1,1-Dichloropropene	EPA 8260D		EPA 8260C
	EPA 8260C		EPA 624.1
1,2,3-Trichloropropane	EPA 8260D	Bromoform	EPA 8260D
	EPA 8260C		EPA 8260C
1,2-Dibromo-3-chloropropane	EPA 8260D		EPA 624.1
	EPA 8260C	Bromomethane	EPA 8260D
1,2-Dibromoethane	EPA 8260D		EPA 8260C
	EPA 8260C		EPA 624.1
1,2-Dichloroethane	EPA 8260D	Carbon tetrachloride	EPA 8260D
	EPA 8260C		EPA 8260C
	EPA 624.1		EPA 624.1
1,2-Dichloropropane	EPA 8260D	Chloroethane	EPA 8260D
	EPA 8260C		EPA 8260C
	EPA 624.1		EPA 624.1
1,3-Dichloropropane	EPA 8260D	Chloroform	EPA 8260D

Serial No.: 64581

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category
ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Volatile Halocarbons

Chloroform	EPA 8260C
	EPA 624.1
Chloromethane	EPA 8260D
	EPA 8260C
	EPA 624.1
cis-1,2-Dichloroethene	EPA 8260D
	EPA 8260C
	EPA 624.1
cis-1,3-Dichloropropene	EPA 8260D
	EPA 8260C
	EPA 624.1
Dibromochloromethane	EPA 8260D
	EPA 8260C
	EPA 624.1
Dibromomethane	EPA 8260D
	EPA 8260C
Dichlorodifluoromethane	EPA 8260D
	EPA 8260C
	EPA 624.1
Hexachlorobutadiene, Volatile	EPA 8260D
	EPA 8260C
Methyl iodide	EPA 8260D
	EPA 8260C
Methylene chloride	EPA 8260D

Volatile Halocarbons

Methylene chloride	EPA 8260C
	EPA 624.1
Tetrachloroethene	EPA 8260D
	EPA 8260C
	EPA 624.1
trans-1,2-Dichloroethene	EPA 8260D
	EPA 8260C
	EPA 624.1
trans-1,3-Dichloropropene	EPA 8260D
	EPA 8260C
	EPA 624.1
trans-1,4-Dichloro-2-butene	EPA 8260D
	EPA 8260C
Trichloroethene	EPA 8260D
	EPA 8260C
	EPA 624.1
Trichlorofluoromethane	EPA 8260D
	EPA 8260C
	EPA 624.1
Vinyl chloride	EPA 8260D
	EPA 8260C
	EPA 624.1

Volatiles Organics

1,4-Dioxane	EPA 8260D

Serial No.: 64581

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category
ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Volatiles Organics

1,4-Dioxane	EPA 8260C
	EPA 8260C SIM
	EPA 8260D SIM
	EPA 8270E SIM
2-Butanone (Methylethyl ketone)	EPA 8260D
	EPA 8260C
2-Hexanone	EPA 8260D
	EPA 8260C
4-Methyl-2-Pentanone	EPA 8260D
	EPA 8260C
	EPA 624.1
Acetone	EPA 8260D
	EPA 8260C
	EPA 624.1
Carbon Disulfide	EPA 8260D
	EPA 8260C
Cyclohexane	EPA 8260D
	EPA 8260C
Di-ethyl ether	EPA 8260D
	EPA 8260C
Ethyl Acetate	EPA 8260D
	EPA 8260C
Isopropanol	EPA 8260D
	EPA 8260C

Volatiles Organics

Methyl acetate	EPA 8260D
	EPA 8260C
Methyl cyclohexane	EPA 8260D
	EPA 8260C
n-Butanol	EPA 8260D
	EPA 8260C
o-Toluidine	EPA 8270D
	EPA 8270E
Tetrahydrofuran	EPA 8260D
	EPA 8260C
Vinyl acetate	EPA 8260D
	EPA 8260C
	EPA 624.1

Sample Preparation Methods

	SM 4500-P B(5)-2011
	EPA 5030C
	SM 4500-CN B-2016 and C-201
	EPA 9030B
	EPA 3510C
	SM 4500-NH3 B-2011
	SM 4500-F B-2011
	SM 4500-N Org B-2011 or C-20
	EPA 9010C

Serial No.: 64581

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

NY Lab Id No: 11148

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Acrylates

Acrolein (Propenal)	EPA 8260D
	EPA 8260C
Acrylonitrile	EPA 8260D
	EPA 8260C
Ethyl methacrylate	EPA 8260D
	EPA 8260C
Methyl methacrylate	EPA 8260D
	EPA 8260C

Amines

1,2-Diphenylhydrazine	EPA 8270D
	EPA 8270E
2-Nitroaniline	EPA 8270D
	EPA 8270E
3-Nitroaniline	EPA 8270D
	EPA 8270E
4-Chloroaniline	EPA 8270D
	EPA 8270E
4-Nitroaniline	EPA 8270D
	EPA 8270E
Aniline	EPA 8270D
	EPA 8270E
Carbazole	EPA 8270D
	EPA 8270E
Diphenylamine	EPA 8270D

Amines

Diphenylamine	EPA 8270E

Benzidines

3,3'-Dichlorobenzidine	EPA 8270D
	EPA 8270E
Benzidine	EPA 8270D
	EPA 8270E

Characteristic Testing

Corrosivity (pH)	EPA 9040C
	EPA 9045D
Free Liquids	EPA 9095B
Ignitability	EPA 1030
	EPA 1010A
Synthetic Precipitation Leaching Proc.	EPA 1312
TCLP	EPA 1311

Chlorinated Hydrocarbon Pesticides

4,4'-DDD	EPA 8081B
4,4'-DDE	EPA 8081B
4,4'-DDT	EPA 8081B
Aldrin	EPA 8081B
alpha-BHC	EPA 8081B
alpha-Chlordane	EPA 8081B
Atrazine	EPA 8270D
	EPA 8270E

Serial No.: 64582

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Chlorinated Hydrocarbon Pesticides

beta-BHC	EPA 8081B
Chlordane Total	EPA 8081B
delta-BHC	EPA 8081B
Dieldrin	EPA 8081B
Endosulfan I	EPA 8081B
Endosulfan II	EPA 8081B
Endosulfan sulfate	EPA 8081B
Endrin	EPA 8081B
Endrin aldehyde	EPA 8081B
Endrin Ketone	EPA 8081B
gamma-Chlordane	EPA 8081B
Heptachlor	EPA 8081B
Heptachlor epoxide	EPA 8081B
Lindane	EPA 8081B
Methoxychlor	EPA 8081B
Pentachloronitrobenzene	EPA 8270D
	EPA 8270E
Toxaphene	EPA 8081B

Chlorinated Hydrocarbons

1,2,3-Trichlorobenzene	EPA 8260D
	EPA 8260C
1,2,4,5-Tetrachlorobenzene	EPA 8270D
	EPA 8270E
1,2,4-Trichlorobenzene	EPA 8270D

Chlorinated Hydrocarbons

1,2,4-Trichlorobenzene	EPA 8270E
2-Chloronaphthalene	EPA 8270D
	EPA 8270E
Hexachlorobenzene	EPA 8270D
	EPA 8270E
Hexachlorobutadiene	EPA 8270D
	EPA 8270E
Hexachlorocyclopentadiene	EPA 8270D
	EPA 8270E
Hexachloroethane	EPA 8260D
	EPA 8260C
	EPA 8270D
	EPA 8270E

Chlorophenoxy Acid Pesticides

2,4,5-T	EPA 8151A
2,4,5-TP (Silvex)	EPA 8151A
2,4-D	EPA 8151A
2,4-DB	EPA 8151A
Dalapon	EPA 8151A
Dicamba	EPA 8151A
Dichloroprop	EPA 8151A
MCPA	EPA 8151A
MCPP	EPA 8151A

Serial No.: 64582

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Haloethers

2,2'-Oxybis(1-chloropropane)	EPA 8270D
	EPA 8270E
4-Bromophenylphenyl ether	EPA 8270D
	EPA 8270E
4-Chlorophenylphenyl ether	EPA 8270D
	EPA 8270E
Bis(2-chloroethoxy)methane	EPA 8270D
	EPA 8270E
Bis(2-chloroethyl)ether	EPA 8270D
	EPA 8270E

Low Level Polynuclear Aromatic Hydrocarbons

Acenaphthene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Acenaphthylene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Anthracene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Benzo(a)anthracene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Benzo(a)pyrene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Benzo(b)fluoranthene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Benzo(g,h,i)perylene Low Level	EPA 8270D SIM

Low Level Polynuclear Aromatic Hydrocarbons

Benzo(g,h,i)perylene Low Level	EPA 8270E SIM
Benzo(k)fluoranthene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Chrysene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Dibenzo(a,h)anthracene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Fluoranthene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Fluorene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Indeno(1,2,3-cd)pyrene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Naphthalene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Phenanthrene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Pyrene Low Level	EPA 8270D SIM
	EPA 8270E SIM

Metals II

Chromium VI	EPA 7196A

Minerals

Chloride	EPA 9251
Sulfate (as SO4)	EPA 9038

Serial No.: 64582

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Miscellaneous	
Cyanide, Total	EPA 9014
	EPA 9012B
Extractable Organic Halides	EPA 9023
Perchlorate	EPA 6860
Phenols	EPA 9065
Specific Conductance	EPA 9050A
Nitroaromatics and Isophorone	
2,4-Dinitrotoluene	EPA 8270D
	EPA 8270E
2,6-Dinitrotoluene	EPA 8270D
	EPA 8270E
Isophorone	EPA 8270D
	EPA 8270E
Nitrobenzene	EPA 8260D
	EPA 8260C
	EPA 8270D
	EPA 8270E
Pyridine	EPA 8270D
	EPA 8270E
Nitrosoamines	
N-Nitrosodimethylamine	EPA 8270D
	EPA 8270E
N-Nitrosodi-n-propylamine	EPA 8270D
	EPA 8270E
Nitrosoamines	
N-Nitrosodiphenylamine	EPA 8270D
	EPA 8270E
Organophosphate Pesticides	
Parathion ethyl	EPA 8270E
Petroleum Hydrocarbons	
Diesel Range Organics	EPA 8015D
Gasoline Range Organics	EPA 8015D
Oil and Grease Total Recoverable	EPA 9071B (Solvent:Hexane)
Phthalate Esters	
Benzyl butyl phthalate	EPA 8270D
	EPA 8270E
Bis(2-ethylhexyl) phthalate	EPA 8270D
	EPA 8270E
Diethyl phthalate	EPA 8270D
	EPA 8270E
Dimethyl phthalate	EPA 8270D
	EPA 8270E
Di-n-butyl phthalate	EPA 8270D
	EPA 8270E
Di-n-octyl phthalate	EPA 8270D
	EPA 8270E
Polychlorinated Biphenyls	
Aroclor 1016 (PCB-1016)	EPA 8082A

Serial No.: 64582

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Polychlorinated Biphenyls

Aroclor 1016 (PCB-1016) in Oil	EPA 8082A
Aroclor 1221 (PCB-1221)	EPA 8082A
Aroclor 1221 (PCB-1221) in Oil	EPA 8082A
Aroclor 1232 (PCB-1232)	EPA 8082A
Aroclor 1232 (PCB-1232) in Oil	EPA 8082A
Aroclor 1242 (PCB-1242)	EPA 8082A
Aroclor 1242 (PCB-1242) in Oil	EPA 8082A
Aroclor 1248 (PCB-1248)	EPA 8082A
Aroclor 1248 (PCB-1248) in Oil	EPA 8082A
Aroclor 1254 (PCB-1254)	EPA 8082A
Aroclor 1254 (PCB-1254) in Oil	EPA 8082A
Aroclor 1260 (PCB-1260)	EPA 8082A
Aroclor 1260 (PCB-1260) in Oil	EPA 8082A
Aroclor 1262 (PCB-1262)	EPA 8082A
Aroclor 1262 (PCB-1262) in Oil	EPA 8082A
Aroclor 1268 (PCB-1268)	EPA 8082A
Aroclor 1268 (PCB-1268) in Oil	EPA 8082A

Polynuclear Aromatic Hydrocarbons

Acenaphthene	EPA 8270D
	EPA 8270E
Acenaphthylene	EPA 8270D
	EPA 8270E
Anthracene	EPA 8270D
	EPA 8270E

Polynuclear Aromatic Hydrocarbons

Benzo(a)anthracene	EPA 8270D
	EPA 8270E
Benzo(a)pyrene	EPA 8270D
	EPA 8270E
Benzo(b)fluoranthene	EPA 8270D
	EPA 8270E
Benzo(g,h,i)perylene	EPA 8270D
	EPA 8270E
Benzo(k)fluoranthene	EPA 8270D
	EPA 8270E
Chrysene	EPA 8270D
	EPA 8270E
Dibenzo(a,h)anthracene	EPA 8270D
	EPA 8270E
Fluoranthene	EPA 8270D
	EPA 8270E
Fluorene	EPA 8270D
	EPA 8270E
Indeno(1,2,3-cd)pyrene	EPA 8270D
	EPA 8270E
Naphthalene	EPA 8270D
	EPA 8270E
Phenanthrene	EPA 8270D
	EPA 8270E

Serial No.: 64582

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Polynuclear Aromatic Hydrocarbons

Pyrene	EPA 8270D
	EPA 8270E

Priority Pollutant Phenols

2,3,4,6 Tetrachlorophenol	EPA 8270D
	EPA 8270E
2,4,5-Trichlorophenol	EPA 8270D
	EPA 8270E
2,4,6-Trichlorophenol	EPA 8270D
	EPA 8270E
2,4-Dichlorophenol	EPA 8270D
	EPA 8270E
2,4-Dimethylphenol	EPA 8270D
	EPA 8270E
2,4-Dinitrophenol	EPA 8270D
	EPA 8270E
2-Chlorophenol	EPA 8270D
	EPA 8270E
2-Methyl-4,6-dinitrophenol	EPA 8270D
	EPA 8270E
2-Methylphenol	EPA 8270D
	EPA 8270E
2-Nitrophenol	EPA 8270D
	EPA 8270E
3-Methylphenol	EPA 8270D

Priority Pollutant Phenols

3-Methylphenol	EPA 8270E
4-Chloro-3-methylphenol	EPA 8270D
	EPA 8270E
4-Methylphenol	EPA 8270D
	EPA 8270E
4-Nitrophenol	EPA 8270D
	EPA 8270E
Pentachlorophenol	EPA 8270D
	EPA 8270E
Phenol	EPA 8270D
	EPA 8270E

Semi-Volatile Organics

1,1'-Biphenyl	EPA 8270D
	EPA 8270E
1,2-Dichlorobenzene, Semi-volatile	EPA 8270D
	EPA 8270E
1,3-Dichlorobenzene, Semi-volatile	EPA 8270D
	EPA 8270E
1,4-Dichlorobenzene, Semi-volatile	EPA 8270D
	EPA 8270E
2-Methylnaphthalene	EPA 8270D
	EPA 8270E
Acetophenone	EPA 8270D
	EPA 8270E

Serial No.: 64582

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Semi-Volatile Organics

Benzaldehyde	EPA 8270D
	EPA 8270E
Benzoic Acid	EPA 8270D
	EPA 8270E
Benzyl alcohol	EPA 8270D
	EPA 8270E
Caprolactam	EPA 8270D
	EPA 8270E
Dibenzofuran	EPA 8270D
	EPA 8270E

Volatile Aromatics

1,2,4-Trichlorobenzene, Volatile	EPA 8260D
	EPA 8260C
1,2,4-Trimethylbenzene	EPA 8260D
	EPA 8260C
1,2-Dichlorobenzene	EPA 8260D
	EPA 8260C
1,3,5-Trimethylbenzene	EPA 8260D
	EPA 8260C
1,3-Dichlorobenzene	EPA 8260D
	EPA 8260C
1,4-Dichlorobenzene	EPA 8260D
	EPA 8260C
2-Chlorotoluene	EPA 8260D

Volatile Aromatics

2-Chlorotoluene	EPA 8260C
4-Chlorotoluene	EPA 8260D
	EPA 8260C
Benzene	EPA 8260D
	EPA 8260C
Bromobenzene	EPA 8260D
	EPA 8260C
Chlorobenzene	EPA 8260D
	EPA 8260C
Ethyl benzene	EPA 8260D
	EPA 8260C
Isopropylbenzene	EPA 8260D
	EPA 8260C
m/p-Xylenes	EPA 8260D
	EPA 8260C
Naphthalene, Volatile	EPA 8260D
	EPA 8260C
n-Butylbenzene	EPA 8260D
	EPA 8260C
n-Propylbenzene	EPA 8260D
	EPA 8260C
o-Xylene	EPA 8260D
	EPA 8260C
p-Isopropyltoluene (P-Cymene)	EPA 8260D

Serial No.: 64582

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Volatile Aromatics

p-Isopropyltoluene (P-Cymene)	EPA 8260C
sec-Butylbenzene	EPA 8260D
	EPA 8260C
Styrene	EPA 8260D
	EPA 8260C
tert-Butylbenzene	EPA 8260D
	EPA 8260C
Toluene	EPA 8260D
	EPA 8260C
Total Xylenes	EPA 8260D
	EPA 8260C

Volatile Halocarbons

1,1,1,2-Tetrachloroethane	EPA 8260D
	EPA 8260C
1,1,1-Trichloroethane	EPA 8260D
	EPA 8260C
1,1,2,2-Tetrachloroethane	EPA 8260D
	EPA 8260C
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA 8260D
	EPA 8260C
1,1,2-Trichloroethane	EPA 8260D
	EPA 8260C
1,1-Dichloroethane	EPA 8260D
	EPA 8260C

Volatile Halocarbons

1,1-Dichloroethene	EPA 8260D
	EPA 8260C
1,1-Dichloropropene	EPA 8260D
	EPA 8260C
1,2,3-Trichloropropane	EPA 8260D
	EPA 8260C
1,2-Dibromo-3-chloropropane	EPA 8260D
	EPA 8260C
1,2-Dibromoethane	EPA 8260D
	EPA 8260C
1,2-Dichloroethane	EPA 8260D
	EPA 8260C
1,2-Dichloropropane	EPA 8260D
	EPA 8260C
1,3-Dichloropropane	EPA 8260D
	EPA 8260C
2,2-Dichloropropane	EPA 8260D
	EPA 8260C
2-Chloroethylvinyl ether	EPA 8260D
	EPA 8260C
3-Chloropropene (Allyl chloride)	EPA 8260D
	EPA 8260C
Bromochloromethane	EPA 8260D
	EPA 8260C

Serial No.: 64582

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Volatile Halocarbons

Bromodichloromethane	EPA 8260D
	EPA 8260C
Bromoform	EPA 8260D
	EPA 8260C
Bromomethane	EPA 8260D
	EPA 8260C
Carbon tetrachloride	EPA 8260D
	EPA 8260C
Chloroethane	EPA 8260D
	EPA 8260C
Chloroform	EPA 8260D
	EPA 8260C
Chloromethane	EPA 8260D
	EPA 8260C
cis-1,2-Dichloroethene	EPA 8260D
	EPA 8260C
cis-1,3-Dichloropropene	EPA 8260D
	EPA 8260C
Dibromochloromethane	EPA 8260D
	EPA 8260C
Dibromomethane	EPA 8260D
	EPA 8260C
Dichlorodifluoromethane	EPA 8260D
	EPA 8260C

Volatile Halocarbons

Hexachlorobutadiene, Volatile	EPA 8260D
	EPA 8260C
Methyl iodide	EPA 8260D
	EPA 8260C
Methylene chloride	EPA 8260D
	EPA 8260C
Tetrachloroethene	EPA 8260D
	EPA 8260C
trans-1,2-Dichloroethene	EPA 8260D
	EPA 8260C
trans-1,3-Dichloropropene	EPA 8260D
	EPA 8260C
trans-1,4-Dichloro-2-butene	EPA 8260D
	EPA 8260C
Trichloroethene	EPA 8260D
	EPA 8260C
Trichlorofluoromethane	EPA 8260D
	EPA 8260C
Vinyl chloride	EPA 8260D
	EPA 8260C

Volatile Organics

1,4-Dioxane	EPA 8260D
	EPA 8260C
	EPA 8270D

Serial No.: 64582

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. MARCO SOARES
ALPHA ANALYTICAL
8 WALKUP DR
WESTBOROUGH, MA 01581-1019

NY Lab Id No: 11148

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Volatile Organics

1,4-Dioxane	EPA 8270E
2-Butanone (Methylethyl ketone)	EPA 8260D
	EPA 8260C
2-Hexanone	EPA 8260D
	EPA 8260C
2-Nitropropane	EPA 8260D
	EPA 8260C
4-Methyl-2-Pentanone	EPA 8260D
	EPA 8260C
Acetone	EPA 8260D
	EPA 8260C
Carbon Disulfide	EPA 8260D
	EPA 8260C
Cyclohexane	EPA 8260D
	EPA 8260C
Di-ethyl ether	EPA 8260D
	EPA 8260C
Ethyl Acetate	EPA 8260D
	EPA 8260C
Methyl acetate	EPA 8260D
	EPA 8260C
Methyl cyclohexane	EPA 8260D
	EPA 8260C
Methyl tert-butyl ether	EPA 8260D

Volatile Organics

Methyl tert-butyl ether	EPA 8260C
n-Butanol	EPA 8260D
	EPA 8260C
tert-butyl alcohol	EPA 8260D
	EPA 8260C
Tetrahydrofuran	EPA 8260D
	EPA 8260C
Vinyl acetate	EPA 8260D
	EPA 8260C

Sample Preparation Methods

EPA 5035A-L
EPA 5035A-H
EPA 3580A
EPA 3540C
EPA 3546
EPA 3060A
EPA 9010C

Serial No.: 64582

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Metals I

Arsenic, Total	EPA 200.8 Rev. 5.4
Barium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Cadmium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Chromium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Copper, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Iron, Total	EPA 200.7 Rev. 4.4
Lead, Total	EPA 200.8 Rev. 5.4
Manganese, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Mercury, Total	EPA 245.1 Rev. 3.0
Selenium, Total	EPA 200.8 Rev. 5.4
Silver, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Zinc, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4

Metals II

Aluminum, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Antimony, Total	EPA 200.8 Rev. 5.4
Beryllium, Total	EPA 200.8 Rev. 5.4

Metals II

Nickel, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Thallium, Total	EPA 200.8 Rev. 5.4
Vanadium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4

Metals III

Boron, Total	EPA 200.7 Rev. 4.4
Calcium, Total	EPA 200.7 Rev. 4.4
Magnesium, Total	EPA 200.7 Rev. 4.4
Potassium, Total	EPA 200.7 Rev. 4.4
Sodium, Total	EPA 200.7 Rev. 4.4

Miscellaneous

1,4-Dioxane	EPA 522
2,3,7,8-Tetrachlorodibenzo-p-dioxin	EPA 1613B

Non-Metals

Calcium Hardness	EPA 200.7 Rev. 4.4

Perfluorinated Alkyl Acids

Perfluorooctanesulfonic Acid (PFOS)	EPA 533
	EPA 537.1
Perfluorooctanoic Acid (PFOA)	EPA 533
	EPA 537.1

Serial No.: 64737

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Amines

1,2-Diphenylhydrazine	EPA 8270D
	EPA 8270E
2-Nitroaniline	EPA 8270D
	EPA 8270E
3-Nitroaniline	EPA 8270D
	EPA 8270E
4-Chloroaniline	EPA 8270D
	EPA 8270E
4-Nitroaniline	EPA 8270D
	EPA 8270E
Aniline	EPA 8270D
	EPA 8270E
Carbazole	EPA 8270D
	EPA 8270E
Pyridine	EPA 8270D
	EPA 8270E

Benzidines

3,3'-Dichlorobenzidine	EPA 8270D
	EPA 8270E
Benzidine	EPA 8270D
	EPA 8270E

Chlorinated Hydrocarbon Pesticides

4,4'-DDD	EPA 8081B
4,4'-DDE	EPA 8081B

Chlorinated Hydrocarbon Pesticides

4,4'-DDT	EPA 8081B
Aldrin	EPA 8081B
alpha-BHC	EPA 8081B
alpha-Chlordane	EPA 8081B
beta-BHC	EPA 8081B
Chlordane Total	EPA 8081B
delta-BHC	EPA 8081B
Dieldrin	EPA 8081B
Endosulfan I	EPA 8081B
Endosulfan II	EPA 8081B
Endosulfan sulfate	EPA 8081B
Endrin	EPA 8081B
Endrin aldehyde	EPA 8081B
Endrin Ketone	EPA 8081B
gamma-Chlordane	EPA 8081B
Heptachlor	EPA 8081B
Heptachlor epoxide	EPA 8081B
Lindane	EPA 8081B
Methoxychlor	EPA 8081B
Mirex	EPA 8081B
PCNB	EPA 8270D
	EPA 8270E
Toxaphene	EPA 8081B

Serial No.: 64738

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Chlorinated Hydrocarbons

1,2,4,5-Tetrachlorobenzene	EPA 8270D
	EPA 8270E
1,2,4-Trichlorobenzene	EPA 8270D
	EPA 8270E
2-Chloronaphthalene	EPA 8270D
	EPA 8270E
Hexachlorobenzene	EPA 8081B
	EPA 8270D
	EPA 8270E
Hexachlorobutadiene	EPA 8270D
	EPA 8270E
Hexachlorocyclopentadiene	EPA 8270D
	EPA 8270E
Hexachloroethane	EPA 8270D
	EPA 8270E

Dioxins and Furans

1,2,3,4,6,7,8,9-Octachlorodibenzofuran	EPA 8290A
	EPA 1613B
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-diox	EPA 8290A
	EPA 1613B
1,2,3,4,6,7,8-Heptachlorodibenzofuran	EPA 8290A
	EPA 1613B
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxi	EPA 8290A
	EPA 1613B

Dioxins and Furans

1,2,3,4,7,8,9-Heptachlorodibenzofuran	EPA 8290A
	EPA 1613B
1,2,3,4,7,8-Hexachlorodibenzofuran	EPA 8290A
	EPA 1613B
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	EPA 8290A
	EPA 1613B
1,2,3,6,7,8-Hexachlorodibenzofuran	EPA 8290A
	EPA 1613B
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	EPA 8290A
	EPA 1613B
1,2,3,7,8,9-Hexachlorodibenzofuran	EPA 8290A
	EPA 1613B
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	EPA 8290A
	EPA 1613B
1,2,3,7,8-Pentachlorodibenzofuran	EPA 8290A
	EPA 1613B
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	EPA 8290A
	EPA 1613B
2,3,4,6,7,8-Hexachlorodibenzofuran	EPA 8290A
	EPA 1613B
2,3,4,7,8-Pentachlorodibenzofuran	EPA 8290A
	EPA 1613B
2,3,7,8-Tetrachlorodibenzofuran	EPA 8290A
	EPA 1613B

Serial No.: 64738

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Dioxins and Furans

2,3,7,8-Tetrachlorodibenzo-p-dioxin	EPA 8290A
	EPA 1613B

Dissolved Gases

Ethane	RSK-175
Ethene (Ethylene)	RSK-175
Methane	RSK-175
Propane	RSK-175

Fuel Oxygenates

Ethanol	EPA 8015D
tert-amyl alcohol	EPA 8015D
tert-butyl alcohol	EPA 8015D

Haloethers

2,2'-Oxybis(1-chloropropane)	EPA 8270D
	EPA 8270E
4-Bromophenylphenyl ether	EPA 8270D
	EPA 8270E
4-Chlorophenylphenyl ether	EPA 8270D
	EPA 8270E
Bis(2-chloroethoxy)methane	EPA 8270D
	EPA 8270E
Bis(2-chloroethyl)ether	EPA 8270D
	EPA 8270E

Low Level Polynuclear Aromatics

Acenaphthene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Acenaphthylene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Anthracene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Benzo(a)anthracene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Benzo(a)pyrene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Benzo(b)fluoranthene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Benzo(g,h,i)perylene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Benzo(k)fluoranthene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Chrysene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Dibenzo(a,h)anthracene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Fluoranthene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Fluorene Low Level	EPA 8270D SIM
	EPA 8270E SIM

Serial No.: 64738

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Low Level Polynuclear Aromatics

Indeno(1,2,3-cd)pyrene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Naphthalene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Phenanthrene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Pyrene Low Level	EPA 8270D SIM
	EPA 8270E SIM

Metals I

Barium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Cadmium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Calcium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
Chromium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)

Metals I

Copper, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Iron, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Lead, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Magnesium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
Manganese, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Nickel, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Potassium, Total	EPA 200.7, Rev. 4.4 (1994)

Serial No.: 64738

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Metals I

Potassium, Total	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Silver, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Sodium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Strontium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B

Metals II

Aluminum, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Antimony, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Arsenic, Total	EPA 200.7, Rev. 4.4 (1994)

Metals II

Arsenic, Total	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Beryllium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Mercury, Low Level	EPA 1631E
Mercury, Total	EPA 245.1, Rev. 3.0 (1994)
	EPA 7470A
Selenium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Vanadium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Zinc, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)

Metals III

Cobalt, Total	EPA 200.7, Rev. 4.4 (1994)

Serial No.: 64738

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Metals III

Cobalt, Total	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Molybdenum, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Thallium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Tin, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
Titanium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D

Mineral

Hardness, Total	SM 2340B-2011

Miscellaneous

Boron, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D
	EPA 6020B
Silica, Dissolved	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010D

Nitroaromatics and Isophorone

2,4-Dinitrotoluene	EPA 8270D
	EPA 8270E
2,6-Dinitrotoluene	EPA 8270D
	EPA 8270E
Isophorone	EPA 8270D
	EPA 8270E
Nitrobenzene	EPA 8270D
	EPA 8270E

Nitrosoamines

N-Nitrosodimethylamine	EPA 8270D
	EPA 8270E
N-Nitrosodi-n-propylamine	EPA 8270D
	EPA 8270E
N-Nitrosodiphenylamine	EPA 8270D
	EPA 8270E

Organophosphate Pesticides

Atrazine	EPA 8270D
	EPA 8270E

Petroleum Hydrocarbons

Diesel Range Organics	EPA 8015D

Phthalate Esters

Benzyl butyl phthalate	EPA 8270D
	EPA 8270E

Serial No.: 64738

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER All approved analytes are listed below:

Phthalate Esters

Bis(2-ethylhexyl) phthalate	EPA 8270D
	EPA 8270E
Diethyl phthalate	EPA 8270D
	EPA 8270E
Dimethyl phthalate	EPA 8270D
	EPA 8270E
Di-n-butyl phthalate	EPA 8270D
	EPA 8270E
Di-n-octyl phthalate	EPA 8270D
	EPA 8270E

Polychlorinated Biphenyls

Aroclor 1016 (PCB-1016)	EPA 8082A
Aroclor 1221 (PCB-1221)	EPA 8082A
Aroclor 1232 (PCB-1232)	EPA 8082A
Aroclor 1242 (PCB-1242)	EPA 8082A
Aroclor 1248 (PCB-1248)	EPA 8082A
Aroclor 1254 (PCB-1254)	EPA 8082A
Aroclor 1260 (PCB-1260)	EPA 8082A
Aroclor 1262 (PCB-1262)	EPA 8082A
Aroclor 1268 (PCB-1268)	EPA 8082A
PCB 1	EPA 1668A
	EPA 1668C
PCB 10	EPA 1668A
	EPA 1668C

Polychlorinated Biphenyls

PCB 100	EPA 1668A
	EPA 1668C
PCB 101	EPA 1668A
	EPA 1668C
PCB 102	EPA 1668A
	EPA 1668C
PCB 103	EPA 1668A
	EPA 1668C
PCB 104	EPA 1668A
	EPA 1668C
PCB 105	EPA 1668A
	EPA 1668C
PCB 106	EPA 1668A
	EPA 1668C
PCB 107	EPA 1668A
	EPA 1668C
PCB 108	EPA 1668A
	EPA 1668C
PCB 109	EPA 1668A
	EPA 1668C
PCB 11	EPA 1668A
	EPA 1668C
PCB 110	EPA 1668A
	EPA 1668C

Serial No.: 64738

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Polychlorinated Biphenyls	
PCB 111	EPA 1668A
	EPA 1668C
PCB 112	EPA 1668A
	EPA 1668C
PCB 113	EPA 1668A
	EPA 1668C
PCB 114	EPA 1668A
	EPA 1668C
PCB 115	EPA 1668A
	EPA 1668C
PCB 116	EPA 1668A
	EPA 1668C
PCB 117	EPA 1668A
	EPA 1668C
PCB 118	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 119	EPA 1668A
	EPA 1668C
PCB 12	EPA 1668A
	EPA 1668C
PCB 120	EPA 1668A
	EPA 1668C
PCB 121	EPA 1668A

Polychlorinated Biphenyls	
PCB 121	EPA 1668C
PCB 122	EPA 1668A
	EPA 1668C
PCB 123	EPA 1668A
	EPA 1668C
PCB 124	EPA 1668A
	EPA 1668C
PCB 125	EPA 1668A
	EPA 1668C
PCB 126	EPA 1668A
	EPA 1668C
PCB 127	EPA 1668A
	EPA 1668C
PCB 128	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 129	EPA 1668A
	EPA 1668C
PCB 13	EPA 1668A
	EPA 1668C
PCB 130	EPA 1668A
	EPA 1668C
PCB 131	EPA 1668A
	EPA 1668C

Serial No.: 64738

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Polychlorinated Biphenyls	
PCB 132	EPA 1668A
	EPA 1668C
PCB 133	EPA 1668A
	EPA 1668C
PCB 134	EPA 1668A
	EPA 1668C
PCB 135	EPA 1668A
	EPA 1668C
PCB 136	EPA 1668A
	EPA 1668C
PCB 137	EPA 1668A
	EPA 1668C
PCB 138	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 139	EPA 1668A
	EPA 1668C
PCB 14	EPA 1668A
	EPA 1668C
PCB 140	EPA 1668A
	EPA 1668C
PCB 141	EPA 1668A
	EPA 1668C
PCB 142	EPA 1668A

Polychlorinated Biphenyls	
PCB 142	EPA 1668C
PCB 143	EPA 1668A
	EPA 1668C
PCB 144	EPA 1668A
	EPA 1668C
PCB 145	EPA 1668A
	EPA 1668C
PCB 146	EPA 1668A
	EPA 1668C
PCB 147	EPA 1668A
	EPA 1668C
PCB 148	EPA 1668A
	EPA 1668C
PCB 149	EPA 1668A
	EPA 1668C
PCB 15	EPA 1668A
	EPA 1668C
PCB 150	EPA 1668A
	EPA 1668C
PCB 151	EPA 1668A
	EPA 1668C
PCB 152	EPA 1668A
	EPA 1668C
PCB 153	EPA 1668A

Serial No.: 64738

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Polychlorinated Biphenyls		Polychlorinated Biphenyls	
PCB 153	EPA 1668C	PCB 164	EPA 1668C
PCB 154	EPA 1668A	PCB 165	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 155	EPA 1668A	PCB 166	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 156	EPA 1668A	PCB 167	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 157	EPA 1668A	PCB 168	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 158	EPA 1668A	PCB 169	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 159	EPA 1668A	PCB 17	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 16	EPA 1668A	PCB 170	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 160	EPA 1668A		EPA 8082A
	EPA 1668C	PCB 171	EPA 1668A
PCB 161	EPA 1668A		EPA 1668C
	EPA 1668C	PCB 172	EPA 1668A
PCB 162	EPA 1668A		EPA 1668C
	EPA 1668C	PCB 173	EPA 1668A
PCB 163	EPA 1668A		EPA 1668C
	EPA 1668C	PCB 174	EPA 1668A
PCB 164	EPA 1668A		EPA 1668C

Serial No.: 64738

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the
National Environmental Laboratory Accreditation Conference Standards (2016) for the category
ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Polychlorinated Biphenyls

PCB 175	EPA 1668A
	EPA 1668C
PCB 176	EPA 1668A
	EPA 1668C
PCB 177	EPA 1668A
	EPA 1668C
PCB 178	EPA 1668A
	EPA 1668C
PCB 179	EPA 1668A
	EPA 1668C
PCB 18	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 180	EPA 1668A
	EPA 1668C
PCB 181	EPA 1668A
	EPA 1668C
PCB 182	EPA 1668A
	EPA 1668C
PCB 183	EPA 1668A
	EPA 1668C
PCB 184	EPA 1668A
	EPA 1668C
PCB 185	EPA 1668A

Polychlorinated Biphenyls

PCB 185	EPA 1668C
PCB 186	EPA 1668A
	EPA 1668C
PCB 187	EPA 1668A
	EPA 1668C
PCB 188	EPA 1668A
	EPA 1668C
PCB 189	EPA 1668A
	EPA 1668C
PCB 19	EPA 1668A
	EPA 1668C
PCB 190	EPA 1668A
	EPA 1668C
PCB 191	EPA 1668A
	EPA 1668C
PCB 192	EPA 1668A
	EPA 1668C
PCB 193	EPA 1668A
	EPA 1668C
PCB 194	EPA 1668A
	EPA 1668C
PCB 195	EPA 1668A
	EPA 1668C
PCB 196	EPA 1668A

Serial No.: 64738

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Polychlorinated Biphenyls

PCB 196	EPA 1668C
PCB 197	EPA 1668A
	EPA 1668C
PCB 198	EPA 1668A
	EPA 1668C
PCB 199	EPA 1668A
	EPA 1668C
PCB 2	EPA 1668A
	EPA 1668C
PCB 20	EPA 1668A
	EPA 1668C
PCB 200	EPA 1668A
	EPA 1668C
PCB 201	EPA 1668A
	EPA 1668C
PCB 202	EPA 1668A
	EPA 1668C
PCB 203	EPA 1668A
	EPA 1668C
PCB 204	EPA 1668A
	EPA 1668C
PCB 205	EPA 1668A
	EPA 1668C
PCB 206	EPA 1668A

Polychlorinated Biphenyls

PCB 206	EPA 1668C
	EPA 8082A
PCB 207	EPA 1668A
	EPA 1668C
PCB 208	EPA 1668A
	EPA 1668C
PCB 209	EPA 1668A
	EPA 1668C
PCB 21	EPA 1668A
	EPA 1668C
PCB 22	EPA 1668A
	EPA 1668C
PCB 23	EPA 1668A
	EPA 1668C
PCB 24	EPA 1668A
	EPA 1668C
PCB 25	EPA 1668A
	EPA 1668C
PCB 26	EPA 1668A
	EPA 1668C
PCB 27	EPA 1668A
	EPA 1668C
PCB 28	EPA 1668A
	EPA 1668C

Serial No.: 64738

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Polychlorinated Biphenyls	
PCB 29	EPA 1668A
	EPA 1668C
PCB 3	EPA 1668A
	EPA 1668C
PCB 30	EPA 1668A
	EPA 1668C
PCB 31	EPA 1668A
	EPA 1668C
PCB 32	EPA 1668A
	EPA 1668C
PCB 33	EPA 1668A
	EPA 1668C
PCB 34	EPA 1668A
	EPA 1668C
PCB 35	EPA 1668A
	EPA 1668C
PCB 36	EPA 1668A
	EPA 1668C
PCB 37	EPA 1668A
	EPA 1668C
PCB 38	EPA 1668A
	EPA 1668C
PCB 39	EPA 1668A
	EPA 1668C

Polychlorinated Biphenyls	
PCB 4	EPA 1668A
	EPA 1668C
PCB 40	EPA 1668A
	EPA 1668C
PCB 41	EPA 1668A
	EPA 1668C
PCB 42	EPA 1668A
	EPA 1668C
PCB 43	EPA 1668A
	EPA 1668C
PCB 44	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 45	EPA 1668A
	EPA 1668C
PCB 46	EPA 1668A
	EPA 1668C
PCB 47	EPA 1668A
	EPA 1668C
PCB 48	EPA 1668A
	EPA 1668C
PCB 49	EPA 1668A
	EPA 1668C
PCB 5	EPA 1668A

Serial No.: 64738

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Polychlorinated Biphenyls	
PCB 5	EPA 1668C
PCB 50	EPA 1668A
	EPA 1668C
PCB 51	EPA 1668A
	EPA 1668C
PCB 52	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 53	EPA 1668A
	EPA 1668C
PCB 54	EPA 1668A
	EPA 1668C
PCB 55	EPA 1668A
	EPA 1668C
PCB 56	EPA 1668A
	EPA 1668C
PCB 57	EPA 1668A
	EPA 1668C
PCB 58	EPA 1668A
	EPA 1668C
PCB 59	EPA 1668A
	EPA 1668C
PCB 6	EPA 1668A
	EPA 1668C

Polychlorinated Biphenyls	
PCB 60	EPA 1668A
	EPA 1668C
PCB 61	EPA 1668A
	EPA 1668C
PCB 62	EPA 1668A
	EPA 1668C
PCB 63	EPA 1668A
	EPA 1668C
PCB 64	EPA 1668A
	EPA 1668C
PCB 65	EPA 1668A
	EPA 1668C
PCB 66	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 67	EPA 1668A
	EPA 1668C
PCB 68	EPA 1668A
	EPA 1668C
PCB 69	EPA 1668A
	EPA 1668C
PCB 7	EPA 1668A
	EPA 1668C
PCB 70	EPA 1668A

Serial No.: 64738

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Polychlorinated Biphenyls	
PCB 70	EPA 1668C
PCB 71	EPA 1668A
	EPA 1668C
PCB 72	EPA 1668A
	EPA 1668C
PCB 73	EPA 1668A
	EPA 1668C
PCB 74	EPA 1668A
	EPA 1668C
PCB 75	EPA 1668A
	EPA 1668C
PCB 76	EPA 1668A
	EPA 1668C
PCB 77	EPA 1668A
	EPA 1668C
PCB 78	EPA 1668A
	EPA 1668C
PCB 79	EPA 1668A
	EPA 1668C
PCB 8	EPA 1668A
	EPA 1668C
PCB 80	EPA 1668A
	EPA 1668C
PCB 81	EPA 1668A

Polychlorinated Biphenyls	
PCB 81	EPA 1668C
PCB 82	EPA 1668A
	EPA 1668C
PCB 83	EPA 1668A
	EPA 1668C
PCB 84	EPA 1668A
	EPA 1668C
PCB 85	EPA 1668A
	EPA 1668C
PCB 86	EPA 1668A
	EPA 1668C
PCB 87	EPA 1668A
	EPA 1668C
PCB 88	EPA 1668A
	EPA 1668C
PCB 89	EPA 1668A
	EPA 1668C
PCB 9	EPA 1668A
	EPA 1668C
PCB 90	EPA 1668A
	EPA 1668C
PCB 91	EPA 1668A
	EPA 1668C
PCB 92	EPA 1668A

Serial No.: 64738

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Polychlorinated Biphenyls

PCB 92	EPA 1668C
PCB 93	EPA 1668A
	EPA 1668C
PCB 94	EPA 1668A
	EPA 1668C
PCB 95	EPA 1668A
	EPA 1668C
PCB 96	EPA 1668A
	EPA 1668C
PCB 97	EPA 1668A
	EPA 1668C
PCB 98	EPA 1668A
	EPA 1668C
PCB 99	EPA 1668A
	EPA 1668C

Polynuclear Aromatics

Acenaphthene	EPA 8270D
	EPA 8270E
Acenaphthylene	EPA 8270D
	EPA 8270E
Anthracene	EPA 8270D
	EPA 8270E
Benzo(a)anthracene	EPA 8270D
	EPA 8270E

Polynuclear Aromatics

Benzo(a)pyrene	EPA 8270D
	EPA 8270E
Benzo(b)fluoranthene	EPA 8270D
	EPA 8270E
Benzo(g,h,i)perylene	EPA 8270D
	EPA 8270E
Benzo(k)fluoranthene	EPA 8270D
	EPA 8270E
Chrysene	EPA 8270D
	EPA 8270E
Dibenzo(a,h)anthracene	EPA 8270D
	EPA 8270E
Fluoranthene	EPA 8270D
	EPA 8270E
Fluorene	EPA 8270D
	EPA 8270E
Indeno(1,2,3-cd)pyrene	EPA 8270D
	EPA 8270E
Naphthalene	EPA 8270D
	EPA 8270E
Phenanthrene	EPA 8270D
	EPA 8270E
Pyrene	EPA 8270D
	EPA 8270E

Serial No.: 64738

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Priority Pollutant Phenols

2,3,4,6 Tetrachlorophenol	EPA 8270D
	EPA 8270E
2,4,5-Trichlorophenol	EPA 8270D
	EPA 8270E
2,4,6-Trichlorophenol	EPA 8270D
	EPA 8270E
2,4-Dichlorophenol	EPA 8270D
	EPA 8270E
2,4-Dimethylphenol	EPA 8270D
	EPA 8270E
2,4-Dinitrophenol	EPA 8270D
	EPA 8270E
2-Chlorophenol	EPA 8270D
	EPA 8270E
2-Methyl-4,6-dinitrophenol	EPA 8270D
	EPA 8270E
2-Methylphenol	EPA 8270D
	EPA 8270E
2-Nitrophenol	EPA 8270D
	EPA 8270E
3-Methylphenol	EPA 8270D
	EPA 8270E
4-Chloro-3-methylphenol	EPA 8270D
	EPA 8270E

Priority Pollutant Phenols

4-Methylphenol	EPA 8270D
	EPA 8270E
4-Nitrophenol	EPA 8270D
	EPA 8270E
Pentachlorophenol	EPA 8270D
	EPA 8270E
Phenol	EPA 8270D
	EPA 8270E

Semi-Volatile Organics

1,1'-Biphenyl	EPA 8270D
	EPA 8270E
1,2-Dichlorobenzene, Semi-volatile	EPA 8270D
	EPA 8270E
1,3-Dichlorobenzene, Semi-volatile	EPA 8270D
	EPA 8270E
1,4-Dichlorobenzene, Semi-volatile	EPA 8270D
	EPA 8270E
2-Methylnaphthalene	EPA 8270D
	EPA 8270E
Acetophenone	EPA 8270D
	EPA 8270E
Benzaldehyde	EPA 8270D
	EPA 8270E
Benzoic Acid	EPA 8270D

Serial No.: 64738

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Semi-Volatile Organics

Benzoic Acid	EPA 8270E
Benzyl alcohol	EPA 8270D
	EPA 8270E
Caprolactam	EPA 8270D
	EPA 8270E
Dibenzofuran	EPA 8270D
	EPA 8270E

Volatiles Organics

1,4-Dioxane	EPA 8270D SIM
	EPA 8270E SIM
Ethylene Glycol	EPA 8015D
Isobutyl alcohol	EPA 8015D
Methanol	EPA 8015D
Propylene Glycol	EPA 8015D

Sample Preparation Methods

	EPA 3015A
	EPA 3005A
	EPA 3510C

Serial No.: 64738

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Amines

1,2-Diphenylhydrazine	EPA 8270D
	EPA 8270E
2-Nitroaniline	EPA 8270D
	EPA 8270E
3-Nitroaniline	EPA 8270D
	EPA 8270E
4-Chloroaniline	EPA 8270D
	EPA 8270E
4-Nitroaniline	EPA 8270D
	EPA 8270E
Aniline	EPA 8270D
	EPA 8270E
Carbazole	EPA 8270D
	EPA 8270E

Benzidines

3,3'-Dichlorobenzidine	EPA 8270D
	EPA 8270E
Benzidine	EPA 8270D
	EPA 8270E

Chlorinated Hydrocarbon Pesticides

4,4'-DDD	EPA 8081B
4,4'-DDE	EPA 8081B
4,4'-DDT	EPA 8081B
Aldrin	EPA 8081B

Chlorinated Hydrocarbon Pesticides

alpha-BHC	EPA 8081B
alpha-Chlordane	EPA 8081B
beta-BHC	EPA 8081B
Chlordane Total	EPA 8081B
delta-BHC	EPA 8081B
Dieldrin	EPA 8081B
Endosulfan I	EPA 8081B
Endosulfan II	EPA 8081B
Endosulfan sulfate	EPA 8081B
Endrin	EPA 8081B
Endrin aldehyde	EPA 8081B
Endrin Ketone	EPA 8081B
gamma-Chlordane	EPA 8081B
Heptachlor	EPA 8081B
Heptachlor epoxide	EPA 8081B
Lindane	EPA 8081B
Methoxychlor	EPA 8081B
Mirex	EPA 8081B
Pentachloronitrobenzene	EPA 8270D
	EPA 8270E
Toxaphene	EPA 8081B

Chlorinated Hydrocarbons

1,2,4,5-Tetrachlorobenzene	EPA 8270D
	EPA 8270E

Serial No.: 64739

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Chlorinated Hydrocarbons

1,2,4-Trichlorobenzene	EPA 8270D
	EPA 8270E
2-Chloronaphthalene	EPA 8270D
	EPA 8270E
Hexachlorobenzene	EPA 8270D
	EPA 8270E
Hexachlorobutadiene	EPA 8270D
	EPA 8270E
Hexachlorocyclopentadiene	EPA 8270D
	EPA 8270E
Hexachloroethane	EPA 8270D
	EPA 8270E

Dioxins and Furans

1,2,3,4,6,7,8,9-Octachlorodibenzofuran	EPA 8290A
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-diox	EPA 8290A
1,2,3,4,6,7,8-Heptachlorodibenzofuran	EPA 8290A
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxi	EPA 8290A
1,2,3,4,7,8,9-Heptachlorodibenzofuran	EPA 8290A
1,2,3,4,7,8-Hexachlorodibenzofuran	EPA 8290A
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	EPA 8290A
1,2,3,6,7,8-Hexachlorodibenzofuran	EPA 8290A
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	EPA 8290A
1,2,3,7,8,9-Hexachlorodibenzofuran	EPA 8290A
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	EPA 8290A

Dioxins and Furans

1,2,3,7,8-Pentachlorodibenzofuran	EPA 8290A
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	EPA 8290A
2,3,4,6,7,8-Hexachlorodibenzofuran	EPA 8290A
2,3,4,7,8-Pentachlorodibenzofuran	EPA 8290A
2,3,7,8-Tetrachlorodibenzofuran	EPA 8290A
2,3,7,8-Tetrachlorodibenzo-p-dioxin	EPA 8290A

Haloethers

2,2'-Oxybis(1-chloropropane)	EPA 8270D
	EPA 8270E
4-Bromophenylphenyl ether	EPA 8270D
	EPA 8270E
4-Chlorophenylphenyl ether	EPA 8270D
	EPA 8270E
Bis(2-chloroethoxy)methane	EPA 8270D
	EPA 8270E
Bis(2-chloroethyl)ether	EPA 8270D
	EPA 8270E

Low Level Polynuclear Aromatic Hydrocarbons

Acenaphthene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Acenaphthylene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Anthracene Low Level	EPA 8270D SIM
	EPA 8270E SIM

Serial No.: 64739

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Low Level Polynuclear Aromatic Hydrocarbons

Benzo(a)anthracene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Benzo(a)pyrene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Benzo(b)fluoranthene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Benzo(g,h,i)perylene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Benzo(k)fluoranthene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Chrysene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Dibenzo(a,h)anthracene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Fluoranthene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Fluorene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Indeno(1,2,3-cd)pyrene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Naphthalene Low Level	EPA 8270D SIM
	EPA 8270E SIM
Phenanthrene Low Level	EPA 8270D SIM
	EPA 8270E SIM

Low Level Polynuclear Aromatic Hydrocarbons

Pyrene Low Level	EPA 8270D SIM
	EPA 8270E SIM

Metals I

Barium, Total	EPA 6010D
	EPA 6020B
Cadmium, Total	EPA 6010D
	EPA 6020B
Calcium, Total	EPA 6010D
	EPA 6020B
Chromium, Total	EPA 6010D
	EPA 6020B
Copper, Total	EPA 6010D
	EPA 6020B
Iron, Total	EPA 6010D
	EPA 6020B
Lead, Total	EPA 6010D
	EPA 6020B
Magnesium, Total	EPA 6010D
	EPA 6020B
Manganese, Total	EPA 6010D
	EPA 6020B
Nickel, Total	EPA 6010D
	EPA 6020B
Potassium, Total	EPA 6010D

Serial No.: 64739

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Metals I

Potassium, Total	EPA 6020B
Silver, Total	EPA 6010D
	EPA 6020B
Sodium, Total	EPA 6010D
	EPA 6020B
Strontium, Total	EPA 6010D
	EPA 6020B

Metals II

Aluminum, Total	EPA 6010D
	EPA 6020B
Antimony, Total	EPA 6010D
	EPA 6020B
Arsenic, Total	EPA 6010D
	EPA 6020B
Beryllium, Total	EPA 6010D
	EPA 6020B
Mercury, Total	EPA 7471B
	EPA 7474
Selenium, Total	EPA 6010D
	EPA 6020B
Vanadium, Total	EPA 6010D
	EPA 6020B
Zinc, Total	EPA 6010D
	EPA 6020B

Metals III

Cobalt, Total	EPA 6010D
	EPA 6020B
Molybdenum, Total	EPA 6010D
	EPA 6020B
Thallium, Total	EPA 6010D
	EPA 6020B
Tin, Total	EPA 6010D
	EPA 6020B
Titanium, Total	EPA 6010D

Miscellaneous

Boron, Total	EPA 6010D
Organic Carbon, Total	Lloyd Kahn Method
	EPA 9060A

Nitroaromatics and Isophorone

2,4-Dinitrotoluene	EPA 8270D
	EPA 8270E
2,6-Dinitrotoluene	EPA 8270D
	EPA 8270E
Isophorone	EPA 8270D
	EPA 8270E
Nitrobenzene	EPA 8270D
	EPA 8270E
Pyridine	EPA 8270D
	EPA 8270E

Serial No.: 64739

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Nitrosoamines

N-Nitrosodimethylamine	EPA 8270D
	EPA 8270E
N-Nitrosodi-n-propylamine	EPA 8270D
	EPA 8270E
N-Nitrosodiphenylamine	EPA 8270D
	EPA 8270E

Petroleum Hydrocarbons

Diesel Range Organics	EPA 8015D

Phthalate Esters

Benzyl butyl phthalate	EPA 8270D
	EPA 8270E
Bis(2-ethylhexyl) phthalate	EPA 8270D
	EPA 8270E
Diethyl phthalate	EPA 8270D
	EPA 8270E
Dimethyl phthalate	EPA 8270D
	EPA 8270E
Di-n-butyl phthalate	EPA 8270D
	EPA 8270E
Di-n-octyl phthalate	EPA 8270D
	EPA 8270E

Polychlorinated Biphenyls

Aroclor 1016 (PCB-1016)	EPA 8082A

Polychlorinated Biphenyls

Aroclor 1221 (PCB-1221)	EPA 8082A
Aroclor 1232 (PCB-1232)	EPA 8082A
Aroclor 1242 (PCB-1242)	EPA 8082A
Aroclor 1248 (PCB-1248)	EPA 8082A
Aroclor 1254 (PCB-1254)	EPA 8082A
Aroclor 1260 (PCB-1260)	EPA 8082A
Aroclor 1262 (PCB-1262)	EPA 8082A
Aroclor 1268 (PCB-1268)	EPA 8082A
PCB 1	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 10	EPA 1668A
	EPA 1668C
PCB 100	EPA 1668A
	EPA 1668C
PCB 101	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 102	EPA 1668A
	EPA 1668C
PCB 103	EPA 1668A
	EPA 1668C
PCB 104	EPA 1668A
	EPA 1668C

Serial No.: 64739

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Polychlorinated Biphenyls

PCB 105	EPA 1668A
	EPA 1668C
PCB 106	EPA 1668A
	EPA 1668C
PCB 107	EPA 1668A
	EPA 1668C
PCB 108	EPA 1668A
	EPA 1668C
PCB 109	EPA 1668A
	EPA 1668C
PCB 11	EPA 1668A
	EPA 1668C
PCB 110	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 111	EPA 1668A
	EPA 1668C
PCB 112	EPA 1668A
	EPA 1668C
PCB 113	EPA 1668A
	EPA 1668C
PCB 114	EPA 1668A
	EPA 1668C
PCB 115	EPA 1668A

Polychlorinated Biphenyls

PCB 115	EPA 1668C
PCB 116	EPA 1668A
	EPA 1668C
PCB 117	EPA 1668A
	EPA 1668C
PCB 118	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 119	EPA 1668A
	EPA 1668C
PCB 12	EPA 1668A
	EPA 1668C
PCB 120	EPA 1668A
	EPA 1668C
PCB 121	EPA 1668A
	EPA 1668C
PCB 122	EPA 1668A
	EPA 1668C
PCB 123	EPA 1668A
	EPA 1668C
PCB 124	EPA 1668A
	EPA 1668C
PCB 125	EPA 1668A
	EPA 1668C

Serial No.: 64739

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Polychlorinated Biphenyls	
PCB 126	EPA 1668A
	EPA 1668C
PCB 127	EPA 1668A
	EPA 1668C
PCB 128	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 129	EPA 1668A
	EPA 1668C
PCB 13	EPA 1668A
	EPA 1668C
PCB 130	EPA 1668A
	EPA 1668C
PCB 131	EPA 1668A
	EPA 1668C
PCB 132	EPA 1668A
	EPA 1668C
PCB 133	EPA 1668A
	EPA 1668C
PCB 134	EPA 1668A
	EPA 1668C
PCB 135	EPA 1668A
	EPA 1668C
PCB 136	EPA 1668A

Polychlorinated Biphenyls	
PCB 136	EPA 1668C
PCB 137	EPA 1668A
	EPA 1668C
PCB 138	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 139	EPA 1668A
	EPA 1668C
PCB 14	EPA 1668A
	EPA 1668C
PCB 140	EPA 1668A
	EPA 1668C
PCB 141	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 142	EPA 1668A
	EPA 1668C
PCB 143	EPA 1668A
	EPA 1668C
PCB 144	EPA 1668A
	EPA 1668C
PCB 145	EPA 1668A
	EPA 1668C
PCB 146	EPA 1668A

Serial No.: 64739

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Polychlorinated Biphenyls

PCB 146	EPA 1668C
PCB 147	EPA 1668A
	EPA 1668C
PCB 148	EPA 1668A
	EPA 1668C
PCB 149	EPA 1668A
	EPA 1668C
PCB 15	EPA 1668A
	EPA 1668C
PCB 150	EPA 1668A
	EPA 1668C
PCB 151	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 152	EPA 1668A
	EPA 1668C
PCB 153	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 154	EPA 1668A
	EPA 1668C
PCB 155	EPA 1668A
	EPA 1668C
PCB 156	EPA 1668A

Polychlorinated Biphenyls

PCB 156	EPA 1668C
PCB 157	EPA 1668A
	EPA 1668C
PCB 158	EPA 1668A
	EPA 1668C
PCB 159	EPA 1668A
	EPA 1668C
PCB 16	EPA 1668A
	EPA 1668C
PCB 160	EPA 1668A
	EPA 1668C
PCB 161	EPA 1668A
	EPA 1668C
PCB 162	EPA 1668A
	EPA 1668C
PCB 163	EPA 1668A
	EPA 1668C
PCB 164	EPA 1668A
	EPA 1668C
PCB 165	EPA 1668A
	EPA 1668C
PCB 166	EPA 1668A
	EPA 1668C
PCB 167	EPA 1668A

Serial No.: 64739

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Polychlorinated Biphenyls	
PCB 167	EPA 1668C
PCB 168	EPA 1668A
	EPA 1668C
PCB 169	EPA 1668A
	EPA 1668C
PCB 17	EPA 1668A
	EPA 1668C
PCB 170	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 171	EPA 1668A
	EPA 1668C
PCB 172	EPA 1668A
	EPA 1668C
PCB 173	EPA 1668A
	EPA 1668C
PCB 174	EPA 1668A
	EPA 1668C
PCB 175	EPA 1668A
	EPA 1668C
PCB 176	EPA 1668A
	EPA 1668C
PCB 177	EPA 1668A
	EPA 1668C

Polychlorinated Biphenyls	
PCB 178	EPA 1668A
	EPA 1668C
PCB 179	EPA 1668A
	EPA 1668C
PCB 18	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 180	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 181	EPA 1668A
	EPA 1668C
PCB 182	EPA 1668A
	EPA 1668C
PCB 183	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 184	EPA 1668A
	EPA 1668C
PCB 185	EPA 1668A
	EPA 1668C
PCB 186	EPA 1668A
	EPA 1668C
PCB 187	EPA 1668A

Serial No.: 64739

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Polychlorinated Biphenyls		Polychlorinated Biphenyls	
PCB 187	EPA 1668C	PCB 198	EPA 1668A
	EPA 8082A		EPA 1668C
PCB 188	EPA 1668A	PCB 199	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 189	EPA 1668A	PCB 2	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 19	EPA 1668A	PCB 20	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 190	EPA 1668A	PCB 200	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 191	EPA 1668A	PCB 201	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 192	EPA 1668A	PCB 202	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 193	EPA 1668A	PCB 203	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 194	EPA 1668A	PCB 204	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 195	EPA 1668A	PCB 205	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 196	EPA 1668A	PCB 206	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 197	EPA 1668A		EPA 8082A
	EPA 1668C	PCB 207	EPA 1668A

Serial No.: 64739

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Polychlorinated Biphenyls

PCB 207	EPA 1668C
PCB 208	EPA 1668A
	EPA 1668C
PCB 209	EPA 1668A
	EPA 1668C
PCB 21	EPA 1668A
	EPA 1668C
PCB 22	EPA 1668A
	EPA 1668C
PCB 23	EPA 1668A
	EPA 1668C
PCB 24	EPA 1668A
	EPA 1668C
PCB 25	EPA 1668A
	EPA 1668C
PCB 26	EPA 1668A
	EPA 1668C
PCB 27	EPA 1668A
	EPA 1668C
PCB 28	EPA 1668A
	EPA 1668C
PCB 29	EPA 1668A
	EPA 1668C
PCB 3	EPA 1668A

Polychlorinated Biphenyls

PCB 3	EPA 1668C
PCB 30	EPA 1668A
	EPA 1668C
PCB 31	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 32	EPA 1668A
	EPA 1668C
PCB 33	EPA 1668A
	EPA 1668C
PCB 34	EPA 1668A
	EPA 1668C
PCB 35	EPA 1668A
	EPA 1668C
PCB 36	EPA 1668A
	EPA 1668C
PCB 37	EPA 1668A
	EPA 1668C
PCB 38	EPA 1668A
	EPA 1668C
PCB 39	EPA 1668A
	EPA 1668C
PCB 4	EPA 1668A
	EPA 1668C

Serial No.: 64739

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Polychlorinated Biphenyls		Polychlorinated Biphenyls	
PCB 40	EPA 1668A	PCB 50	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 41	EPA 1668A	PCB 51	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 42	EPA 1668A	PCB 52	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 43	EPA 1668A		EPA 8082A
	EPA 1668C	PCB 53	EPA 1668A
PCB 44	EPA 1668A		EPA 1668C
	EPA 1668C	PCB 54	EPA 1668A
	EPA 8082A		EPA 1668C
PCB 45	EPA 1668A	PCB 55	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 46	EPA 1668A	PCB 56	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 47	EPA 1668A	PCB 57	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 48	EPA 1668A	PCB 58	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 49	EPA 1668A	PCB 59	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 5	EPA 1668A	PCB 6	EPA 1668A
	EPA 1668C		EPA 1668C
	EPA 8082A	PCB 60	EPA 1668A

Serial No.: 64739

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Polychlorinated Biphenyls		**Polychlorinated Biphenyls**	
PCB 60	EPA 1668C	PCB 71	EPA 1668A
PCB 61	EPA 1668A		EPA 1668C
	EPA 1668C	PCB 72	EPA 1668A
PCB 62	EPA 1668A		EPA 1668C
	EPA 1668C	PCB 73	EPA 1668A
PCB 63	EPA 1668A		EPA 1668C
	EPA 1668C	PCB 74	EPA 1668A
PCB 64	EPA 1668A		EPA 1668C
	EPA 1668C	PCB 75	EPA 1668A
PCB 65	EPA 1668A		EPA 1668C
	EPA 1668C	PCB 76	EPA 1668A
PCB 66	EPA 1668A		EPA 1668C
	EPA 1668C	PCB 77	EPA 1668A
	EPA 8082A		EPA 1668C
PCB 67	EPA 1668A	PCB 78	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 68	EPA 1668A	PCB 79	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 69	EPA 1668A	PCB 8	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 7	EPA 1668A	PCB 80	EPA 1668A
	EPA 1668C		EPA 1668C
PCB 70	EPA 1668A	PCB 81	EPA 1668A
	EPA 1668C		EPA 1668C

Serial No.: 64739

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Polychlorinated Biphenyls

PCB 82	EPA 1668A
	EPA 1668C
PCB 83	EPA 1668A
	EPA 1668C
PCB 84	EPA 1668A
	EPA 1668C
PCB 85	EPA 1668A
	EPA 1668C
PCB 86	EPA 1668A
	EPA 1668C
PCB 87	EPA 1668A
	EPA 1668C
	EPA 8082A
PCB 88	EPA 1668A
	EPA 1668C
PCB 89	EPA 1668A
	EPA 1668C
PCB 9	EPA 1668A
	EPA 1668C
PCB 90	EPA 1668A
	EPA 1668C
PCB 91	EPA 1668A
	EPA 1668C
PCB 92	EPA 1668A

Polychlorinated Biphenyls

PCB 92	EPA 1668C
PCB 93	EPA 1668A
	EPA 1668C
PCB 94	EPA 1668A
	EPA 1668C
PCB 95	EPA 1668A
	EPA 1668C
PCB 96	EPA 1668A
	EPA 1668C
PCB 97	EPA 1668A
	EPA 1668C
PCB 98	EPA 1668A
	EPA 1668C
PCB 99	EPA 1668A
	EPA 1668C

Polynuclear Aromatic Hydrocarbons

Acenaphthene	EPA 8270D
	EPA 8270E
Acenaphthylene	EPA 8270D
	EPA 8270E
Anthracene	EPA 8270D
	EPA 8270E
Benzo(a)anthracene	EPA 8270D
	EPA 8270E

Serial No.: 64739

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Polynuclear Aromatic Hydrocarbons

Benzo(a)pyrene	EPA 8270D
	EPA 8270E
Benzo(b)fluoranthene	EPA 8270D
	EPA 8270E
Benzo(g,h,i)perylene	EPA 8270D
	EPA 8270E
Benzo(k)fluoranthene	EPA 8270D
	EPA 8270E
Chrysene	EPA 8270D
	EPA 8270E
Dibenzo(a,h)anthracene	EPA 8270D
	EPA 8270E
Fluoranthene	EPA 8270D
	EPA 8270E
Fluorene	EPA 8270D
	EPA 8270E
Indeno(1,2,3-cd)pyrene	EPA 8270D
	EPA 8270E
Naphthalene	EPA 8270D
	EPA 8270E
Phenanthrene	EPA 8270D
	EPA 8270E
Pyrene	EPA 8270D
	EPA 8270E

Priority Pollutant Phenols

2,3,4,6 Tetrachlorophenol	EPA 8270D
	EPA 8270E
2,4,5-Trichlorophenol	EPA 8270D
	EPA 8270E
2,4,6-Trichlorophenol	EPA 8270D
	EPA 8270E
2,4-Dichlorophenol	EPA 8270D
	EPA 8270E
2,4-Dimethylphenol	EPA 8270D
	EPA 8270E
2,4-Dinitrophenol	EPA 8270D
	EPA 8270E
2-Chlorophenol	EPA 8270D
	EPA 8270E
2-Methyl-4,6-dinitrophenol	EPA 8270D
	EPA 8270E
2-Methylphenol	EPA 8270D
	EPA 8270E
2-Nitrophenol	EPA 8270D
	EPA 8270E
3-Methylphenol	EPA 8270D
	EPA 8270E
4-Chloro-3-methylphenol	EPA 8270D
	EPA 8270E

Serial No.: 64739

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Priority Pollutant Phenols

4-Methylphenol	EPA 8270D
	EPA 8270E
4-Nitrophenol	EPA 8270D
	EPA 8270E
Pentachlorophenol	EPA 8270D
	EPA 8270E
Phenol	EPA 8270D
	EPA 8270E

Semi-Volatile Organics

1,1'-Biphenyl	EPA 8270D
	EPA 8270E
1,2-Dichlorobenzene, Semi-volatile	EPA 8270D
	EPA 8270E
1,3-Dichlorobenzene, Semi-volatile	EPA 8270D
	EPA 8270E
1,4-Dichlorobenzene, Semi-volatile	EPA 8270D
	EPA 8270E
2-Methylnaphthalene	EPA 8270D
	EPA 8270E
Acetophenone	EPA 8270D
	EPA 8270E
Benzaldehyde	EPA 8270D
	EPA 8270E
Benzoic Acid	EPA 8270D

Semi-Volatile Organics

Benzoic Acid	EPA 8270E
Benzyl alcohol	EPA 8270D
	EPA 8270E
Caprolactam	EPA 8270D
	EPA 8270E
Dibenzofuran	EPA 8270D
	EPA 8270E

Volatile Organics

1,4-Dioxane	EPA 8270D SIM
	EPA 8270E SIM
Ethylene Glycol	EPA 8015D
Isobutyl alcohol	EPA 8015D
tert-butyl alcohol	EPA 8015D

Sample Preparation Methods

	EPA 3570
	EPA 3580A
	EPA 3050B
	EPA 3540C
	EPA 3051A

Serial No.: 64739

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved analytes are listed below:

Acrylates

Acetonitrile	EPA TO-15
Acrylonitrile	EPA TO-15
Methyl methacrylate	EPA TO-15

Chlorinated Hydrocarbons

1,2,4-Trichlorobenzene	EPA TO-15
Hexachlorobutadiene	EPA TO-15

Polychlorinated Biphenyls

PCBs and Aroclors	EPA TO-10A
	EPA TO-4A

Polynuclear Aromatics

Acenaphthene	EPA TO-13A
Acenaphthylene	EPA TO-13A
Anthracene	EPA TO-13A
Benzo(a)anthracene	EPA TO-13A
Benzo(a)pyrene	EPA TO-13A
Benzo(b)fluoranthene	EPA TO-13A
Benzo(g,h,i)perylene	EPA TO-13A
Benzo(k)fluoranthene	EPA TO-13A
Chrysene	EPA TO-13A
Dibenzo(a,h)anthracene	EPA TO-13A
Fluoranthene	EPA TO-13A
Fluorene	EPA TO-13A
Indeno(1,2,3-cd)pyrene	EPA TO-13A

Polynuclear Aromatics

Naphthalene	EPA TO-13A
	EPA TO-15
Phenanthrene	EPA TO-13A
Pyrene	EPA TO-13A

Purgeable Aromatics

1,2,4-Trimethylbenzene	EPA TO-15
1,2-Dichlorobenzene	EPA TO-15
1,3,5-Trimethylbenzene	EPA TO-15
1,3-Dichlorobenzene	EPA TO-15
1,4-Dichlorobenzene	EPA TO-15
2-Chlorotoluene	EPA TO-15
Benzene	EPA TO-15
Chlorobenzene	EPA TO-15
Ethyl benzene	EPA TO-15
Isopropylbenzene	EPA TO-15
m/p-Xylenes	EPA TO-15
o-Xylene	EPA TO-15
Styrene	EPA TO-15
Toluene	EPA TO-15
Total Xylenes	EPA TO-15

Purgeable Halocarbons

1,1,1-Trichloroethane	EPA TO-15
1,1,2,2-Tetrachloroethane	EPA TO-15
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA TO-15

Serial No.: 64740

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. JOHN TRIMBLE
ALPHA ANALYTICAL
320 FORBES BOULEVARD
MANSFIELD, MA 02048

NY Lab Id No: 11627

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2016) for the category ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved analytes are listed below:

Purgeable Halocarbons

1,1,2-Trichloroethane	EPA TO-15
1,1-Dichloroethane	EPA TO-15
1,1-Dichloroethene	EPA TO-15
1,2-Dibromo-3-chloropropane	EPA TO-15
1,2-Dibromoethane	EPA TO-15
1,2-Dichloroethane	EPA TO-15
1,2-Dichloropropane	EPA TO-15
3-Chloropropene (Allyl chloride)	EPA TO-15
Bromodichloromethane	EPA TO-15
Bromoform	EPA TO-15
Bromomethane	EPA TO-15
Carbon tetrachloride	EPA TO-15
Chloroethane	EPA TO-15
Chloroform	EPA TO-15
Chloromethane	EPA TO-15
cis-1,2-Dichloroethene	EPA TO-15
cis-1,3-Dichloropropene	EPA TO-15
Dibromochloromethane	EPA TO-15
Dichlorodifluoromethane	EPA TO-15
Methylene chloride	EPA TO-15
Tetrachloroethene	EPA TO-15
trans-1,2-Dichloroethene	EPA TO-15
trans-1,3-Dichloropropene	EPA TO-15
Trichloroethene	EPA TO-15

Purgeable Halocarbons

Trichlorofluoromethane	EPA TO-15
Vinyl bromide	EPA TO-15
Vinyl chloride	EPA TO-15

Volatile Chlorinated Organics

Benzyl chloride	EPA TO-15

Volatile Organics

1,2-Dichlorotetrafluoroethane	EPA TO-15
1,3-Butadiene	EPA TO-15
1,4-Dioxane	EPA TO-15
2,2,4-Trimethylpentane	EPA TO-15
2-Butanone (Methylethyl ketone)	EPA TO-15
4-Methyl-2-Pentanone	EPA TO-15
Acetaldehyde	EPA TO-15
Acetone	EPA TO-15
Acrolein (Propenal)	EPA TO-15
Carbon Disulfide	EPA TO-15
Cyclohexane	EPA TO-15
Hexane	EPA TO-15
Isopropanol	EPA TO-15
Methanol	EPA TO-15
Methyl tert-butyl ether	EPA TO-15
n-Heptane	EPA TO-15
tert-butyl alcohol	EPA TO-15
Vinyl acetate	EPA TO-15

Serial No.: 64740

APPENDIX E

Project Personnel Resumes

STEWART H. ABRAMS, PE

PRINCIPAL/VICE PRESIDENT

CORPORATE DIRECTOR OF REMEDIATION TECHNOLOGY

Mr. Abrams has over 35 years of experience in soil and groundwater remediation, water treatment, Brownfields redevelopment, and engineering design. He is an expert in remedial technology, with particular emphasis on bioremediation, chemical oxidation/reduction technologies, soil vapor extraction, and air sparging. He also has extensive experience in water process engineering, notably water and wastewater treatment and industrial waste treatment for organics and metals. He is also involved in the fields of emerging contaminants and sustainable remediation. Before joining Langan, Mr. Abrams held positions of National Practice Leader for Remediation at a national consulting and engineering company and as vice president of operations at an environmental R&D firm. He is the founder of Langan's treatability facility, a joint venture with the New Jersey Institute of Technology (NJIT), whereby Langan personnel perform a wide variety of treatability and research studies for soil, groundwater and sediments.

SELECTED PROJECTS

Emerging Contaminants – Technical Director for a complex treatment upgrade project. Onsite pump and treat systems that do not currently address 1,4-dioxane, are being upgraded via the addition of an advanced oxidation process (AOP). Offsite, a public water supply, which had included air stripping for trichloroethylene removal, requires upgrade to address 1,4-dioxane and PFAS. AOP coupled with granular activated carbon is the selected approach. Treatability studies for various AOP processes; as well GAC were performed prior to final to final process selection. Mr. Abrams consults to a Superfund site where he formulates natural attenuation and other strategies for 1,4-dioxane. For the Interstate Technology Regulatory Council (ITRC), Mr. Abrams is one of a handful of experts on PFAS treatment providing seminars nationwide.

Peer Review Activities – Mr. Abrams serves routinely as an independent third party reviewer of remediation plans for Fortune 500 clients. This work is often performed in a collaborative panel format with other reviewers.

Technology Development Consulting - Mr. Abrams has an ongoing consulting relationship with a venture-capital technology start-up in the PFAS treatment field. He advises the firm on the engineering aspects of various developmental technologies.

Expert Testimony. Mr. Abrams has served as a testifying expert witness in both State and Federal Court. He has also been deposed and has prepared expert reports for submission as evidence.

Experimental Work – At Langan's Treatability Facility at the NJIT, recently directed a bench scale research test of an emerging technology for PFOS treatment, i.e., electrocoagulation. Findings showed the electrochemical adsorption may be a feasible as a more cost-effective alternative to conventional GAC.

EDUCATION

M.S., Environmental Sciences Rutgers University

B.S., Civil Engineering Rutgers University

B.A., Political Science Rutgers University

PROFESSIONAL REGISTRATION

Professional Engineer (PE) in NJ, NY, PA, NC

AFFILIATIONS

Battelle Conference on Bioremediation and Sustainable Remediation Technologies 2019 – Steering Committee Member

New Jersey Institute of Technology (NJIT) – Albert Dorman Honors College – Board of Visitors (2018-present)

PFAS Experts Symposium 2019, 2021. Chair – Available In-Situ Technologies Committee

Remediation Journal – Editorial Board (2019 – present)

Thermal Remediation – Directed the installation and operation of an in-situ Thermal Conductive Heating project to remediate PCE and naphthalene in both groundwater and soil. System successfully remediated soils to stringent NJDEP standards. Subsequently, directed the use of bioremediation "polishing" to remove

Injectable Activated Carbon – Providing technical direction for several projects utilizing this technology for the remediation of VOCs in sources areas.

MTBE/Propane Bioaugmentation – First use of propane infusion at a gasoline station to bioremediate MTBE. Combined use of low-level propane with oxygen infusion has been shown to promote the direct remediation of ethers, notably MTBE, with concentrations driven to non-detect in less than four months. Used bioaugmentation.

Zero Valent Iron – Directed the use of injected zero-valent iron for remediating chlorinated solvents at a Brownfield site. Pneumatic fracturing was used to inject 500,000 pounds of micro-scale iron into the shallow bedrock source zone. This process resulted in remediation of the 20,000-square-foot source zone and conditions favorable to the long-term natural attenuation of the plume.

Sulfate Reduction – Directing the use of sulfate addition (Epsom salts) in the remediation of benzene-contaminated soils and groundwater. Microcosm and column treatability studies completed. Directed use of gypsum for full scale sulfate reduction at Brownfield site.

Emulsified Zero Valent Iron (EZVI) – Directed combined use of emulsified vegetable oil and zero valent iron (NASA Patented technology) at a two separate sites: A Brownfield site in Brooklyn, NY and a dry cleaner in New Jersey. NJ site combined EZVI with pneumatic fracturing injection under the floor of the operating dry cleaner.

Ex-situ chemical oxidation mixing –Technical Director of large iron-activated persulfate soil mixing project. Contaminants in soil and groundwater include primarily chlorinated benzenes. Mixing accomplished via "Lang Tool". On-site laboratory utilized for oxidation optimization in real-time.

In-situ chromium remediation – Directed the in-situ remediation of hexavalent chromium through the use of calcium polysulfide (CaSx) addition injection. Injections performed both inside the building as well as outside. Pneumatic fracturing used for injection in shallow bedrock. Monitoring showed that concentrations in the source area groundwater declined to non-detect from 15,000 ug/l in less than a week.

Pump & Treat – Directed the design, installation and operation of a pump and treat system located in southeastern Pennsylvania. Unit processes include filtration, air stripping and granular activated carbon. Constructed in 2013, the system mitigates migration of a plume into a potable water supply.

New Jersey Turnpike, Cranbury, NJ – Managed design (pilot testing, conceptual, and plans and specifications) of a remediation system consisting of 77 air-sparging (AS) wells and 37 soil vapor extraction (SVE) wells for the New Jersey Turnpike at the Molly Pitcher Service Area. Oversaw installation and system startup. Innovative one-day AS/SVE pilot test. Volatilization and destruction of 10,000 gallons of subsurface free product. First use of catalytic oxidation at a Turnpike facility for air-pollution control.

Sustainable Remediation Forum (SURF) (2009 – present)

ITRC Perfluorinated Contaminants Committee (2017 – present) – Subcommittee on Remediation & Treatment

ITRC Integrated Chlorinated Site Remedy Committee (2007 – 2009)

NJDEP Advisory Council on Environmental Justice (2002 - 2004, 2006 - 2013)

Governor-elect Corzine Environmental Policy Transition Committee (2005 – 2006)

NJDEP Remediation Stakeholders Committee (2007 - 2009)

Woodlands Superfund Site, Woodland Twp., NJ – As a subcontractor to *de maximis, inc.,* directed the subsurface design, installation and testing of a major air sparging/SVE system (+200 vertical wells) for a Superfund site in southern New Jersey. Work involved pilot testing of air sparging, SVE pneumatic modeling, early use of CPT/MIPS, and an extensive well-installation using sonic drilling.

GE – Schenectady, NY – Served as technical director for the design of a comprehensive remediation program for a New York state site involving the bioremediation of three VOC plumes and the collection and treatment of leachate seeps. Supported GE Researchers in performing flow-through laboratory column tests using innovative sulfate reduction techniques to remediate a BTEX plume. Led the scale-up of this column study into a design.

BROS Superfund Site, Bridgeport, NJ – Directed extensive laboratory treatability studies and design scale-up of aerobic and anaerobic bioremediation, in-situ Fenton's reagent for chlorinated solvents, and BTEX and cometabolic testing of BCEE degradation. Bench testing was correlated to a site conceptual model, with particular tests tailored to conditions in specific segments and zones of the aquifer. This included detailed work plans for submission to USEPA Laboratories in Cincinnati and Oklahoma.

TCE & Chromium combined – Site with both Cr+6 and TCE contamination being contained by a pump-and-treat system. Pursued pump-and-treat shutdown strategy through laboratory testing and a comprehensive feasibility study. Zero-valent iron, bioremediation, calcium polysulfide, and ferrous sulfate were all lab-tested. Directed the field pilot testing of bioaugmentation and nano-scale zero-valent iron at the sites. Bioaugmentation selected for full scale, since it was highly effective for both Cr^{+6} and TCE.

TCE Cometabolic Bioaugmentation – Innovative first use of aerobic bioaugmentation for the shutdown of a 20-year-old pump-and-treat system in 1995. TCE and daughter products were the contaminants of concern. Shutdown occurred over six months through the repeated injection of bioaugmentation culture.

Zero Valent Iron for P&T Shutdown – Directed the use of injected zero-valent iron at a northern New Jersey site for the remediation of chlorinated solvents. Pneumatic fracturing used to inject micro-scale iron into the recovery zone. Temporary shutdown permission obtained from NJDEP. Injection was a significant success, resulting in permanent cessation of pump-and-treat activities at the site.

TCE Bioaugmentation – Directed the injection of emulsified vegetable oil, followed by bioaugmentation culture, in an aquifer contaminated with PCE. Aquifer preconditioned with baker's yeast and sugar, prior to injection of EVO. Bioaugmentation activities completed in April 2012. Second source area was remediated via in-situ thermal remediation in 2014.

Horizontal Injection Wells for Permanganate Injection – Directed the injection of over 400,000 pounds of potassium permanganate for chlorinated solvent destruction at a large Brownfields site in Maryland. Extensive use of horizontal wells. Work performed under a fixed-price contract with blended finite insurance. This project awarded the prestigious Phoenix Award for EPA Region 3 by the National Brownfields Association.

Selected Publications, Reports, and Presentations

PFAS Experts Symposium: White Paper. Position paper prepared by a group of 40 experts convened under the auspices of Remediation Journal. September 2019.

Treatment Technology for Perfluorinated Compounds. Presented at ITRC PFAS Annual Meeting. Boston, MA. March 2019.

Treatment Technology for Perfluorinated Compounds. Presented at ITRC PFAS Training Program. Montclair State University, New Jersey. October 2018.

Use of In-Situ Remediation Technology at Brownfield Sites – Case Studies. Presented at Battelle Symposium on Remediation of Chlorinated and Recalcitrant Compounds, Palm Springs, CA. (April 2018).

Air Sparging Technology Status Review: Advanced Design and Implementation Tools. Joint with Omer Uppal. Presented at Battelle Symposium on Bioremediation of Chlorinated and Recalcitrant Compounds, Palm Springs, CA. (May 2016).

Evaluation of Remedial Alternatives via Three Bench-Scale Treatability Studies for a Mixed Dense Non-Aqueous Phase Plume. Presented at Battelle International Symposium on Bioremediation and Sustainable Environmental Technologies, Jacksonville, FL. (June 2013).

Geng, X., Boufadel, M.C., Lee, K., Abrams, S., Suidan, M. (2014). Biodegradation of subsurface oil in a tidally influenced sand beach: Impact of hydraulics and interaction with pore water chemistry. *AGU Water Resources Research, 51,* 3193 – 3218.

From Flask to Field – The Role of Treatability and Pilot Tests in Remediation. Presented to Association of Environmental & Engineering Geologists (AEG) New York/Philadelphia Section, Somerset, NJ. (December 2014).

Evaluation of Remedial Alternatives via Three Bench-Scale Treatability Studies for a Mixed Dense Non-Aqueous Phase Plume. Presented at Battelle International Symposium on Bioremediation and Sustainable Environmental Technologies, Jacksonville, FL. (June 2013).

Sustainable Remediation and SURF. Presented at RE3 Conference, Atlantic City, NJ. (November 2012).

Application of Pneumatic Fracturing and Zero-valent Iron for a Maryland Brownfield Site. Presented at Battelle International Symposium on In-Situ and Sustainable Technologies, Monterey, CA. (May 2012).

Integrating Remediation and Redevelopment. Presented at Honeywell "All-Hands" RES Meeting, Morristown, NJ. (December 2011).

Assessing Innovative Remedial Technologies. Presented to Environmental Bankers Association, Charlotte, NC. (January 2009).
Time, Cost & Effectiveness: Assessing Innovative Remedial Technologies. Presented at ITRC/Langan Conference, East Brunswick, NJ. (June 2008).

Remediation Technology Pitfalls. Presented at Prudential Realty Investors Conference, New Orleans, LA. (December 2008).

Selecting Innovative Remedial Technologies. Presented at NJ Innovative Environmental Technology Conference, Newark, NJ. (October 2007).

Bioaugmentation for Site Remediation. Presented at AWMA Central New York Conference, Syracuse, NY. (March 2007).

Selecting Innovative Remedial Technologies. Presented at NJ Innovative Environmental Technology Conference, Newark, NJ. (October 2007).

Use of Persulfate for MTBE Remediation. Presented by Abrams, S.H. & E. Mott-Smith at AEHS West Conference, San Diego, CA. (March 2006).

Innovative Approaches to Chlorinated Solvent Remediation. Presented to Conference of Envirogen clients. Oak Brook, IL. (May 2002).

Bioremediation. Guest Lecturer at Rutgers Graduate School, New Brunswick, NJ. (October 2001).

Biosparging and Bioventing for In-situ Cleanup. Guest Lecturer at Rutgers Graduate School, New Brunswick, NJ. (April 1995).

NPDES Permitting in the Pulp & Paper Industry. Presented at Delaware Valley Section Meeting, Yardley, PA. (November 1991).

Strategies to Minimize Liabilities Under the New Jersey Clean Water Enforcement Act. Presented to New Jersey Business & Industry Association, West Windsor, NJ. (October 1990).

Meeting EPA's Organic Chemicals Plastics and Synthetic Fibers Pretreatment Regulations. Presented at Mid-Atlantic Industrial Waste Conference, Harrisburg, PA. (June 1989).

Design of Packed Columns for Water Treatment. Guest Lecturer at Rutgers Graduate School, New Brunswick, NJ. (March 1987).

Workshop on Response to Volatile Organics in Public Water Supplies. Presented to water suppliers at Technology transfer session. Edison, NJ (March 1987).

AMANDA FORSBURG, CHMM

SENIOR PROJECT SCIENTIST

BROWNFIELD REDEVELOPMENT, DUE DILIGENCE AND SITE INVESTIGATION, REMEDIAL ACTIONS

Ms. Forsburg has 14 years of experience primarily focused on providing environmental support to redevelopment sites within the metropolitan New York area. She has experience with projects in the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) and Spill Programs, New York City Office of Environmental Remediation (NYCOER) E-Designated and New York City Voluntary Cleanup Program (VCP) sites, and New York City Department of Environmental Protection (NYCDEP) remediation sites. Her field experience includes implementation and management of all phases of environmental projects involving soil, groundwater, and soil vapor contamination including Phase I inspections, Phase II site investigations, Remedial Investigations, and Remedial Actions.

During her tenure at Langan, Ms. Forsburg's experience has included schematic-, design-, and construction-phase project team involvement on numerous large scale construction projects requiring multi-disciplinary coordination and collaboration across different Langan teams and offices.

SELECTED PROJECTS

- 101 Murray Street, New York, NY (NYSDEC Spill Site, Multi-discipline)
- 110 University Place, New York, NY (NYSDEC Spill Site, Multi-discipline)
- 138 Willoughby Street, Brooklyn, NY (NYCOER E-Designation Site, Multi-discipline)
- 180 East 125th Street, New York, NY (NYCOER E-Designation Site, Multi-discipline)
- 1905 Surf Avenue, Brooklyn, NY (NYCOER E-Designation Site, Multi-discipline)
- 1921 Atlantic Avenue, Brooklyn, NY (NYSDEC BCP Site)
- 225 East 39th Street, New York, NY (NYCDEP Remediation Site, Multi-Discipline)
- 23-30 Borden Avenue, Queens, NY (NYSDEC BCP Site, Multi-discipline)
- 28-90 Review Avenue, Queens, NY (NYSDEC BCP Site, Multi-discipline)
- 280 West 155th Street, New York, NY (NYSDEC BCP Site, Multi-discipline)
- 311 West 42nd Street, New York, NY (NYCOER E-Designation Site, Multi-discipline)
- 363 and 365 Bond Street, Brooklyn, NY (NYSDEC BCP Site, Multi-discipline)
- 400 Park Avenue South, New York, NY (NYCOER E-Designation and VCP Site)
- 412 Greenwich Street, New York, NY (NYCOER E-Designation Site, Multi-discipline)

EDUCATION

B.A., Environmental Studies
Bucknell University

B.A., Environmental Geology
Bucknell University

PROFESSIONAL REGISTRATION

Certified Hazardous Materials Manager (CHMM)

OSHA 29 CFR 1910.120 Certification (HAZWOPER)

AFFILIATIONS

New Jersey Society of Women Environmental Professionals (NJSWEP) - MetroNet Committee

Association of Environmental and Engineering Geologists

Professional Women in Construction

Urban Land Institute, Norther New Jersey Chapter - Women's Leadership Initiative Co-Chair

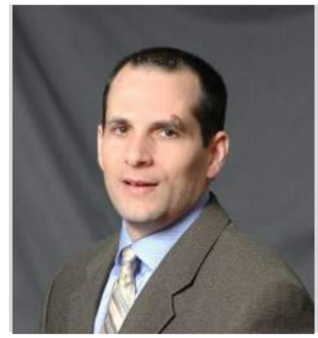
LANGAN

- 42-50 24^{th} Street, Queens, NY (NYSDEC Spill Site, Multi-discipline)
- 460 West 41^{st} Street, New York, NY (NYCOER E-Designation Site, Multi-discipline)
- 505 West 19th Street, New York, NY (NYCOER E-Designation Site, Multi-discipline)
- 508 West 24th Street, New York, NY (NYCOER E-Designation and VCP Site, Multi-discipline)
- 525 West 52nd Street, New York, NY (NYCOER E-Designation Site, Multi-discipline)
- 53 West 53rd Street (MoMA Expansion), New York, NY (NYCOER E-Designation Site, Multi-discipline)
- 54 Crown Street, Brooklyn, NY (NYCOER E-Designation and VCP Site, Multi-discipline)
- 540 West 26th Street, New York, NY (NYSDEC Spill Site, Multi-discipline)
- 550 Tenth Avenue, New York, NY (NYCOER E-Designation Site, Multi-discipline)
- 68 Charlton Street, New York, NY (NYCOER E-Designation Site, Multi-discipline)
- Broome Street Parking Lot Site, New York, NY (NYSDEC BCP Site, Multi-discipline)
- Marble Collegiate Church Office Building, New York, NY (Multi-discipline)
- Norfolk Street Site, New York, NY (NYCOER E-Designation Site, Multi-discipline)

ANTHONY MOFFA, JR., ASP, CHMM, COSS, CSP

ASSOCIATE/CORPORATE HEALTH AND SAFETY MANAGER

Anthony is Langan's Corporate Health & Safety Manager and is responsible for managing health and safety compliance in all Langan office locations. He has nearly 20 years of experience in the health and safety field. He is responsible for ensuring compliance with all federal and state occupational health and safety laws and development and implementation of corporate health and safety policies. His responsibilities include reviewing and updating Langan's Corporate Health and Safety Program and assisting employees in the development of site specific Health & Safety Plans. He maintains and manages health and safety records for employees in all Langan office locations including medical evaluations, respirator fit testing, and Hazardous Waste Operations and Emergency Response training. He is also responsible for documentation and investigation of work-related injuries and incidents and sharing this information with employees to assist in the prevention of future incidents. He is also the chairman of the Corporate Health & Safety Committee and Health & Safety Leadership Team that meet periodically throughout the year. He is responsible for coordinating and providing health and safe training to Langan employees. He was formerly the Environmental, Health and Safety Coordinator at a chemical manufacturer. His experience included employee hazard communications, development of material safety data sheets for developed products, respirator fit testing and conducting required Occupational Health & Safety Association and Department of Transportation training.



EDUCATION

B.S., Physics
West Chester University

PROFESSIONAL REGISTRATION

Associate Safety Professional (ASP)

Certified Hazardous Material Manager (CHMM)

Certified Occupational Safety Specialist (COSS)

Certified Safety Professional (CSP)

AFFILIATIONS

Pennsylvania Chamber of Business & Industry

Chemical Council of New Jersey

New Jersey Business & Industry Association

Geoprofessional Business Association

American Society of Safety Professionals

LANGAN

Steven Ciambruschini, PG, LEP

Principal/Vice President

Environmental Site Assessments/Investigations, Brownfield Remediation, UST Management

33 years in the industry ~ 28 years with Langan

Mr. Ciambruschini has over 30 years of experience in hydrogeologic and environmental investigations including management of environmental and geotechnical investigations relating to petroleum and chlorinated solvent spill sites, underground storage tank sites, manufactured gas plant sites, landfills, wastewater treatment facilities and industrial/commercial sites. His experience includes managing environmental compliance audits, remedial investigation, pre-acquisition due diligence and permitting assessment, feasibility studies and design, construction and operation of complex innovative remediation systems to treat, contain and recover contaminated soil and groundwater. These projects are managed under various NJDEP, PADEP, NYDEC, NYCDEP and CTDEP programs. Mr. Ciambruschini provides consultation to a diverse group of clients including private developers, utilities, retail and industrial facilities and is expert in assessing remediation options and funding options under various state and federal grant, loan and tax reimbursement programs including Brownfield programs.

Selected Projects

- Brodson Property, Montville NJ, (RCRA, NJDEP ACO Cleanup)
- Carroll Gardens, Brooklyn, NY (NY Brownfield, EPA Superfund, OER E-designated Site)
- Con Edison Appendix B Spill Sites - Various Locations, NY
- Former MGP Site, Brooklyn, NY (VCP Site)
- Extell Development, Hudson Yards, New York, NY (NYC E-designated, NYS Brownfield Site)
- Pan Graphics, Bergen County, NJ (ISRA, LSRP)
- New Jersey Turnpike General Environmental Services Contract, Various Sites, NJ
- Liberty Science Center, Jersey City, NJ (EO 215)
- Blue Back Square, West Hartford, CT (UST, Transfer Act, Brownfield)
- Hershey, Act II Investigation (PA VCP)
- Hershey, Naugatuck, CT (CT Transfer Act)
- Halby Chemical Sites, Various Sites, DE (CERCLA)
- Unisys, Middletown CT, (CT Transfer Act, Brownfield)
- Ryder Rental, Various Sites in CT (CT Transfer Act)
- St. Marks Avenue, Brooklyn, NY (Vapor Mitigation)
- Pan Graphics, Lodi, NJ (Eco Risk Assessment, LSRP)

Education

M.S., Geology
Montclair State University

M.A., Environmental Science
Montclair University

B.S., Environmental Science
Cook College, Rutgers University

Professional Registration

Professional Geologist (PG) in NY, DE, KY

Licensed Environmental Professional (LEP) in CT

Underground Storage Tank License in NJ

Affiliations

National Ground Water Association

Association of Ground Water Scientists and Engineers

American Association of Petroleum Geologists

Environmental Professionals of Connecticut

American Bar Association (ABA)

LANGAN

ASHLEY SANDVE

SENIOR STAFF ENGINEER

ENVIRONMENTAL ENGINEERING

Ms. Sandve's 6 years of experience includes field work and office work on environmental investigation and remediation projects. Her field work experience includes soil, soil vapor, indoor air and groundwater sampling; drilling oversight; air monitoring; soil management; and remediation oversight, including excavation and off-site soil disposal. Her office work experience includes environmental site background research, state environmental database research, EQuIS database management, data evaluation, remedial design, and report work, including, but not limited to, Phase I ESAs, Preliminary Assessment/Site Investigations, Spill Closure Reports, Remedial Investigation Reports, Remedial Action Work Plans, and Remedial Action Reports. Ms. Sandve is proficient in excel and database management and has ample experience researching sites through the online NJDEP and NYSDEC portals.

SELECTED PROJECTS

- 1921 Atlantic Avenue, NYSDEC BCP Site Remediation, Brooklyn, New York
- 28-90 Review Avenue, NYSDEC BCP Site Remediation, Queens, NY
- 550 Tenth Avenue, NYSDEC BCP Site Remediation, New York, NY
- Norfolk Street Site, NYCOER E-Designation Remediation, New York, NY
- Broome Street Parking Lot Site, NYSDEC BCP Site Remediation, New York, NY
- 1538 Stillwell Avenue, NYCOER E-Designation and VCP Site Remediation, Bronx, NY
- 540 West 26th Street, NYSDEC Spills Redevelopment, Remedial Action, New York, NY
- 412 Greenwich Street, NYCOER E-Designation Remediation, New York, NY
- 125 Greenbush Road, Soil and Groundwater Investigation, Orangeburg, NY
- 12 West 48th Street, Phase II Environmental Investigation, New York, NY
- 68 Charlton Street, NYCOER E-Designation Remediation, New York, NY
- Carlyle Residential Portfolio, Brooklyn & Queens, NY
- Phase I Environmental Site Assessments and Due Diligence Investigations, Various Sites, NJ and NY
- Former Penick Corporation Facility RCRA Site, Data Management, Remedial Investigation, and Remedial Action, Montville, NJ
- Former Hess Terminal, Remediation Oversight, Edgewater, NJ
- Stop & Shop, Soil Vapor Intrusion Investigation, Emerson, NJ
- ThorLabs, Groundwater and Soil Vapor Intrusion Investigation, Andover, NJ
- Bright Horizons, Preliminary Assessment and Site Investigation, Roseland, NJ

EDUCATION

B.E., Environmental Engineering
Stevens Institute of Technology

PROFESSIONAL REGISTRATION

OSHA 29 CFR 1910.120 Certification (HAZWOPER)

MARLENA JEWETT

DATA ANALYST

CAD/GIS

1 year in the industry

Proposed Title: Field Technician

Ms. Jewett is a data analyst with experience in database design, management and visualization using EarthSoft's EQuIS™ database in support of environmental site characterizations for sites regulated under federal and state compliance programs. Her expertise includes integration of analytical databases and coordination with GIS users.

In her current role Marlena assists project teams with planning and implementation of project databases and data visualization. This includes coordinating with field staff and laboratories to define, workflows, SOPs and ensure the receipt of the proper deliverables for field and lab data; reviewing and managing project data and information using EQuIS™, Microsoft® Access, and Excel; generating data reports including tables, graphs, charts, and GIS compatible files; and generating and reviewing electronic data deliverables following project or agency specific formats.

Education

B.A., Environmental Economics
Colgate University

Work History

Equitable Advisors
Financial Advisor
9/7/2020-4/23/2021

Langan
Data Analyst
5/10/2021 – Present

SELECTED PROJECTS

EQuIS Management and NYSDEC deliverables – Data Analyst. Loaded and maintained soil, groundwater, and soil vapor data in an EQuIS database for a remedial investigation and waste characterizations of New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP), NYC Office of Environmental Remediation (OER), and due diligence sites. Provided final report deliverables including sample summaries; tags; and exceedance summary exports from EQuIS. Completed this work for the following projects:

- **2-8 Main Street**
- **28-90 Review Avenue**
- **34-15 10th Street**
- **37-11 30th Street**
- **44-01 Northern Boulevard**
- **45 Commercial Avenue**
- **50 Jersey Avenue**
- **111 Willow Street**
- **118 West 13th Street**
- **122 Fifth Avenue**
- **155 Third Street**
- **160 East 125th Street**
- **210 Clarkson Avenue**
- **241 West 28th Street**
- **266 West 96th Street**
- **445 Gerard Avenue**
- **475 Bay Street and 31 Wave Street**

- **495 Peninsula Boulevard**
- **561 Greenwich Street**
- **563 Sackett Street**
- **805-825 Atlantic Avenue**
- **1525 Bedford Avenue**
- **2455 Third Avenue**
- **4650 Broadway**
- **ABC Block 27**
- **Bay Crane**
- **Broome Street**
- **Former Grant Hardware**
- **Forsyth and Delancy Street**
- **Gowanus Canal Northside**
- **Greenpoint Landing E1**
- **Greenpoint Landing Parcel H3**
- **John Evans**
- **Kissena Boulevard**
- **NYCHA Farragut**
- **Remeeder**

JOSEPH CONBOY

STAFF CHEMIST

ENVIRONMNETAL

Mr. Conboy has seven years of environmental chemistry, quality assurance, and environmental database management experience, with a current emphasis on validation of laboratory data for submittal to NJDEP via the New Jersey Data of Known Quality Protocols and to NYSDEC. Previous work experience includes performing validation of data for projects in USEPA Regions 2 and 3 while employing appropriate validation guidelines for each region, managing large data sets, updating appropriate regulatory limits, performing statistical evaluations, and preparing electronic data deliverables and report deliverables using the Earthsoft EQuIS database program, and acted as an intermediary between project managers, field staff, and laboratories. Mr. Conboy also has experience in field sampling techniques and maintains current OSHA HAZWOPER certification.

EDUCATION

B.Sc., Chemistry with a minor in Mathematics
Rowan University

CERTIFICATIONS & TRAINING

OSHA 40-Hour HAZWOPER 29 CFR 1910.120(e)(4) Certification

NJ Analytical Guidance and Data Usability Training

USEPA Data Validation Training

Earthsoft EQuIS Environmental Database Training

SELECTED PROJECTS

- 1400 Ferris, Bronx, NY – Completed validation of soil and groundwater data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOCs and SVOCs including 1,4-dioxane, and tangentially used based on professional judgment to perform validation of PFAS data.
- Broome Street Parking Lot, NY - Completed validation of waste characterization data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOCs, SVOCs, herbicides, PCBs, pesticides, metals including mercury, ignitability temperature, pH, reactive cyanide, reactive sulfide, cyanide, and hexavalent chromium. Toxicity characteristic leachate procedure extraction data for VOCs, SVOCs, herbicides, pesticides, metals, and mercury were also validated.
- 215 North 10th Street, Brooklyn, NY - Completed validation of soil and groundwater data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data.
- 35 Commercial Street, Brooklyn, NY - Completed validation of soil data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data, and tangentially used based on professional judgment to perform validation of PFAS data.
- Suffolk Street, Lower East Side, NY- Completed validation of soil, groundwater, and soil vapor data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II

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

- Managed a database for a confidential client containing 10+ years of environmental chemical data from multiple laboratories, requiring select data validation in accordance with New Jersey Data of Known Quality Protocols and identifying areas of delineation from historic field information. Once identified, NJDEP designated groundwater, surface water, soil, sediment, soil vapor, and custom screening criteria were researched and applied to each area, requiring individualized flagging for reporting.*
- Prepared the New Jersey Data of Known Quality Protocol Data Usability Evaluation and managed the database for a confidential client for a data set greater than 20 years old. A DUE or any validation effort was not prepared in the 20 years prior to current. This included data from variations of methods for volatile organic compounds, semivolatile organic compounds, total and dissolved metals, pesticides, herbicides, natural attenuation parameters, and per- and polyfluoroalkyl substances in multiple media.*
- Performed 200+ Stage 2a validations for a combined 87-acre USEPA designated Corrective Action site under the Resource Conservation and Recovery Act, including a quick-turn USEPA required PCB by soxhlet extraction investigation across multiple plants. Once a former train car painting facility, USEPA required a quick-turn PCB by soxhlet extraction soil investigation.
- Preparation of a quality assurance program for a confidential client in West Virginia. A quick turn QAPP was prepared in a service location new to the consultant, resulting in research into state requirements for data usability and auditing newly employed laboratories. The QAPP was understood to be prepared for groundwater only, but the client did not reveal the need for sediment and soil. Two QAPPs were submitted for review to governing agencies.*
- Used statistical software to determine a localized background upper confidence limit of chromium for a confidential client's sand and gravel site. Validation was used to confirm laboratory procedures, and data was used in ProUCL calculations to compare to researched background chromium levels for Pennsylvania soils. *
- Prepared daily perimeter dust and air monitoring summaries and validation of low level mirex data for a confidential client's superfund site. Low level mirex data was generated by university laboratories and subject to validation following national functional guidelines to aide in river clean-up, including sediment, surface water, and treatment system water matrices.*

*Project completed prior to employment at LANGAN.

APPENDIX F

Citizen Participation Plan

NEW YORK STATE | Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
1487 1st Avenue Redevelopment Site

August 2022

C231152
1487 1st Avenue
Manhattan
New York County, New York

Draft

Contents

*** * * * ***

Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the site's investigation and cleanup process.

Applicant: **CP VII 78th Street Owner, LLC ("Applicant")**
Site Name: **1487 1st Avenue Redevelopment Site ("Site")**
Site Address: **1487 1st Avenue, Manhattan, NY**
Site County: **New York**
Site Number: **C231152**

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as "brownfields" so that they can be reused and developed. These uses include recreation, housing, and business.

A *brownfield* is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal, and financial burdens on a community. If a brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants who conduct brownfield site investigation and cleanup activities. An Applicant is a person who has requested to participate in the BCP and has been accepted by NYSDEC. The BCP contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at:
http://www.dec.ny.gov/chemical/8450.html .

2. Citizen Participation Activities

Why NYSDEC Involves the Public and Why It Is Important

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well-being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision makers form or adopt final positions.

Involving citizens affected and interested in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment

- Improving public access to, and understanding of, issues and information related to a particular site and that site's investigation and cleanup process

- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process

- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community

- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's investigation and cleanup program. The public's suggestions about this CP Plan and the CP program for the site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Locations of Reports and Information

The locations of the reports and information related to the site's investigation and cleanup program also are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some documents may be placed on the NYSDEC web site. If this occurs, NYSDEC will inform the public in fact sheets distributed about the site and by other means, as appropriate.

Site Contact List

Appendix B contains the site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and cleanup process. The site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.
The site contact list includes, at a minimum:

- chief executive officer and planning board chairperson of each county, city, town and village in which the site is located;
- residents, owners, and occupants of the site and properties adjacent to the site;
- the public water supplier which services the area in which the site is located;
- any person who has requested to be placed on the site contact list;
- the administrator of any school or day care facility located on or near the site for purposes of posting and/or dissemination of information at the facility;
- location(s) of reports and information.

The site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

Note: The first site fact sheet (usually related to the draft Remedial Investigation Work Plan) is distributed both by paper mailing through the postal service and through DEC Delivers, its email listserv service. The fact sheet includes instructions for signing up with the appropriate county listserv to receive future notifications about the site. See http://www.dec.ny.gov/chemical/61092.html .

Subsequent fact sheets about the site will be distributed exclusively through the listserv, except for households without internet access that have indicated the need to continue to receive site information in paper form. Please advise the NYSDEC site project manager identified in Appendix A if that is the case. Paper mailings may continue during the investigation and cleanup process for some sites, based on public interest and need.

CP Activities

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the site's investigation and cleanup program. The flowchart in Appendix D shows how these CP activities integrate with the site investigation and cleanup process. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site.

- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the site's investigation and cleanup process with questions, comments, or requests for information.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of investigation and cleanup activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

Technical Assistance Grant

NYSDEC must determine if the site poses a significant threat to public health or the environment. This determination generally is made using information developed during the investigation of the site, as described in Section 5.

If the site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the site.

As of the date the declaration (page 2) was signed by the NYSDEC project manager, the significant threat determination for the site had not yet been made.

To verify the significant threat status of the site, the interested public may contact the NYSDEC project manager identified in Appendix A.

For more information about TAGs, go online at
http://www.dec.ny.gov/regulations/2590.html

Note: The table identifying the citizen participation activities related to the site's investigation and cleanup program follows on the next page:

Citizen Participation Activities	Timing of CP Activity(ies)
Application Process:	
• Prepare site contact list • Establish document repository(ies)	At time of preparation of application to participate in the BCP.
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period • Publish above ENB content in local newspaper • Mail above ENB content to site contact list • Conduct 30-day public comment period	When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement (BCA):	
• Prepare Citizen Participation (CP) Plan	Before start of Remedial Investigation **Note:** Applicant must submit CP Plan to NYSDEC for review and approval within 20 days of the effective date of the BCA.
Before NYSDEC Approves Remedial Investigation (RI) Work Plan:	
• Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan • Conduct 30-day public comment period	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.
After Applicant Completes Remedial Investigation:	
• Distribute fact sheet to site contact list that describes RI results	Before NYSDEC approves RI Report
Before NYSDEC Approves Remedial Work Plan (RWP):	
• Distribute fact sheet to site contact list about draft RWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period	Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period.
Before Applicant Starts Cleanup Action:	
• Distribute fact sheet to site contact list that describes upcoming cleanup action	Before the start of cleanup action.
After Applicant Completes Cleanup Action:	
• Distribute fact sheet to site contact list that announces that cleanup action has been completed and that NYSDEC is reviewing the Final Engineering Report • Distribute fact sheet to site contact list announcing NYSDEC approval of Final Engineering Report and issuance of Certificate of Completion (COC)	At the time the cleanup action has been completed. **Note:** The two fact sheets are combined when possible if there is not a delay in issuing the COC.

3. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern that relate to the site. Additional major issues of public concern may be identified during the course of the site's investigation and cleanup process.

The following potential major issues of public concern were identified: construction-related air quality, health of workers and community, nuisance odors, noise and traffic. These issues are of the most concern to Site workers and to adjacent property owners, businesses, and residents. These issues will be addressed in the Community Air Monitoring Program (CAMP) and site-specific Health and Safety Program (HASP) for the project to be approved by the NYSDEC prior to the respective phases of work.

According to the mapping tool maintained online by the New York City Mayor's Office of Climate & Environmental Justice, the Site is not located within an Environmental Justice Area. However, according to the NYSDEC DECinfo Locator mapping tool, the site is located in an Environmental Justice Area. Environmental Justice is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Environmental justice efforts focus on improving the environment in communities, specifically minority and low-income communities, and addressing disproportionate adverse environmental impacts that may exist in those communities.

The NYSDEC "Scoping Sheet for Major Issues of Public Concern" was used to complete this section (see Appendix E).

4. Site Information

Appendix C contains a map identifying the location of the site.

Site Description

The Site is located in the Upper East Side neighborhood of Manhattan, New York and is identified as Block 1452, Lots 27, 28, 29, and 30 (to be merged as Tentative Lot 27 in accordance with the New York City RP-602 Form partially executed on 6 January 2022). The Site is an approximately 10,050-square foot parcel that is currently occupied by two four-story vacant buildings in the southern and northwestern portions of the site. The remaining portions of the site consist of vacant land where former building basements were previously partially backfilled with remnant demolition debris from sidewalk level to the assumed depth of the former basement slabs at approximately 8 to 10 feet below sidewalk level (bsl) by the previous owner. The vacant portion of the site was heavily vegetated with uneven topography; however, vegetation was cleared and the remnant demolition debris was graded to a flat surface ranging from 4 to 8 feet bsl. The Site is bordered by the four-story 354 East 78th Street building to the west, East 78th Street to the north, 1st Avenue to the east, and the nine-story 1485 1st Avenue building to the south.

History of Site Use, Investigation, and Cleanup

According to the Phase I ESA completed by Langan in January 2022, historical operations on the subject site included dyeing and cleaning operations between 1920 and 2005 on Lot 28 and Lot 30 and a solvent tank was identified on the Sanborn Maps from 1951 to 2005 on Lot 30. Chlorinated solvent contamination has been detected in site soil, groundwater, and soil vapor.

The site was identified in the NY Spills database for a release reported to the NYSDEC on 4 November 2009 and assigned Spill No. 0908776. According to the case narrative, a supply line for two 275-gallon fuel oil aboveground storage tanks (ASTs) was suspected to have leaked. The supply line was replaced and the spill was administratively closed on 2 December 2009.

Two fuel oil aboveground storage tanks (ASTs) have been documented at the site; one is located in the basement of the vacant building in the northwestern corner of the site and one was found buried in the debris of the building demolished by the previous owners. A release was observed when the AST was discovered and reported to NYSDEC and assigned Spill No. 2109276.

5. Investigation and Cleanup Process

Application

The Applicant has applied for and been accepted into New York’s Brownfield Cleanup Program as a **Volunteer**. This means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination onsite, and must conduct a “qualitative exposure assessment,” a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the site and to contamination that has migrated from the site.

The Applicant proposes that the site will be used for restricted residential purposes.

To achieve this goal, the Applicant will conduct investigation and cleanup activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the site.

Investigation

The Applicant submitted a Remedial Investigation Work Plan (“RIWP”) with its BCP Application, which was subject to public comment with the application, to conduct an investigation of the site officially called a “remedial investigation” (RI). The investigation will determine the nature and extent of contamination on the site.

The remedial investigation has several goals:

1) define the nature and extent of contamination in soil, surface water, groundwater and any other parts of the environment that may be affected;
2) identify the source(s) of the contamination;
3) assess the impact of the contamination on public health and the environment; and
4) provide information to support the development of a proposed remedy to address the contamination or the determination that cleanup is not necessary.

When the investigation is complete, the Applicant will prepare and submit a report that summarizes the results (the RI Report). This report also will recommend whether cleanup action is needed to address site-related contamination. The RI Report is subject to review and approval by NYSDEC. NYSDEC will determine if the RI Report summarizing the results is sufficient to characterize the contamination on the Site or if additional investigation will be required.

NYSDEC will use the information in the RI Report to determine if the site poses a significant threat to public health or the environment. If the site is a “significant threat,” it must be cleaned up using a remedy selected by NYSDEC from an analysis of alternatives prepared by the Applicant and approved by NYSDEC. If the site does not pose a significant threat, the Applicant may select the remedy from the approved analysis of alternatives.

Interim Remedial Measures

An Interim Remedial Measure (IRM) is an action that can be undertaken at a site when a source of contamination or exposure pathway can be effectively addressed before the site investigation and analysis of alternatives are completed. The Applicant submitted an IRM Work Plan with its BCP Application, which was subject to public comment with the application, to complete an interim remedy. The IRM Work Plan addresses soil and groundwater contamination at the site. If an additional IRM is likely to represent all or a significant part of the final remedy, NYSDEC will require a 30-day public comment period.

Remedy Selection

When the investigation of the site has been determined to be complete, the project likely would proceed in one of two directions:

1. The Applicant may recommend in its investigation report that no action is necessary at the site. In this case, NYSDEC would make the investigation report available for public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a “Certificate of Completion” (described below) to the Applicant.

or

2. The Applicant may recommend in its investigation report that action needs to be taken to address site contamination. After NYSDEC approves the investigation report, the Applicant may then develop a cleanup plan, officially called a “Remedial Work Plan”. The Remedial Work Plan describes the Applicant’s proposed remedy for addressing contamination related to the site.

When the Applicant submits a draft Remedial Work Plan for approval, NYSDEC would announce the availability of the draft plan for public review during a 45-day public comment period.

Cleanup Action

NYSDEC will consider public comments, and revise the draft cleanup plan if necessary, before approving the proposed remedy. The New York State Department of Health (NYSDOH) must concur with the proposed remedy. After approval, the proposed remedy becomes the selected remedy. The selected remedy is formalized in the site Decision Document.

The Applicant may then design and perform the cleanup action to address the site contamination. NYSDEC and NYSDOH oversee the activities. When the Applicant completes cleanup activities, it will prepare a final engineering report (FER) that certifies that cleanup requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the cleanup is protective of public health and the environment for the intended use of the site.

Certificate of Completion

When NYSDEC is satisfied that cleanup requirements have been achieved or will be achieved for the site, it will approve the final engineering report. NYSDEC then will issue a Certificate of Completion (COC) to the Applicant. The COC states that cleanup goals have been achieved, and relieves the Applicant from future liability for site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the site after it receives a COC.

Site Management

The purpose of site management is to ensure the safe reuse of the property if contamination will remain in place. Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management incorporates any institutional and engineering controls required to ensure that the remedy implemented for the site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan.

An *institutional control* is a non-physical restriction on use of the site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional control may be used when the cleanup action leaves some contamination that makes the site suitable for some, but not all uses.

An *engineering control* is a physical barrier or method to manage contamination. Examples include: caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that pumps and treats groundwater. Site management continues until NYSDEC determines that it is no longer needed.

Appendix A
Project Contacts and Locations of Reports and Information

Project Contacts

For information about the site's investigation and cleanup program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

Michael MacCabe
Project Manager
NYSDEC
Division of Environmental Remediation
625 Broadway
Albany, NY 12233-7016
Michael.maccabe@dec.ny.gov

New York State Department of Health (NYSDOH):
Christine Vooris
Project Manager
NYSDOH
Empire State Plaza
Corning Tower Room 1787
Albany, NY 12237
christine.vooris@health.ny.gov

Locations of Reports and Information

The facilities identified below are being used to provide the public with convenient access to important project documents:

New York Public Library – Webster Library
1465 York Avenue
New York, NY 10075
(212) 288-5049

Hours:
- Mon: 11 AM to 7 PM
- Tues: 11 AM to 7 PM
- Wed: 11 AM to 7 PM
- Thurs: 11 AM to 7 PM
- Fri: 10 AM to 5 PM
- Sat: 10 AM to 5 PM
- Sun: Closed

Borough of Manhattan, Community Board 8
505 Park Avenue, Suite 620
New York, NY 10022
(212) 758-4616

Appendix B
Site Contact List

Chief Executive Officer
New York City Mayor
Eric Adams (Mayor)
City Hall
260 Broadway Avenue
New York, NY 10007

New York City Planning Commission Chairman and Director of City Planning
Dan Garodnick
Department of City Planning
120 Broadway, 31st Floor
New York, NY 10271

Borough of Manhattan, Borough President
Mark Levine (Borough President)
431 West 125th Street
New York, NY 10027

Borough of Manhattan, Community District 8
Russell Squire, Chairperson
505 Park Avenue
Suite 620
New York, NY 10022

New York City Council, Council District 5
Julie Menin, Councilman
444 East 75th Street
Unit 1BNew York, NY 10021
Residents, owners, and occupants of the site and the properties adjacent to the site:

Owner:
CP VII 78th Street Owner, LLC
805 Third Avenue, 20th Floor
New York, NY 10022

Adjacent Properties:

1495 1st Avenue
New York, NY 10075
Block 1453, Lot 23
Owner: Keren Associates
c/o Werber Mgmt Corp.
40-52 75th Avenue
Elmhurst, NY 11373

354 East 78th Street
New York, NY 10075
Block 1452, Lot 31
Owner: Chou's Three D LLC
408 8th Avenue
New York, NY 10001

1485 1st Avenue
New York, NY 10075
Block 1452 Lot 26
Owner: Rothman First Avenue, LLC
27236 Grand Central Parkway
Floral Park, NY 10005

1488 and 1490 1st Avenue
Block 1472, Lot 49 and 50
Owner: Plentino Realty
650 Park Avenue
New York, NY 10065

1492 1st Avenue
Block 1472, Lot 48
Owner: 1492 Realty Co.
1492 First Avenue
New York, NY 10021

1494 1st Avenue
Block 1472, Lot 47
Owner: The Notaro Family Limited Partnership
2170 80th Street
Brooklyn, NY 11214

Local news media from which the community typically obtains information:

Local newspaper
Our Town – East Side
505 8th Avenue, Ste. 804
New York, NY 10018

Local television
WABC7 New York
7 Lincoln Square
New York, NY 10023

The public water supplier which services the area in which the property is located:

The responsibility for supplying water in New York City is shared between the NYC Department of Environmental Protection (NYCDEP), the Municipal Water Finance Authority, and the New York City Water Board:

NYCDEP
Rohit T. Aggarwala, Commissioner
59-17 Junction Boulevard
Flushing, NY 11373

New York City Municipal Water Finance Authority
255 Greenwich Street, 6th Floor
New York, NY 10007

New York City Department of Environmental Protection
Bureau of Environmental Planning and Analysis
59-17 Junction Boulevard, 11th Floor
Flushing, NY 11373

The administrator of any school or day care facility located on or near the site:

There are no schools or day care facilities located on the site. The following are schools or day care facilities located within a ½-mile radius of the site:

Eleanor Roosevelt High School – (approximately 450 feet southeast of the site)
Superintendent: Vivian Orlen
411 East 76th Street
New York, NY 10021
(212) 772-1220

Yorkville East Middle School – (approximately 820 feet southeast of the site)
Superintendent: Kelly Mcguire
1458 York Avenue
New York, NY 10021
(212) 744-6562 or (917) 432-5413

JHS 167 Robert F. Wagner– (approximately 1,085 feet west of the site)
Superintendent: Kelly Mcguire
220 East 76th Street
New York, NY 10021
(212) 535-8610

PS 290 Manhattan New School – (approximately 1,125 feet north of the site)
Superintendent: Kelly Mcguire
311 East 82nd Street
New York, NY 10028
(212) 734-7127

PS 158 Bayard Taylor (approximately 820 feet southeast of the site)
Principal: Dina Ercolano
1458 York Avenue
New York, NY 10075
(212) 744-6562

Lenox Hill Neighborhood House and Day Care (approximately 2,020 feet southwest of the site)
Director: Teresa Stewart
331 East 70th Street
New York, NY 10021
(212) 218-0404

Cassidy's Place (approximately 2,380 feet northeast of the site)
Executive Director: Gretchen Buchenholz
419 East 86th Street
New York, NY 10028
(212) 845-3821

Marymount Manhattan College (approximately 1,950 feet southwest of the site)
President: Kerry Walk
221 East 71st Street
New York, NY 10021
(212) 517-0400

Hunter College School Social Work CUNY (approximately 2,060 feet northwest of the site)
Dean: Mary Cavanaugh
129 East 79th Street
New York, NY 10021
(212) 396-7500

Cornell University / Weill Graduate School of Medical Sciences of Cornell University (approximately 2,600 feet southwest of the site)
Dean: Barbara Hempstead
445 East 69th Street
New York, NY 10021
(212) 746-6565

Cornell University / Weill Medical College of Cornell University (approximately 2,420 feet southwest of the site)
Dean: Barbara Hempstead
1300 York Avenue
New York, NY 10021
(212) 746-6565

NYPL, Webster Branch (approximately 745 feet southeast of the site)
Director: Jason Baumann
1465 York Avenue
New York, NY 10021
(212) 288-5049

NYPL, Yorkville Branch (approximately 1,040 feet northwest of the site)
Director: Jason Baumann
222 East 79th Street
New York, NY 10021
(212) 744-5824

OST - Lenox Hill Neighborhood House (approximately 1,170 feet west of the site)
Director: Teresa Stewart
220 East 76th Street
New York, NY 10021
(212) 218-0404

Chabad Lobavitch of the Upper East Side (approximately 360 feet southeast of the site)
Director: Chanie Krasnianski
419 East 77th Street
New York, NY 10075
(212) 717-4613

Hopscotch Montessori, Inc (approximately 724 feet east of the site)
435 East 79th Street
New York, NY 10075
(212) 774-1907

The Caedmon School (approximately 740 feet northeast of the site)
Head of School: Matthew Stuart
416 East 80th Street
New York, NY 10075
(212) 879-2296

Temple Shaaray Tefila Nursery School (approximately 815 feet northwest of the site)
Director of Lifelong Learning: Rabbi Sharon Litwin
250 East 79th Street
New York, NY 10075
(212) 535-8008

Saint Stephen of Hungary School (approximately 840 feet northeast of the site)
408 East 82nd Street
New York, NY 10028
(212) 288-1989

The Cathedral School (approximately 900 feet southwest of the site)
Director of Education: Anastasios Koularmanis
319 East 74th Street
New York, NY 10021
(212) 249-2840

The Church of the Epiphany (approximately 1,115 feet southeast of the site)
Interim Rector: Reverend Roy A. Cole
1393 York Avenue
New York, NY 10021
(212) 737-2720

Lycee Francais de New York (approximately 1,140 feet southeast of the site)
Head of School: Evelyne Estey
505 East 75th Street
New York, NY 10021
(212) 369-1400

The Children's Academy (approximately 1,165 feet northeast of the site)
350 East 82nd Street
New York, NY 10028

The Birch Wathen Lenox School (approximately 1,120 feet northwest of the site)
210 East 77th Street
New York, NY 10075
(212) 861-0404

York Avenue Preschool (approximately 1,230 feet northeast of the site)
Director: Becky Laird
1520 York Avenue
New York, NY 10028
(212) 734-0922

The Town School (approximately 1,500 feet southeast of the site)
540 East 76th Street
New York, NY 10021
(212) 288-4383

St. Jean Baptiste High School (approximately 1,700 feet east of the site)
173 East 75th Street
New York, NY 10021
(212) 288-1645

All Souls School (approximately 1,875 feet northwest of the site)
Director: Jennifer Vest
1157 Lexington Avenue
New York, NY 10075
(212) 861-5232

Church of St. Ignatius Layola (approximately 1,730 feet north of the site)
Head of School: Mary E. Larkin
240 East 84th Street
New York, NY 10028
(212) 861-3820

Manhattan School House LLC (approximately 1,960 feet northeast of the site)
1624 First Avenue
New York, NY 10028
(212) 772-2066

Manhattan School House LLC (approximately 1,640 feet northeast of the site)
1616 First Avenue
New York, NY 10028
(212) 879-4400

Manhattan School House LLC (approximately 495 feet south of the site)
1456 First Avenue
New York, NY 10028
(212) 879-3495

The Allen Stevenson School (approximately 2,045 feet northwest of the site)
132 East 78th Street
New York, NY 10075
(212) 288-6710

Bright Horizons Children’s Center Inc. (approximately 2,080 feet southwest of the site)
Center Director: Kimberly Sanseverino
435 East 70th Street
New York, NY 10021
(212) 746-6543

Clarke School for the Deaf (approximately 2,120 feet northeast of the site)
President: Bruce Skyer
80 East End Avenue
New York, NY 10028
(212) 585-3500

The Brearley Kindergarten/School (approximately 2,225 feet northeast of the site)
610 East 83rd Street
New York, NY 10028
(212) 744-8582

The Chapin School (approximately 2,300 feet northeast of the site)
Head of School: Suzanne Fogarty
100 East End Avenue
New York, NY 10028
(212) 744-2335

Resurrection Episcopal Day School (approximately 2,290 feet west of the site)
Head of School: Sharon Lickerman
119 East 74th Street
New York, NY 10021
(212) 535-3191

Temple Israel of the City of New York (approximately 2,270 feet northwest of the site)
Executive Director: Lara Knuettel
112 East 75th Street
New York, NY 10021
(212) 249-5000

International Preschools, Inc. (approximately 2,400 feet northeast of the site)
345 East 86th Street
New York, NY 10028
(212) 371-8604

St. Catherine of Sienna (approximately 2,420 feet southwest of the site)
Pastor: Father Peter Martyr Yungwirth
420 East 69th Street
New York, NY 10021
(212) 744-2080

The Buckley Preschool/School (approximately 2,450 feet southwest of the site)
113 East 73rd Street
New York, NY 10021
(212) 535-8787

The William Woodward, Jr. Nursery School (approximately 2,490 feet south of the site)
Director: Serena Fine English
436 East 69th Street
New York, NY 10021
(212) 744-6611

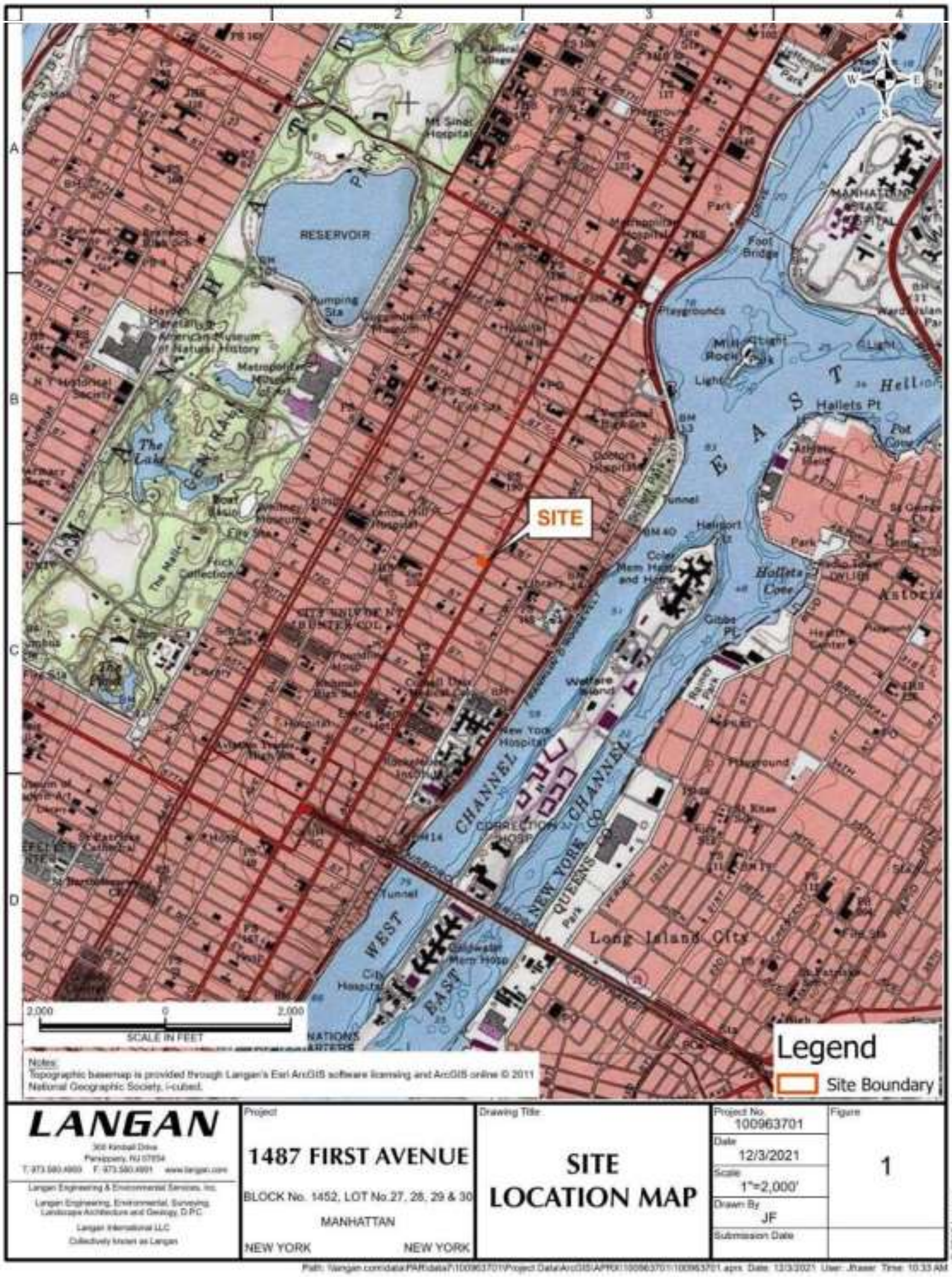
Association to Benefit Children, Inc. (approximately 2,550 feet northeast of the site)
Executive Director: Gretchen Buchenholz
420 East 87th Street
New York, NY 10128
(212) 845-3821

The location of the document repository for the project (e.g., local library):

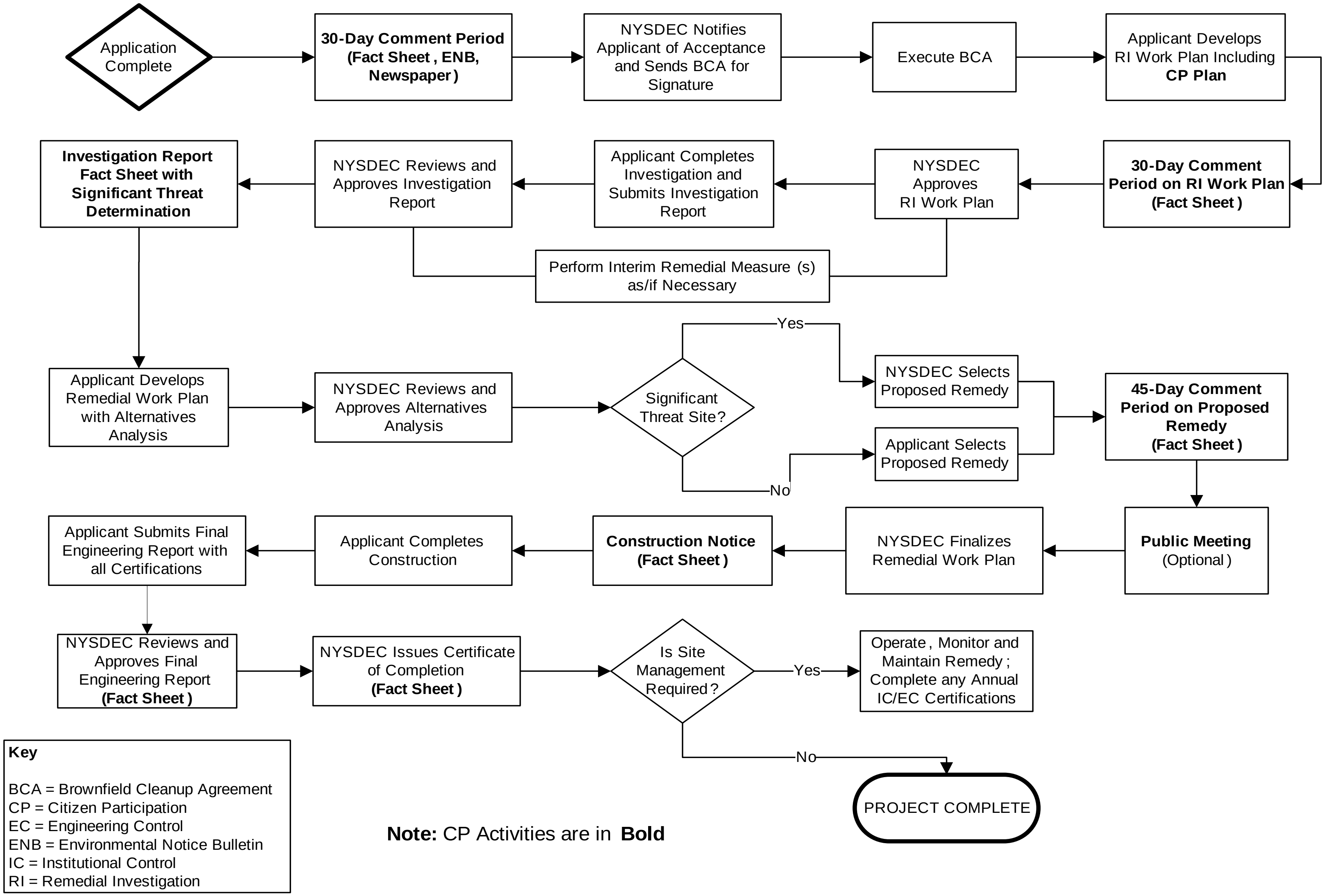
New York Public Library – Webster Library
1465 York Avenue
New York, NY 10075
(212) 288-5049

Borough of Manhattan, Community Board 8
505 Park Avenue, Suite 620
New York, NY 10022
(212) 758-4616

Appendix C
Site Location Map



Appendix D– Brownfield Cleanup Program Process



Note: CP Activities are in **Bold**

NEW YORK STATE OF OPPORTUNITY. | Department of Environmental Conservation

Division of Environmental Remediation

Remedial Programs
Scoping Sheet for Major Issues of Public Concern

Instructions

This Scoping Sheet assesses major issues of public concern; impacts of the site and its remedial program on the community; community interest in the site; information the public needs; and information needed from the public.

The information generated helps to plan and conduct required citizen participation (CP) activities, and to choose and conduct additional CP activities, if appropriate. The scoping sheet can be revisited and updated as appropriate during the site's remedial process to more effectively implement the site's CP program.

Note: Use the information as an aid to prepare and update the Major Issues of Public Concern section of the site CP Plan.

General Instructions

- When to prepare: During preparation of the CP Plan for the site. It can be revisited and updated anytime during the site remedial process.
- Fill in site name and other information as appropriate.
- The Scoping Sheet may be prepared by DEC or a remedial party, but must be reviewed and approved by the DER site project manager or his/her designee.

Instructions for Numbered Parts

Consider the bulleted issues and questions below and any others that may be unique or appropriate to the site and the community to help complete the five Parts of this Scoping Sheet. Identify the issue stakeholders in Parts 1 through 3 and adjust the site's contact list accordingly.

Part 1. List Major Issues of Public Concern and Information the Community Wants.

- Is our health being impacted? (e.g. Are there problems with our drinking water or air? Are you going to test our water, yards, sumps, basements? Have health studies been done?)
- There are odors in the neighborhood. Do they come from the site and are they hazardous?
- Are there restrictions on what we may do (e.g. Can our children play outside? Can we garden? Must we avoid certain areas? Can we recreate (fish, hunt, hike, etc. on/around the site?)
- How and when were the site's contamination problems created?
- What contaminants are of concern and why? How will you look for contamination and find out where it is going? What is the schedule for doing that?
- The site is affecting our property values!
- How can we get more information (e.g. who are the project contacts?)
- How will we be kept informed and involved during the site remedial process?
- Who has been contacted in the community about site remedial activities?
- What has been done to this point? What happens next and when?
- The site is going to be cleaned up for restricted use. What does that mean? We don't want redevelopment on a "dirty" site.

Part 2. List Important Information Needed From the Community, if Applicable.

- Can the community supplement knowledge about past/current uses of the site?
- Does the community have knowledge that the site may be significantly impacting nearby people, properties, natural resources, etc.?
- Are activities currently taking place at the site or at nearby properties that may need to be restricted?
- Who may be interested or affected by the site that has not yet been identified?
- Are there unique community characteristics that could affect how information is exchanged?
- Does the community and/or individuals have any concerns they want monitored?
- Does the community have information about other sources in the area for the contamination?

Part 3. List Major Issues and Information That Need to be Communicated to the Community.

- Specific site investigation or remediation activities currently underway, or that will begin in the near future.
- The process and general schedule to investigate, remediate and, if applicable, redevelop the site.
- Current understanding about the site contamination and effects, if any, on public health and the environment.
- Site impacts on the community and any restrictions on the public's use of the site and/or nearby properties.
- Planned CP activities, their schedule, and how they relate to the site's remedial process.
- Ways for the community to obtain/provide information (document repositories, contacts, etc.).

Part 4. Community Characteristics

a. - e. Obtain information from local officials, property owners and residents, site reports, site visits, "windshield surveys," other staff, etc.

f. Has the affected community experienced other **significant** present or past environmental problems unrelated to this site? Such experiences could significantly affect public concerns and perspectives about the site; how the community will relate to project staff; the image and credibility of project staff within the community; and the ways in which project staff communicate with the community.

g. In its remedial programs, DER seeks to integrate, and be consistent with, environmental justice principles set forth in *DEC Commissioner Policy 29 on Environmental Justice* and *DER 23 – Citizen Participation Handbook for Remedial Programs*. Is the site and/or affected community wholly or partly in an Environmental Justice (EJ) Area? Use the Search feature on DEC's public web site for "environmental justice". DEC's EJ pages define an EJ area, and link to county maps to help determine if the site and/or community are in an EJ area.

h. Consider factors such as:

- Is English the primary language of the affected community? If not, provisions should be considered regarding public outreach activities such as fact sheets, meetings, door-to-door visits and other activities to ensure their effectiveness.
- The age demographics of the community. For example, is there a significant number of senior citizens in the community? It may be difficult for some to attend public meetings and use document repositories. This may suggest adopting more direct interaction with the community with activities such as door-to-door visits, additional fact sheets, visits to community and church centers, nursing homes, etc.
- How do people travel about the community? Would most people drive to a public meeting or document repository? Is there adequate public transportation?

Part 5. Affected/Interested Public.

Individuals and organizations who need or want information and input can change during the site's remedial process. This need is influenced by real, potential, or perceived impacts of the site or the remedial process. Some people may want information and input throughout the remedial process. Others may participate only during specific remedial stages, or may only be interested in particular issues.

It is important to revisit this question when reviewing this scoping sheet. Knowing who is interested in the site – and the issues that are important to them – will help to select and conduct appropriate outreach activities, and to identify their timing and the information to be exchanged.

Check all affected/interested parties that apply to the site. **Note: Adjust the site's contact list appropriately.** The following are some ways to identify affected/interested parties:

- Tax maps of adjacent property owners
- Attendees at public meetings
- Telephone discussions
- Letters and e-mails to DER, the remedial party, and other agencies
- Political jurisdictions and boundaries
- Media coverage
- Current/proposed uses of site and/or nearby properties (recreational, commercial, industrial)
- Discussions with community organizations: grass roots organizations, local environmental groups, environmental justice groups, churches, and neighborhood advisory groups

Appendix E - Scoping Sheet for Major Issues of Public Concern

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Division of Environmental Remediation

Remedial Programs
Scoping Sheet for Major Issues of Public Concern (see instructions)

Site Name: 1487 1st Avenue Redevelopment Site

Site Number: C231152

Site Address and County: 1487 1st Avenue, Manhattan, NY

Remedial Party(ies): CP VII 78th Street Owner, LLC

Note: For Parts 1. – 3. the individuals, groups, organizations, businesses and units of government identified should be added to the site contact list as appropriate.

Part 1. List major issues of public concern and information the community wants. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and information needs. **Use this information as an aid to prepare or update the Major Issues of Public Concern section of the site Citizen Participation Plan.**
Investigation and remediation of soil, groundwater, and soil vapor may impact air quality during investigation and construction activities. NYSDEC and NYSDOH are overseeing the project to ensure the air and odor issues are monitored and mitigated during implementation of the work plan.

How were these issues and/or information needs identified?
Previous limited environmental investigations identified contaminated soil, groundwater, and soil vapor at the site

Part 2. List important information needed **from** the community, if applicable. Identify individuals, groups, organizations, businesses and/or units of government related to the information needed.
No additional information is required from the community at this time.

How were these information needs identified?
There are no information needs at this time.

Part 3. List major issues and information that need to be communicated **to** the community. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and/or information.
Information will be communicated to the public as outlined in the Citizen Participation Plan. NYSDEC and NYSDOH contacts will be provided. A repository will exist for the public to review documentation.

How were these issues and/or information needs identified?
Issue identification is the same as Part 1 response. Information communication was established by NYSDEC and NYSDOH as part of the NYS Brownfield Cleanup Program

Part 4. Identify the following characteristics of the affected/interested community. This knowledge will help to identify and understand issues and information important to the community, and ways to effectively develop and implement the site citizen participation plan (mark all that apply):

a. Land use/zoning at and around site:
☒ **Residential** ☐ **Agricultural** ☒ **Recreational** ☒ **Commercial** ☐ **Industrial**

b. Residential type around site:
☒ **Urban** ☐ **Suburban** ☐ **Rural**

c. Population density around site:
☒ **High** ☐ **Medium** ☐ **Low**

d. Water supply of nearby residences:
☒ **Public** ☐ **Private Wells** ☐ **Mixed**

e. Is part or all of the water supply of the affected/interested community currently impacted by the site?
☐ **Yes** ☒ **No**

Provide details if appropriate:
Click here to enter text.

f. Other environmental issues significantly impacted/impacting the affected community?
☐ **Yes** ☒ **No**

Provide details if appropriate:
Click here to enter text.

g. Is the site and/or the affected/interested community wholly or partly in an Environmental Justice Area?
☒ **Yes** ☐ **No**

h. Special considerations:
☐ **Language** ☐ **Age** ☐ **Transportation** ☐ **Other**

Explain any marked categories in **h:**
There are no special considerations at this time.

Part 5. The site contact list must include, at a minimum, the individuals, groups, and organizations identified in Part 2. of the Citizen Participation Plan under 'Site Contact List'. Are *other* individuals, groups, organizations, and units of government affected by, or interested in, the site, or its remedial program? (Mark and identify all that apply, then adjust the site contact list as appropriate.)

☐ **Non-Adjacent Residents/Property Owners:** Click here to enter text.

☐ **Local Officials:** Click here to enter text.

☐ **Media:** Click here to enter text.

☐ **Business/Commercial Interests:** Click here to enter text.

☐ **Labor Group(s)/Employees:** Click here to enter text.

☐ **Indian Nation:** Click here to enter text.

☐ **Citizens/Community Group(s):** Click here to enter text.

☐ **Environmental Justice Group(s):** Click here to enter text.

☐ **Environmental Group(s):** Click here to enter text.

☐ **Civic Group(s):** Click here to enter text.

☐ **Recreational Group(s):** Click here to enter text.

☐ **Other(s):** Click here to enter text.

Prepared/Updated By: Amanda Forsburg, CHMM
Langan Engineering, Environmental, Survey,
Landscape Architecture and Geology, D.P.C.

Date: 8/16/2022

Reviewed/Approved By: Click here to enter text.

Date: Click here to enter text.

APPENDIX G

Remediation Schedule

Brownfield Cleanup Program Estimated Project Schedule
1487 1st Avenue Development Site
New York, New York

Estimated Project Schedule		2022												2023											
Item	**Action**	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	Investigation for IRM Technical Design												■												
2	Submission of IRM Technical Design														■										
3	IRMWP Implementation (Injections)															■	■								
4	Remedial Action Implementation (SOE/Foundation Construction)																■	■	■	■	■	■			
5	Round 1 of Injection Performance Monitoring Groundwater Sampling																						■		
6	Preparation and Submission of FER and SMP																				■	■	■		
7	NYSDEC & NYSDOH Review of FER and SMP																					■	■	■	
8	NYSDEC Issues COC																								■

Notes:

c) This is an estimated schedule; actions and duration are subject to change.
g) IRMWP = Interim Remedial Measures Work Plan
j) RAWP = Remedial Action Work Plan
k) Completion of Item 4 refers to the completion of remediation and not the end of overall construction.
l) FER = Final Engineering Report
m) SMP = Site Management Plan
n) NYSDEC = New York State Department of Environmental Conservation
o) NYSDOH = New York State Department of Health
p) COC = Certificate of Completion

APPENDIX H

NYSDOH Generic Community Air Monitoring Plan

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

APPENDIX I

Support of Excavation Drawings

1487 FIRST AVENUE
SUPPORT OF EXCAVATION

NOTES FOR SUPPORT OF EXCAVATION:

SCOPE OF WORK

1. THE SUPPORT OF EXCAVATION (SOE) SCOPE OF WORK IS OUTLINED ON THESE DRAWINGS AND INCLUDES BUT IS NOT LIMITED TO THE INSTALLATION OF SOLDIER PILES AND TIMBER LAGGING, SECANT PILE WALLS, AND UNDERPINNING PIERS TO ALLOW EXCAVATION FOR CONSTRUCTION OF PROPOSED FOUNDATIONS.
2. DESIGN IS BASED ON THE GEOTECHNICAL REPORT PREPARED BY LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES, INC., DATED APRIL 26, 2022. ALL REQUIREMENTS DEPICTED HEREIN ARE THE RESPONSIBILITY OF THE CONTRACTOR(S) PERFORMING THE WORK UNLESS EXPLICITLY STATED OTHERWISE.
3. SUPPORT OF EXCAVATION DRAWINGS HAVE BEEN PREPARED PER NEW YORK CITY BUILDING CODE (BC) SECTION 3304.2.

GENERAL

1. DELINEATION OF DESIGN AND SPECIAL INSPECTION RESPONSIBILITY:
   A. IF THE CONTRACTOR PROPOSES AN ALTERNATIVE DESIGN OR MODIFICATIONS TO THE DESIGN SHOWN, THEN:
      i. ALTERNATIVES SUBMITTED BY THE CONTRACTOR MUST DEMONSTRATE EQUIVALENCE IN TERMS OF LIMITING GROUND MOVEMENT TO THE SYSTEM SHOWN BELOW HEREON.
      ii. THE CONTRACTOR SHALL RETAIN THE SERVICES OF A LICENSED PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF NEW YORK TO PREPARE ALL ALTERNATIVE SUPPORT OF EXCAVATION DRAWINGS.
      iii. MINIMUM 4 WEEKS PRIOR TO START OF THE WORK, THE CONTRACTOR SHALL SUBMIT SIGNED AND SEALED ALTERNATIVE SUPPORT OF EXCAVATION AND UNDERPINNING CALCULATIONS AND DRAWINGS TO THE CONSTRUCTION MANAGER FOR REVIEW AND APPROVAL.
      iv. THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE NYC DOB FOR HIS ALTERNATIVE DESIGN.
   B. THE OWNER WILL PROVIDE SPECIAL INSPECTION FOR ALL SUPPORT OF EXCAVATION WORK.
2. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. BASE PLAN AND SECTIONS ARE COMPILED USING:
   A. SURVEY DRAWING FOR 1487 1ST AVENUE PREPARED BY TRUE NORTH SURVEYORS, P.C. DATED 2022-03-10.
   B. FOUNDATION DRAWINGS DATED 2022-07-09, PREPARED BY MCNAMARA SALVIA, STRUCTURAL ENGINEERS.
4. PROPOSED FOUNDATIONS ARE SHOWN ON THESE DRAWINGS FOR REFERENCE ONLY. REFER TO STRUCTURAL DRAWINGS FOR ALL FOUNDATION INFORMATION.
5. THE SOE-SERIES DRAWINGS DO NOT ADDRESS SAFETY ISSUES RELATED TO THE EXCAVATION AND SHORING WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SAFETY AND PROVIDE A SAFETY PLAN CONFORMING TO OSHA STANDARDS AND NYC DOB REQUIREMENTS.
6. CONTRACTOR SHALL PROVIDE BARRIERS AND FENCING AROUND THE EXCAVATION PER NYC DOB AND DOT REQUIREMENTS.
7. CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS AND CHECK FOR CLEARANCES, INCLUDING CLEARANCES WITH EXISTING SEWERS AND OTHER UTILITIES TO REMAIN, PRIOR TO THE START OF WORK. ACTUAL FIELD CONDITIONS MAY REQUIRE MODIFICATIONS TO THE CONSTRUCTION DETAILS SHOWN. CONFLICTS BETWEEN ACTUAL CONDITIONS AND DETAILS SHOWN SHALL BE BROUGHT TO THE CONSTRUCTION MANAGER'S ATTENTION FOR RESOLUTION.
8. SURCHARGE PRESSURES:
   A. EXCAVATION SHORING HAS BEEN DESIGNED FOR A VERTICAL CONSTRUCTION SURCHARGE OF:
      i. 600 PSF ALONG E. 78TH STREET AND 1ST AVENUE.
      ii. EXISTING BUILDING SURCHARGE ALONG THE SOUTH AND WEST PROPERTY LINE OF THE SITE.
9. SUBMITTALS:
   A. SUBMITTALS WILL BE REVIEWED BY MRCE. OBTAIN APPROVAL OF SUBMITTALS PRIOR TO USE ON SITE.
   B. A MINIMUM OF 14 DAYS PRIOR TO USE ONSITE:
      i. MIX DESIGNS, MATERIAL DATA SHEETS, MANUFACTURER'S CERTIFICATIONS, ETC. INCLUDING ALL LABORATORY TESTS REQUIRED HEREIN.
      ii. DRILLING PROCEDURES FOR SECANT PILE WALLS AND TIEBACKS.
      iii. SITE LOGISTICS PLAN INCLUDING THE PROPOSED SEQUENCE OF SOE CONSTRUCTION, SEQUENCE OF INSTALLATION OF SOE WALLS, LOCATION OF THE SITE ACCESS RAMP, AND FOUNDATION CONSTRUCTION SEQUENCE.
   C. AS THE WORK PROGRESSES WITHIN 48 HOURS OF PERFORMANCE OF THE WORK:
      i. CAST-IN-PLACE CONCRETE AND GROUT TEST RESULTS.

MATERIALS AND TESTING

1. FLOWABLE FILL SHALL ATTAIN A MINIMUM COMPRESSIVE STRENGTH (ASTM C39) OF 100 PSI AT 28 DAYS, AND SHALL BE SELF CONSOLIDATING AND EXCAVATABLE WITHOUT PNEUMATIC TOOLS.
2. LEAN CONCRETE SHALL ATTAIN A MINIMUM COMPRESSIVE STRENGTH (ASTM C39) OF 500 PSI AT 28 DAYS.
3. CONCRETE FOR SECANT PILES AND UNDERPINNING PIERS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS. THE CONTRACTOR SHALL SUBMIT A MIX DESIGN MEETING THE SPECIFICATION REQUIREMENTS FOR APPROVAL PRIOR TO PERFORMING THE WORK. MAKE A SET OF EIGHT CONCRETE CYLINDERS FOR FOR THE GREATER OF ONCE PER DAY OR ONCE EACH 50 YARDS OF CONCRETE PLACED. CYLINDERS SHALL BE TESTED FOR 7, 14, AND 28 DAY COMPRESSIVE STRENGTHS. TWO CYLINDERS SHALL BE KEPT FOR ADDITIONAL TESTING AS DIRECTED BY ENGINEER.
4. TIEBACK GROUT SHALL ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI PRIOR TO TIEBACK STRESSING AND 4,000 PSI AT 28 DAYS. RAKER GROUT PAD GROUT SHALL ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS. THE CONTRACTOR SHALL SUBMIT A MIX DESIGN MEETING THE REQUIREMENTS FOR APPROVAL PRIOR TO PERFORMING THE WORK. MAKE A SET OF EIGHT GROUT CUBES FOR THE GREATER OF ONCE PER DAY OR ONCE EACH 50 YARDS OF GROUT PLACED. GROUT CUBES SHALL BE TESTED FOR 7, 14, AND 28 DAY COMPRESSIVE STRENGTHS OR UNTIL MINIMUM COMPRESSIVE STRENGTH IS REACHED. TWO GROUT CUBES SHALL BE KEPT FOR ADDITIONAL TESTING AS DIRECTED BY THE ENGINEER.
5. LEVELING GROUT – A NON-SHRINK GROUT WITH A MANUFACTURER CERTIFIED COMPRESSIVE STRENGTH OF 4000 PSI.
6. STRUCTURAL STEEL SHAPES AND PLATES: ASTM A992 OR A572 GRADE 50, UNLESS OTHERWISE NOTED.
7. TIEBACKS:
   A. ANCHOR BAR: 105 KSI HOLLOW INJECTION BAR OR EQUAL. PROVIDE AND INSTALL COUPLERS WHICH DEVELOP THE FULL TENSILE STRENGTH OF THE BAR. INSTALL CENTRALIZERS AT MAXIMUM SPACING OF 10 FEET ON CENTER.
   B. FREE LENGTH: PROVIDE BOND BREAKER SUCH THAT BAR AND COUPLERS WITHIN UNBONDED LENGTH DO NOT ENGAGE TIEBACK GROUT. TAPE ALL SEAMS WITH LOW FRICTION TAPE.
8. TIMBER LAGGING: ROUGH CUT FULL SIZE, CONSTRUCTION GRADE, WITH A MINIMUM ALLOWABLE BENDING STRESS OF 1200 PSI AND ALLOWABLE SHEAR STRESS OF 175 PSI. MINIMUM LAGGING THICKNESS SHALL BE 3 INCHES.
9. WALE SPLICES: UNLESS OTHERWISE NOTED ON THE DRAWINGS OR APPROVED BY THE ENGINEER, SPLICES SHALL BE SUFFICIENT TO DEVELOP DEMAND MOMENT AND SHEAR FORCES PROVIDED BY THE ENGINEER, AT THE SPLICE LOCATION. SPLICE LOCATIONS AND DETAIL SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL.
10. WELDING: PERFORM ALL WELDING USING CERTIFIED WELDERS WITH E-70 ELECTRODES AND EQUIPMENT IN CONFORMANCE WITH AWS D1.1. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE WELDING SPECIAL INSPECTOR.

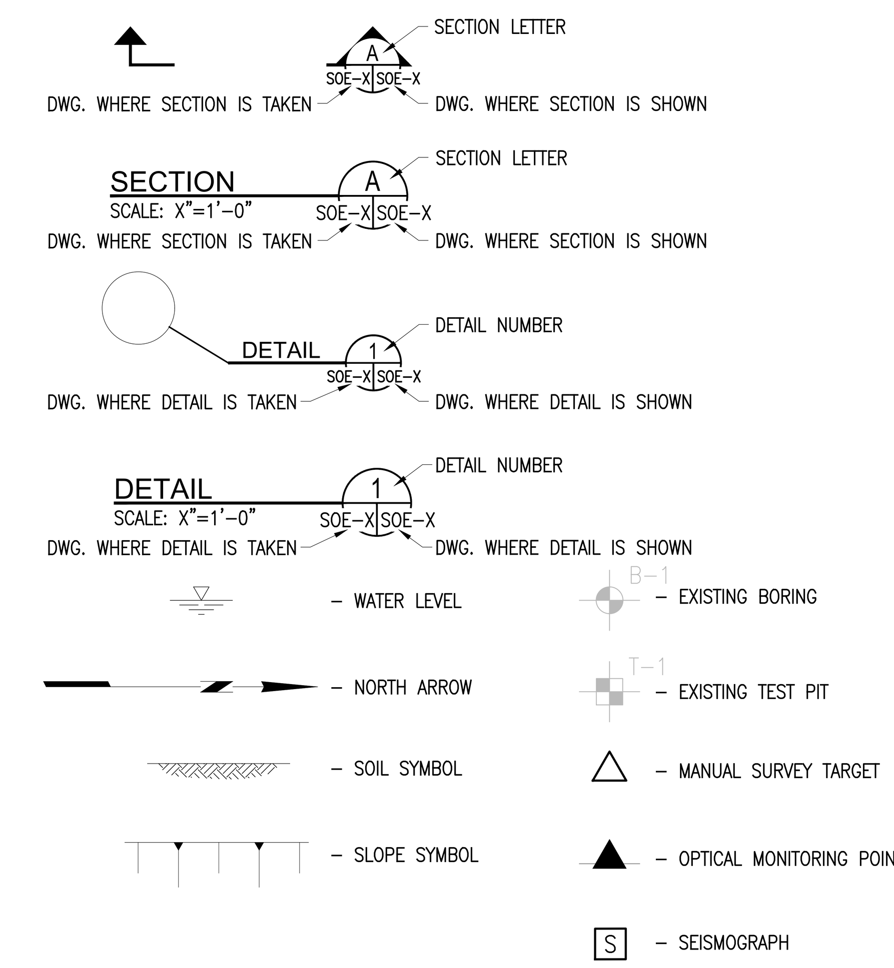
PROCEDURES

1. LOCATE ALL EXISTING UTILITIES BY UTILITY COMPANY MARK OUT, THEN, FOR UTILITIES WITHIN 5 FEET OF SOLDIER PILE, SECANT PILE AND TANGENT PILE INSTALLATION, CONFIRM CLEARANCE BY LOCAL PRE-EXCAVATION TO VERIFY CLEARANCE OF EACH SOLDIER PILE AND TIEBACK LOCATION.
2. PRIOR TO THE START OF WORK, VERIFY AND COORDINATE ALL DIMENSIONS AND CHECK FOR CLEARANCES, INCLUDING CLEARANCES WITH EXISTING COMBINED SEWERS AND OTHER UTILITIES TO REMAIN. ACTUAL FIELD CONDITIONS MAY REQUIRE MODIFICATIONS TO THE CONSTRUCTION DETAILS SHOWN. BRING CONFLICTS TO THE CONSTRUCTION MANAGER'S ATTENTION FOR RESOLUTION.
3. ALL REMNANT FOUNDATIONS TO BE REMOVED TO CLEAR DRILLING OPERATIONS SHALL BE DONE WITH MEANS AND METHODS TO LIMIT ENCROACHMENT TO NEIGHBORING PROPERTIES. AT NO TIME SHALL EXCAVATION FOR REMOVAL OF REMNANT FOUNDATIONS SHALL ADVANCE BELOW BOTTOM OF NEIGHBORING BUILDINGS. WHERE REMNANT FOUNDATIONS CANNOT BE REMOVED DUE TO ACCESS RESTRICTIONS, CONTRACTOR SHALL DRILL THROUGH THE ABANDONED STRUCTURES. PROCEDURES FOR DRILLING THROUGH REMNANT STRUCTURES SHALL BE INCLUDED IN THE CONTRACTOR'S WORK PLAN.
4. NUMBERING PLAN: TOGETHER WITH THE SPECIAL INSPECTOR DEVELOP A NUMBERING PLAN FOR SOE ELEMENTS. DISTRIBUTE THE NUMBERING PLAN TO THE CONSTRUCTION MANAGER FOR DISSEMINATION TO THE PROJECT TEAM.
5. SOLDIER PILE WALL:
   A. INSTALL SOLDIER PILES IN PRE-DRILLED CASED HOLE AS DESCRIBED BELOW:
      a. DRILL A 24 INCH DIAMETER, OPEN ENDED, STEEL CASING TO MINIMUM TIP ELEVATION SHOWN ON THESE DRAWINGS, REMOVING SOIL FROM WITHIN THE CASING USING A ROLLER BIT, AUGER, OR CONTINUOUS FLIGHT AUGER. EXTERNAL FLUSH METHODS ARE NOT BE PERMITTED. USE OF AN AIR POWERED DOWN HOLE HAMMER WILL NOT BE PERMITTED TO ADVANCE THE CASING THROUGH SOIL EXCEPT AS APPROVED BY THE ENGINEER TO PENETRATE OBSTRUCTIONS.
      b. FILL CASED HOLE WITH CONCRETE PLACED BY TREMIE METHOD TO SUBGRADE ELEVATION. FLOWABLE FILL IS PERMITTED FOR SOLDIER PILES ABOVE SUBGRADE ELEVATION.
      c. WITHDRAW THE STEEL CASING AS LEAN CONCRETE IS BEING PLACED, MAINTAINING LEVEL OF CONCRETE A MINIMUM OF 3 FEET ABOVE TIP OF CASING.
      d. PUSH SOLDIER PILE TO FINAL TIP ELEVATION.
   B. PRIOR TO INSTALLATION OF PILES, CONTRACTOR SHALL SUBMIT THE FOLLOWING FOR APPROVAL:
      i. SOLDIER PILE INSTALLATION PROCEDURES AND DESCRIPTION OF EQUIPMENT TO BE USED.
      ii. SHOP DRAWINGS INDICATING SOLDIER PILE ID PLAN, PILE COORDINATES, PILE SIZE, TOP OF PILE ELEVATION, AND PILE TIP ELEVATION
6. SECANT PILE WALLS:
   A. LATERAL TOLERANCE AT THE TOP OF THE HOLE SHALL BE 2 INCHES OF PLAN LOCATION. VERTICAL ALIGNMENT SHALL BE PLUMB WITHIN 1 PERCENT OF THE HOLE LENGTH. THE HOLE CENTER LOCATIONS SHALL BE ACCURATELY SURVEYED. PRIOR TO DRILLING SECANT PILES, CONSTRUCT CONCRETE GUIDE WALLS ALONG THE ALIGNMENT OF THE WALL.
   B. THE CONTRACTOR IS RESPONSIBLE FOR SUBMITTING PILE INSTALLATION TECHNIQUES THAT PREVENT GROUND LOSS IN ADJACENT AREAS. THE SECANT PILE WALLS SHALL BE INSTALLED USING CASED CONTINUOUS FLIGHT AUGER (CFA) DRILLING METHODS. SOILS SHALL BE REMOVED FROM WITHIN THE CASING.
   C. THE TEMPORARY DRILL CASING SHALL BE FITTED WITH A CUTTING SHOE CAPABLE OF ADVANCING THROUGH THE SITE SOILS INCLUDING FILL, BOULDERS AND OBSTRUCTIONS BY ROTARY DRILLING.
   D. BELOW THE GROUNDWATER TABLE, IF THE AUGER IS RETRACTED, THE LEVEL OF WATER INSIDE THE CASING SHALL BE KEPT SUFFICIENTLY ABOVE THE LEVEL OUTSIDE, TO CREATE A POSITIVE HYDROSTATIC PRESSURE AND PROVIDE A STABLE BOTTOM.
   E. DRILLED HOLES SHALL BE SAND-GROUTED THROUGH AUGER STEM AS THE CASING AND AUGER ARE RETRACTED. MAINTAIN A POSITIVE HEAD OF GROUT A MINIMUM OF 5 FEET HIGHER THAT THE BOTTOM OF THE CASING AT ALL TIMES.
   F. PRIMARY HOLES SHALL BE DRILLED FIRST, FILLED WITH SANDED-GROUT AND ALLOWED TO SET PRIOR TO DRILLING THE SECONDARY HOLES.
   G. THE MINIMUM DISTANCE BETWEEN DRILLED HOLES GROUTED WITHIN 24 HOURS IS 12 FEET.
   H. STEEL CORE BEAMS SHALL BE INSERTED CONCENTRICALLY AND VERTICALLY WITHIN THE HOLE AFTER GROUTING.
   I. EACH DRILLED HOLE SHALL BE GROUTED IN ONE CONTINUOUS OPERATION.
   J. INSTALL PILES TO MINIMUM TIP ELEVATION SHOWN ON DRAWINGS.
   K. MAINTAIN AN INSTALLATION RECORD FOR EACH PILE. INDICATE ON THE INSTALLATION RECORD INSTALLATION DATE AND TIMES, TYPE OF DRILL RIG, TOTAL DRILLING TIME, PILE LOCATION, DRILL HEAD PLUMBNESS, TIP ELEVATIONS, GROUND ELEVATIONS, CUT-OFF ELEVATIONS, AND CORE BEAM LENGTH. RECORD ANY UNUSUAL INSTALLATION PROBLEMS.
   L. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT THE FOLLOWING FOR APPROVAL:
      a. SHOP DRAWING INDICATING SECANT PILE WALL ID PLAN, COORDINATES, CORE BEAM SIZE, TOP OF CORE BEAM ELEVATION AND WALL TIP ELEVATION.
      b. GUIDE WALL SHOP DRAWING FOR SECANT PILE WALLS.
      c. PILE SPLICE DETAIL (IF REQUIRED) SPLICE DETAILS DEVELOP MOMENT AND SHEAR CAPACITY REQUIRED BY DESIGN. CONTRACTOR SHALL SUBMIT PROPOSED SPLICE LOCATION TO OBTAIN SPLICE DESIGN VALUES. CONTRACTOR SHALL SUBMIT SPLICE DETAIL TO ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.
      d. CORE BEAM CENTRALIZER DETAIL.
      e. DRILLING AND INSTALLATION PROCEDURES.
7. UNDERPINNING:
   A. EXCAVATE UNDERPINNING PITS FROM THE ELEVATION INDICATED ON THE SECTIONS, A MINIMUM OF 2 FEET ABOVE THE BOTTOM OF THE ADJACENT FOOTINGS. VERIFY THE BOTTOM OF FOOTING ELEVATION AND REPORT THE BOTTOM OF FOOTING ELEVATION TO THE CONSTRUCTION MANAGER.
   B. UPON COMPLETION OF EXCAVATION TO BOTTOM OF EXISTING ADJACENT BUILDING FOOTINGS AND PRIOR TO START OF UNDERPINNING, REMOVE ALL LOOSE MORTAR AND PARGE THE ENTIRE EXPOSED FACE OF ALL ADJACENT BUILDING FOUNDATION WALL USING A SAND-CEMENT MORTAR. THIS REQUIREMENT DOES NOT APPLY IF EXISTING WALL IS FOUND TO BE WATERPROOFED. IF LATTER, THEN PROTECT OR RESTORE EXISTING WATERPROOFING.
   C. ONLY PITS HAVING THE SAME NUMERICAL DESIGNATION SHALL BE OPEN AT ANY ONE TIME. PITS OF THE SAME NUMERICAL DESIGNATION SHALL BE LOCATED A MINIMUM OF 20 FEET APART.
   D. PITS OF THE NEXT NUMERICAL DESIGNATION SHALL NOT BE EXCAVATED UNTIL ALL PITS OF THE PREVIOUS NUMERICAL DESIGNATION ARE WEDGED AND DRYPACKED.
   E. SEQUENCE UNDERPINNING WORK SUCH THAT PITS ARE EXCAVATED, CONCRETED AND DRYPACKED DURING THE SAME WORK WEEK. DO NOT LEAVE PITS OPEN OVER WEEKEND OR HOLIDAYS.
   F. EXCAVATION BELOW BOTTOM OF EXISTING FOOTING SHALL BE BY MANUAL HAND EXCAVATION. CAREFULLY HAND TRIM FACE OF CUT TO MINIMIZE UNDERMINING ADJACENT PORTIONS OF THE EXISTING FOOTING OR SLAB. PROVIDE TIMBER LAGGING AS SHOWN IN THE PIT SHORING DETAIL.
   G. THE INSPECTOR RESPONSIBLE FOR THE SPECIAL INSPECTION OF UNDERPINNING SHALL INSPECT AND APPROVE THE SUBGRADE PRIOR TO CASTING CONCRETE. WEDGING AND DRYPACKING SHALL OCCUR AFTER UNDERPINNING CONCRETE HAS CURED A MINIMUM 18 HOURS.
8. TIEBACKS:
   A. TIEBACKS SHALL BE DRILLED USING ROTARY DUPLEX DRILLING TECHNIQUES. SOILS SHALL BE REMOVED FROM WITHIN THE CASING USING WASH BORING METHODS, KEEPING THE WASH WATER RETURN INSIDE THE CASING. FLUSHING BEYOND THE CASING AND DRILLING TOOLS THAT RESULT IN CIRCULATION OUTSIDE OF THE CASING SHALL NOT BE USED. ALTERNATIVELY, THE USE OF HOLLOW BARS ARE PERMITTED. HOLLOW BARS SHALL MEET THE REQUIREMENTS TO SUSTAIN THE DESIGN LOAD AND TESTING REQUIREMENTS. DRILLING OF HOLLOW BARS SHALL BE PERFORMED USING LEAN-MIX GROUT AT ALL TIMES. DRILLING OF HOLLOW BARS WITH WATER IS NOT PERMITTED. CONTRACTOR SHALL SUBMIT MEANS AND METHODS FOR INSTALLATION OF DRILLING HOLLOW BARS FOR APPROVAL.
   B. THE CONTRACTOR SHALL PROVIDE A DESIGN FOR THE TIEBACK ANCHORS SHOWN. THE CONTRACTOR SHALL PROVIDE CALCULATIONS AND SHOP DRAWING PREPARED BY A NYS LICENSED ENGINEER FOR REVIEW AND APPROVAL. THE CONTRACTOR'S DESIGN CALCULATIONS SHALL INCLUDE DESIGN OF THE BOND LENGTH, BOND STRESS, POST GROUTING AND GROUT STRENGTH. THE CALCULATIONS SHALL CONFORM TO THE REQUIREMENTS OF NYC BUILDING CODE AND POST TENSIONING INSTITUTE (PTI) RECOMMENDATIONS FOR PRESTRESSED ROCK AND SOIL ANCHORS.
   C. PREPARE A SHOP DRAWING FOR THE TIEBACK ANCHORS. THE SHOP DRAWING SHALL SHOW A COMPLETE ANCHOR SYSTEM INCLUDING ALL DETAILS REQUIRED ON THE CONTRACT DRAWINGS. THE SHOP DRAWING SHALL INCLUDE THE PTI TESTING AND ACCEPTANCE CRITERIA. PERFORMANCE TESTS SHALL BE PERFORMED ON AT LEAST ONE OF EACH DESIGN LOAD. ALL OTHER TIEBACKS SHALL BE PROOF TESTED.
   D. TIEBACK GROUTING PRESSURE AND VOLUME SHALL BE DETERMINED BY THE CONTRACTOR TO ACHIEVE THE TIEBACK DESIGN LOADS SHOWN ON THESE DRAWINGS. POST-GROUTING IS ACCEPTABLE AND SHALL BE PERFORMED IN ACCORDANCE WITH PTI, IF USED.
   E. LOCK OFF TIEBACKS AT 80% OF THE DESIGN LOAD.
8. EXCAVATION AND DEWATERING:
   A. EXCAVATE THE SITE IN STAGES AS SHOWN HEREIN. DO NOT EXCAVATE GREATER THAN 2 FEET BELOW THE CENTERLINE OF BRACING PRIOR TO STRESSING TIEBACKS OR DRIVING WEDGES AND WELDING RAKERS WITHIN THE INFLUENCE OF THAT LEVEL OF BRACING. DO NOT UNDERMINE ADJACENT FOUNDATIONS, NEWLY CONSTRUCTED FOUNDATIONS OR SOE ELEMENTS.
   B. EXPOSED NEIGHBORING FOUNDATIONS WALLS RESULTING FROM EXCAVATION SHALL BE CLEANED OF ALL LOOSE MORTAR AND PARGED USING A SAND-CEMENT MORTAR. PARGING SHALL CONSIST OF TYPE S MORTAR, CONFORMING TO ASTM C270, WITH A MINIMUM ALLOWABLE COMPRESSIVE STRENGTH OF 1800 PSI. THIS REQUIREMENT DOES NOT APPLY IF EXISTING WALL IS FOUND TO BE WATERPROOFED. IF THE LATTER, THEN PROTECT OR RESTORE EXISTING WATERPROOFING IN KIND.
   C. TIMBER LAGGING:
      i. INSTALL BETWEEN SOLDIER PILES IN LIFTS 2 TO 4 FEET IN HEIGHT, LEAVE 1-1/2 INCH LOUVERS BETWEEN EACH LAGGING BOARD. IMMEDIATELY BACKPACK VOIDS BEHIND THE LAGGING.
      ii. LINE LOUVERS WITH STRAW OR PLACE A NON-WOVEN FILTER FABRIC BEHIND THE LAGGING BOARDS FOR ALL LOCATIONS WITHIN 5 FEET OF EXISTING GRADE OR LOCATIONS WHERE WATER SEEPS OCCUR.
      iii. THE ENGINEER WILL MONITOR THE CHARACTER AND STABILITY OF THE EXCAVATION FACE AS THE WORK PROGRESSES AND MAY REDUCE THE ALLOWABLE UNSUPPORTED HEIGHT TO 2 FEET.
   D. GROUNDWATER WILL BE ENCOUNTERED DURING EXCAVATION. REFER TO THE GEOTECHNICAL REPORT FOR AVAILABLE INFORMATION. THE CONTRACTOR IS RESPONSIBLE FOR COLLECTING AND DISPOSING OF GROUNDWATER.
   E. CONTROL ALL GROUNDWATER, RAIN WATER, AND SURFACE WATER ENTERING SITE AS NECESSARY TO MAINTAIN A DRY AND STABLE SUBGRADE FOR EXCAVATION AND FOUNDATION CONSTRUCTION AT ALL TIMES.
   F. THE CONTRACTOR SHALL MANAGE AND DISPOSE OF WATER GENERATED DURING DEWATERING ACTIVITES IN ACCORDANCE WITH EITHER NEW YORK STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM (SPDES) STANDARDS SET BY THE NEW YORK STATE DEC FOR DISCHARGE TO SURFACE WATER, OR NEW YORK CITY DEP SEWER DISCHARGE CRITERIA FOR DISCHARGE TO THE CITY WASTEWATER COLLECTION SYSTEM. THE CONTRACTOR SHALL ACQUIRE ALL NECESSARY PERMITS AND/OR APPLICATIONS FOR DISPOSAL OF DEWATERING EFFLUENT.
   G. THE CONTRACTOR SHALL DISPOSE OF WATER COLLECTED ON SITE ACCORDING TO PERMITS AND REGULATIONS.
9. BRACING:
   A. THE WELDING SPECIAL INSPECTOR VISUALLY INSPECT WELDS. CORRECT ALL NOTED DEFICIENCIES PRIOR TO LOADING BRACING OR ADVANCING EXCAVATION.
   B. HEEL BLOCKS: PREPARE SUBGRADE FOR AN ALLOWABLE BEARING PRESSURE OF 20 TONS PER SQUARE FOOT (TSF). THE SPECIAL INSPECTOR WILL OBSERVE SUBGRADE AND CONFIRM ACCEPTANCE PRIOR TO PLACEMENT OF CONCRETE.
   C. RAKER BRACING: PERFORM LOCAL EXCAVATION TO INSTALL RAKER HEEL BLOCKS AND INSTALL RAKERS. PLACE RAKER BASE PLATE ON A LEVEL PAD, USE SHIMS AND DRIVE WEDGES TO ENGAGE LOAD. WELD WEDGES IN PLACE UPON COMPLETION. DO NOT APPLY VERTICAL OR HORIZONTAL LOAD TO THE RAKER ALONG ITS LENGTH.
10. BACKFILL:
   A. DO NOT PLACE BACKFILL BETWEEN SOE AND COMPLETED FOUNDATION WALL UNTIL RECEIVING WRITTEN NOTICE FROM THE STRUCTURAL ENGINEER.
   B. PLACE BACKFILL IN ACCORDANCE WITH PROJECT SPECIFICATIONS.
   C. UPON BACKFILLING TO WITHIN 2 FEET OF WALERS, DESTRESS TIEBACKS AND REMOVE ALL SOE BRACING AND SOLDIER PILES WITHIN 4 FEET OF SIDEWALK GRADE. ABANDON ALL SOE BRACING AND SOLDIER PILES GREATER THAN 4 FEET BELOW SIDEWALK.

SURVEY AND MONITORING

1. THE OWNER WILL:
   A. PROVIDE PRE-CONSTRUCTION CONDITION SURVEYS OF ADJACENT BUILDINGS.
   B. IMPLEMENT AN INSTRUMENTATION AND MONITORING PROGRAM DURING CONSTRUCTION FOR PROTECTION OF ADJACENT STRUCTURES AND MONITORING THE EXCAVATION INCLUDING VIBRATION AND OPITCAL MONITORING. REFER TO INST SERIES DRAWINGS FOR DETAILS.
   C. PROVIDE ACCESS TO A WEBSITE FOR REVIEW OF MONITORING DATA AND ALARM NOTIFICATIONS VIA EMAIL TO A DISTRIBUTION LIST.
2. DESIGNATE AN ON-SITE POINT OF CONTACT WITH THE AUTHORITY TO STOP WORK OR ALTER WORK ACTIVITIES FOR CORRESPONDANCE WITH THE OWNER'S GEOTECHNICAL INSTRUMENTATION ENGINEER (GIE) FOR ALARM RESOLUTION AND TROUBLESHOOTING INSTRUMENTS.
3. PROVIDE ACCESS TO THE OWNER'S GIE FOR ON-SITE TROUBLESHOOTING OF INSTRUMENTS. AT THE REQUEST OF THE OWNER'S GIE, PROVIDE AN EXTENSION LADDER, AND LABOR OR OTHER EQUIPMENT/LABOR AS REQUIRED FOR INSTRUMENTATION, MAINTENANCE AND REMOVAL OF PRISMS AND OTHER MONITORING EQUIPMENT.
4. THRESHOLD VALUE – UNLESS OTHERWISE STATED IN ACCESS AGREEMENTS WITH NEIGHBORING PROPERTIES, EXCEEDANCES WILL TRIGGER A REVIEW OF THE STRUCTURE INDICATING THE EXCEEDANCE, INSTALLATION OF ADDITIONAL MONITORING AND REVISION TO THE MEANS AND METHODS IF NECESSARY.
5. LIMITING VALUE – UNLESS OTHERWISE STATED IN ACCESS AGREEMENTS WITH NEIGHBORING PROPERTIES, EXCEEDANCES WILL REQUIRE A HALT TO THE WORK, REVIEW OF THE STRUCTURE INDICATING THE EXCEEDANCE, INSTALLATION OF ADDITIONAL MONITORING IF NECESSARY AND REVISIONS TO THE MEANS AND METHODS OF INSTALLATION OR DESIGN TO PREVENT THE EXCEEDANCE FROM RE-OCCURRING.
6. MOVEMENT CRITERIA:
   A. FOR SOLDIER PILES:
      A.1. THRESHOLD VALUE – 1 INCH
      A.2. LIMITING VALUE – 2 INCH
   B. FOR SECANT PILES AND UNDERPINNING PIERS:
      B.1. THRESHOLD VALUE – 0.5 INCH
      B.2. LIMITING VALUE – 1 INCH
   C. FOR ADJACENT STRUCTURES, UNLESS OTHERWISE STATED IN ACCESS AGREEMENTS WITH NEIGHBORING PROPERTIES THE FOLLOWING SHALL APPLY:
      C.1. THRESHOLD VALUE – 0.125 INCH
      C.2. LIMITING VALUE – 0.25 INCH
7. VIBRATION CRITERIA – PEAK PARTICLE VELOCITY (PPV) MEASURED IN INCHES PER SECOND (IPS):
   A. FOR ADJACENT STRUCTURES, UNLESS OTHERWISE STATED IN ACCESS AGREEMENTS WITH NEIGHBORING PROPERTIES THE FOLLOWING SHALL APPLY:
      A.1. THRESHOLD VALUE – 0.5 IPS
      A.2. LIMITING VALUE – 1.0 IPS

LEGEND:



ABBREVIATIONS:

B.S.	– BOTH SIDES	LG.	– LONG
℄	– CENTER LINE	NO.	– NUMBER
CONC.	– CONCRETE	NOS.	– NUMBERS
DIA.	– DIAMETER	O.D.	– OUTSIDE DIAMETER
DWG.	– DRAWING	SCHED.	– SCHEDULE
DWGS.	– DRAWINGS	STIFF.	– STIFFENER
EL.	– ELEVATION	TYP.	– TYPICAL
EQ.	– EQUAL	W.P.	– WORK POINT
EXIST.	– EXISTING	U.O.N.	– UNLESS OTHERWISE NOTED
FT.	– FOOT, FEET		

LIST OF REQUIRED NYC DOB SPECIAL INSPECTIONS:

1. SUBSURFACE CONDITIONS – FILL PLACEMENT & IN-PLACE DENSITY
2. SUBGRADE INSPECTION
3. EXCAVATIONS – SHEETING, SHORING AND BRACING
4. CONCRETE – CAST-IN-PLACE
5. CONCRETE DESIGN MIX
6. CONCRETE SAMPLING AND TESTING

DOB NOTIFICATION:

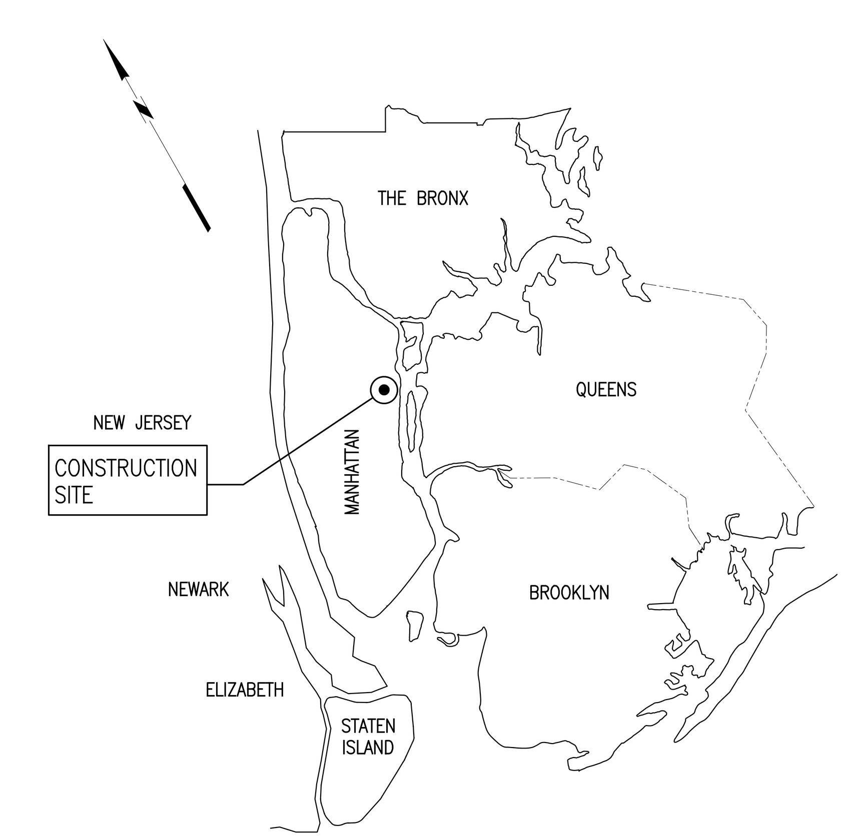
THE CONSTRUCTION MANAGER SHALL PROVIDE NOTIFICATION TO THE NYC DOB WITHIN 24 TO 48 HOURS PRIOR TO COMMENCEMENT OF EARTHWORK AS REQUIRED BY BC 3304.3.1.

ADJACENT BUILDING OWNER NOTIFICATION:

THE CONSTRUCTION MANAGER SHALL PROVIDE NOTIFICATION TO THE ADJACENT BUILDING OWNERS AT LEAST 10 DAYS PRIOR TO COMMENCEMENT OF EARTHWORK AS REQUIRED BY BC 3304.3.2.

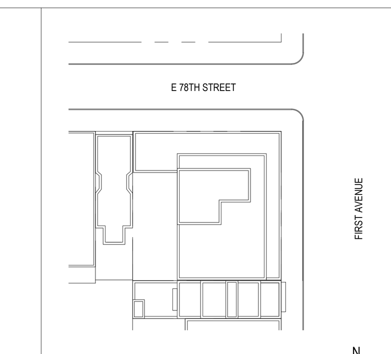
SOE-SERIES SCOPE OF WORK:

SUPPORT OF EXCAVATION (SOE) WORK CONSISTS OF BRACED SOLDIER PILES AND LAGGING WITH EXCAVATIONS TO FACILITATE CONSTRUCTION OF NEW FOUNDATIONS AND CELLAR FOR THE PROPOSED NEW BUILDING FILED IN CONJUNCTION WITH:
NB xxxxxxxxxxxxxxxx



VICINITY MAP
SCALE: NO SCALE

LIST OF DRAWINGS	
DRAWING NUMBER	DRAWING TITLE
SOE-100	SUPPORT OF EXCAVATION GENERAL NOTES
SOE-110	SUPPORT OF EXCAVATION PLAN
SOE-120	SUPPORT OF EXCAVATION SECTIONS
SOE-121	SUPPORT OF EXCAVATION SECTIONS
SOE-130	SUPPORT OF EXCAVATION DETAILS



KEY PLAN

NOTES:

Number:	Date:	Revision:
1.	03/23/2023	ISSUED FOR PAA

Project:
1487 First Avenue
NEW YORK, NY 10075

Owner:
CP VII 78TH STREET OWNER, LLC
805 Third Avenue, 20th Floor
New York, NY 10022

Architect:
HILL | WEST ARCHITECTS
11 BROADWAY
17TH FLOOR
NEW YORK, NY 10004
T. 212 213 8007

Expeditor:
Jam Consulants
104 W 29th St #9
New York, NY 10001
(212) 627-1050

Structural Engineer:
McNamara Salvia
45 West 45th Street, 10th Floor,
New York, NY 10036
(212) 246-9800

MEP Engineer:
Cosentini Associates
498 Seventh Avenue
New York, NY 10018
(212) 615-3600

Geotechnical/SOE Engineer:
Mueser Rutledge Consulting Engineers PLLC
225 West 34th Street, 6th Floor
New York, NY 10122
(917)339-9300

DOB STAMPS & SIGNATURES:

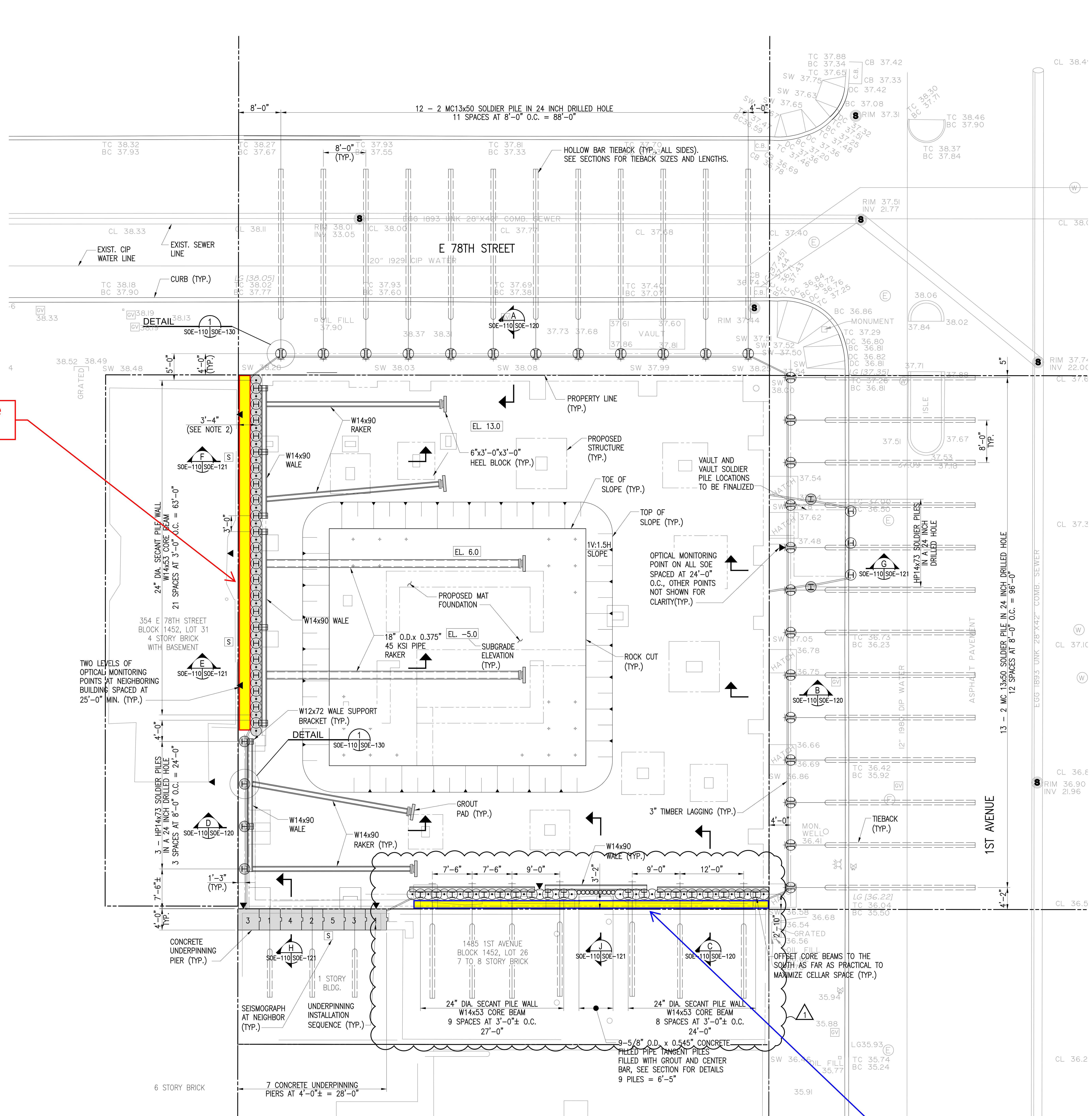
DWG TITLE:
SUPPORT OF EXCAVATION PLAN

SEAL & SIGNATURE:
STATE OF NEW YORK · JAN CERMAK · 090694 · LICENSED PROFESSIONAL ENGINEER

DATE: 02/06/2023
PROJECT #: 14536
SCALE: AS NOTED
SOE-100.00
DWG NO.

Last saved by: sdamico on Thursday, Mar 23, 2023 - 3:25:00 PM
Printed on: Thursday, Mar 23, 2023 - 04:04:13 PM
Printed by: Foythe Wu
O:\DWGS\145\14536\SOE-100.00.DWG

Former foundation rubble wall to remain in place

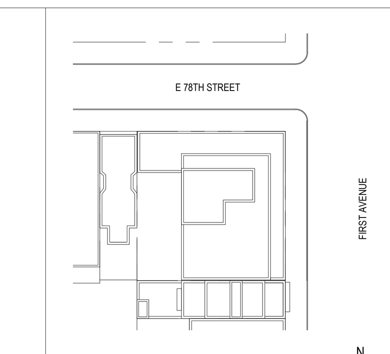


Foundation party wall to remain in place

PLAN
SCALE: 1/8"=1'-0"

NOTES:

1. FOR GENERAL NOTES, SEE DRAWING SOE-100.
2. LOCATE CENTER LINE OF WESTERN SECANT PILE WALL AS CLOSE TO WESTERN PROPERTY LINE AS POSSIBLE. PROVIDE AS-BUILT DIMENSIONS FOR COORDINATION WITH FOUNDATION DRAWINGS.



KEY PLAN

NOTES:

Number:	Date:	Revision:
1.	03/23/2023	ISSUED FOR PAA

Project:
1487 First Avenue
NEW YORK, NY 10075

Owner:
CP VII 78TH STREET OWNER, LLC
805 Third Avenue, 20th Floor
New York, NY 10022

Architect:
HILL | WEST ARCHITECTS
11 BROADWAY 17TH FLOOR NEW YORK, NY 10004 T. 212 213 8007

Expeditor:
Jam Consultants
104 W 29th St #9
New York, NY 10001
(212) 627-1050

Structural Engineer:
McNamara Salvia
45 West 45th Street, 10th Floor,
New York, NY 10036
(212) 246-9800

MEP Engineer:
Cosentini Associates
498 Seventh Avenue
New York, NY 10018
(212) 615-3600

Geotechnical/SOE Engineer:
Mueser Rutledge Consulting Engineers PLLC
225 West 34th Street, 6th Floor
New York, NY 10122
(917)339-9300

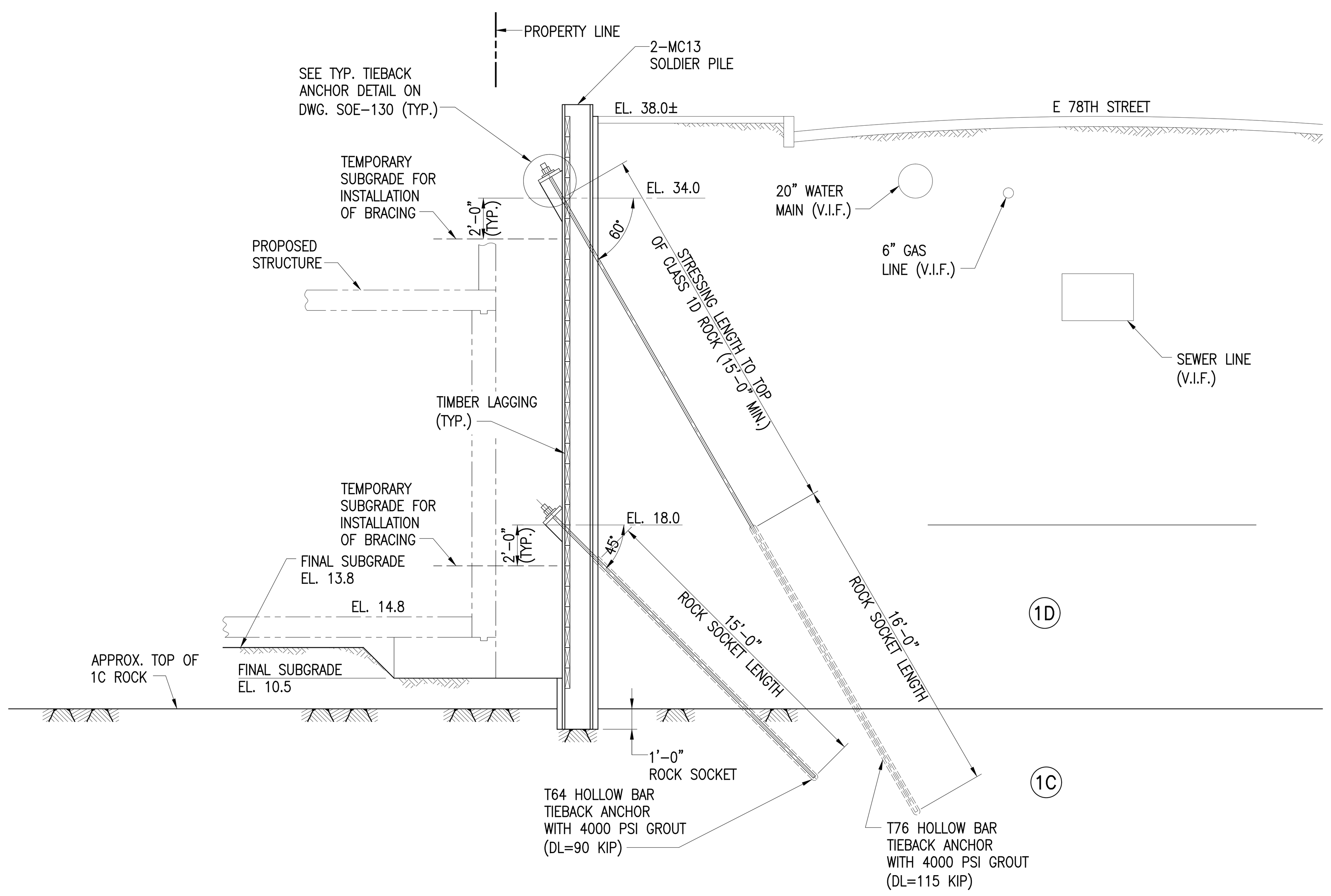
DOB STAMPS & SIGNATURES:

DWG TITLE:
SUPPORT OF EXCAVATION PLAN

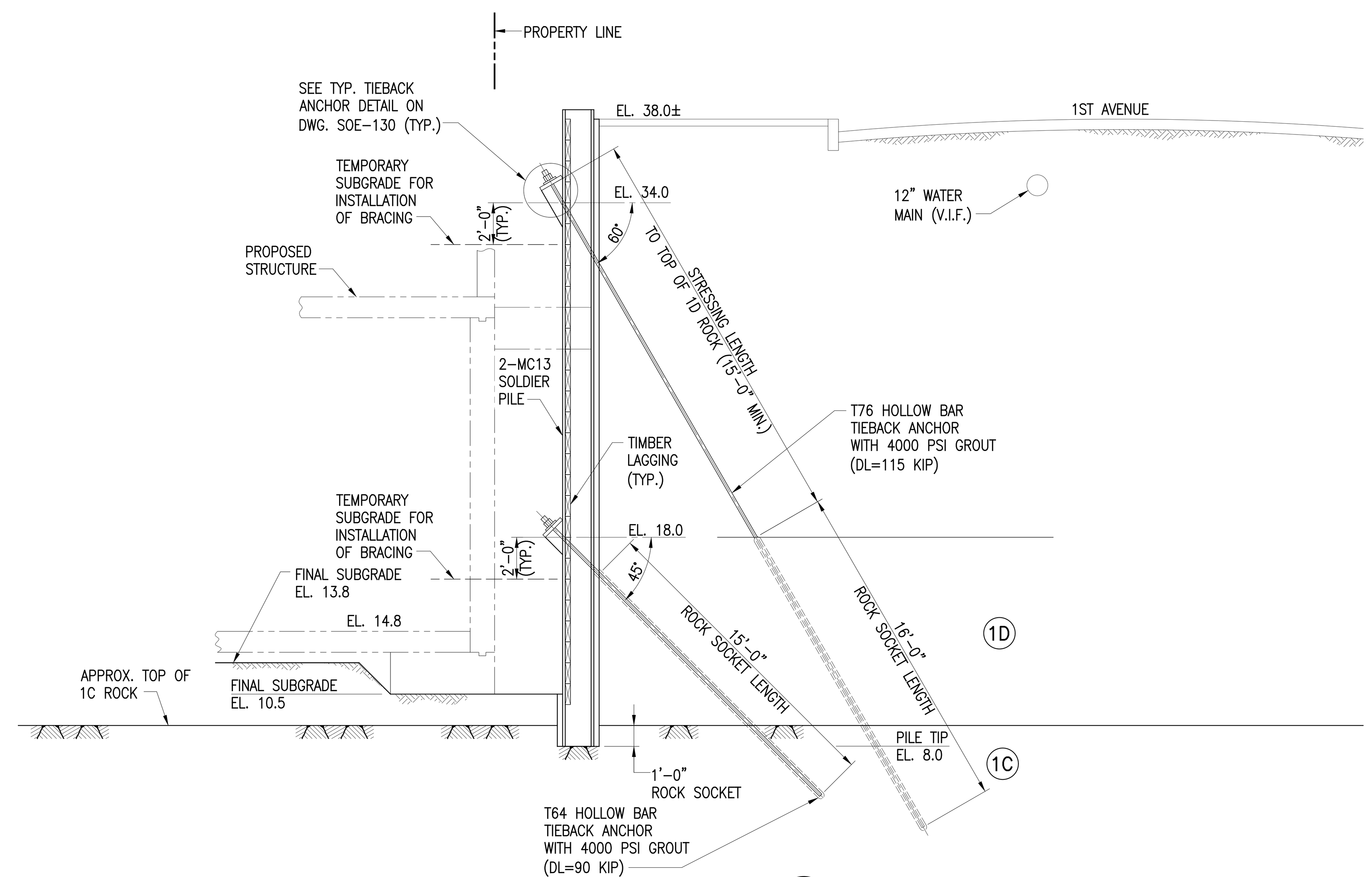
SEAL & SIGNATURE:

DATE: 02/06/2023
PROJECT #: 14536
SCALE: AS NOTED
SOE-110.01
DWG NO.

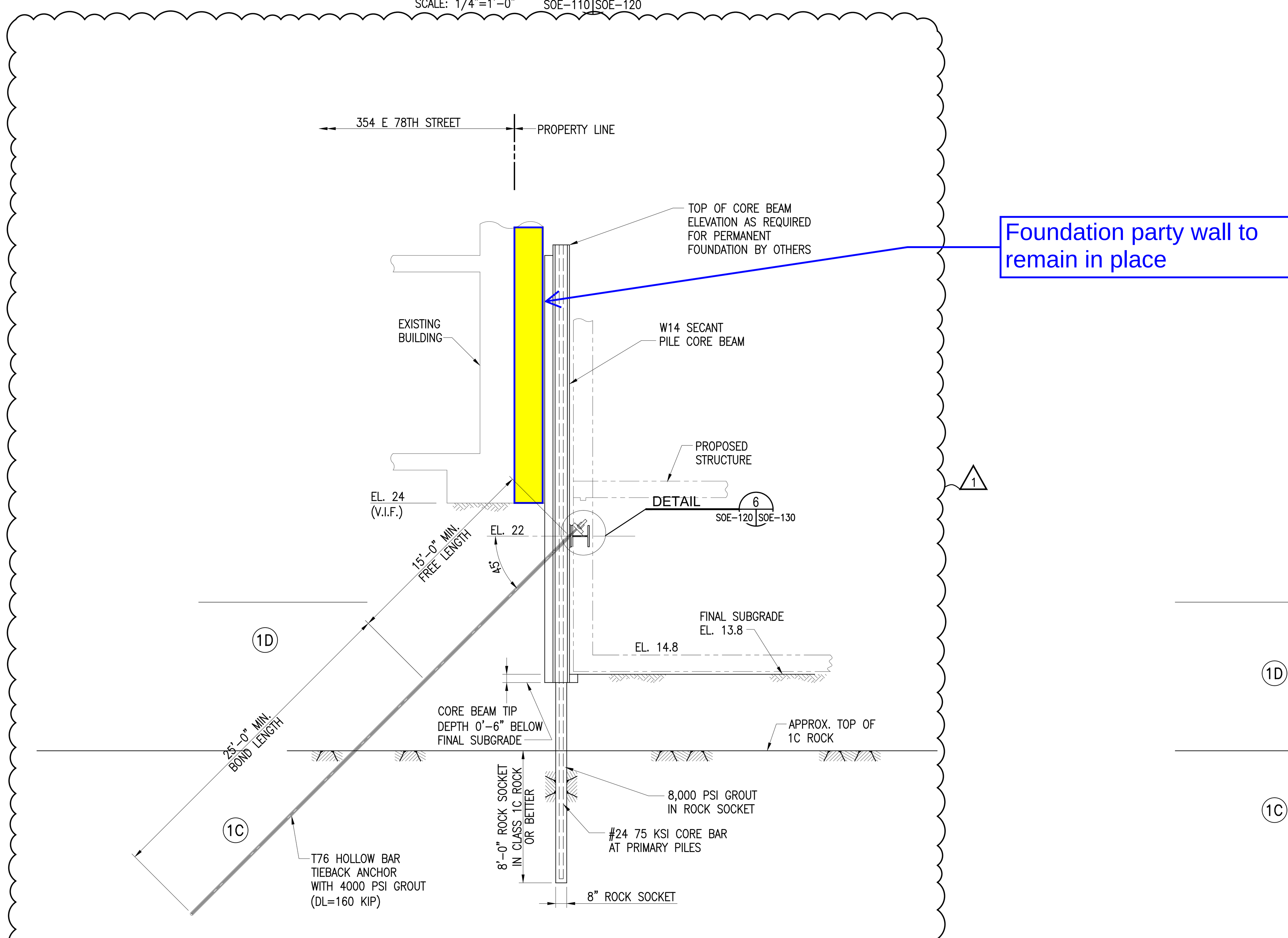
Last saved by: fwu on Thursday, Mar 23, 2023 – 3:59:03 PM
Printed on: Thursday, Mar 23, 2023 – 04:04:33 PM
Printed by: Foythe Wu
O:\DWGS\145\14536\SOE-110.01.dwg



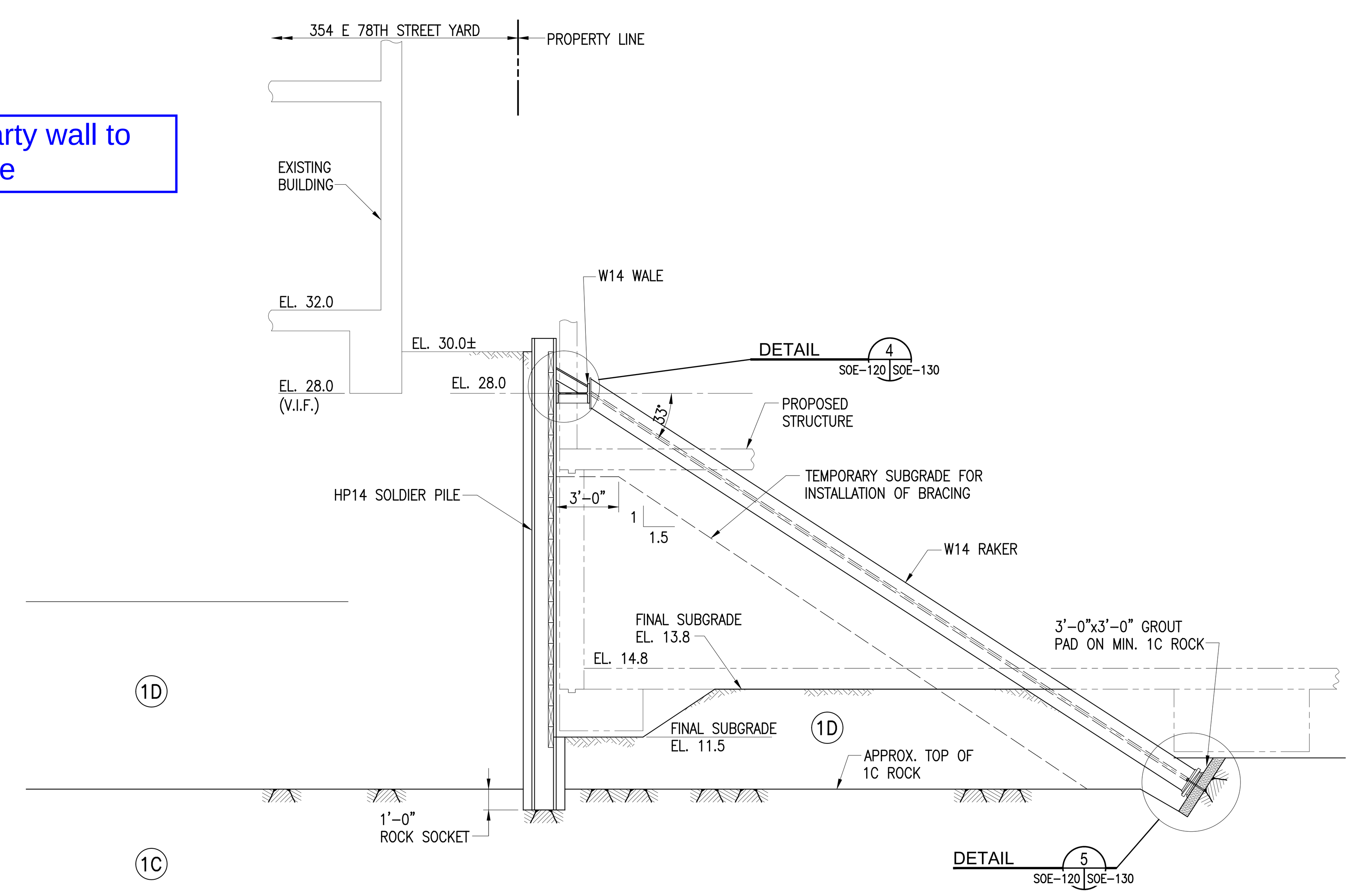
SECTION A
SCALE: 1/4"=1'-0" SOE-110 | SOE-120



SECTION B
SCALE: 1/4"=1'-0" SOE-110 | SOE-120



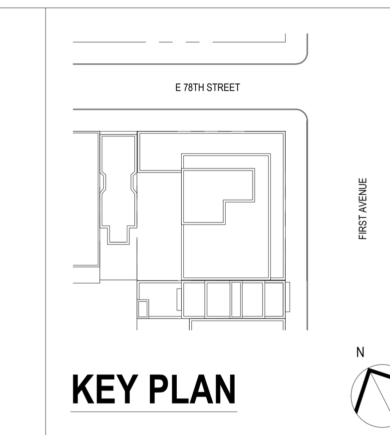
SECTION C
SCALE: 1/4"=1'-0" SOE-110 | SOE-120



SECTION D
SCALE: 1/4"=1'-0" SOE-110 | SOE-120

NOTES:

1. FOR GENERAL NOTES, SEE DRAWING SOE-100.
2. LOCATE CENTER LINE OF WESTERN SECANT PILE WALL AS CLOSE TO WESTERN PROPERTY LINE AS POSSIBLE. PROVIDE AS-BUILT DIMENSIONS FOR COORDINATION WITH FOUNDATION DRAWINGS.



KEY PLAN

NOTES:

Number:	Date:	Revision:
1.	03/23/2023	ISSUED FOR PAA

Project:
1487 First Avenue
NEW YORK, NY 10075

Owner:
CP VII 78TH STREET OWNER, LLC
805 Third Avenue, 20th Floor
New York, NY 10022

Architect:
HILL | WEST ARCHITECTS
11 BROADWAY
17TH FLOOR
NEW YORK, NY 10004
T. 212 213 8007

Expeditor:
Jam Consulants
104 W 29th St #9
New York, NY 10001
(212) 627-1050

Structural Engineer:
McNamara Salvia
45 West 45th Street, 10th Floor,
New York, NY 10036
(212) 246-9800

MEP Engineer:
Cosentini Associates
498 Seventh Avenue
New York, NY 10018
(212) 615-3600

Geotechnical/SOE Engineer:
Mueser Rutledge Consulting Engineers PLLC
225 West 34th Street, 6th Floor
New York, NY 10122
(917)339-9300

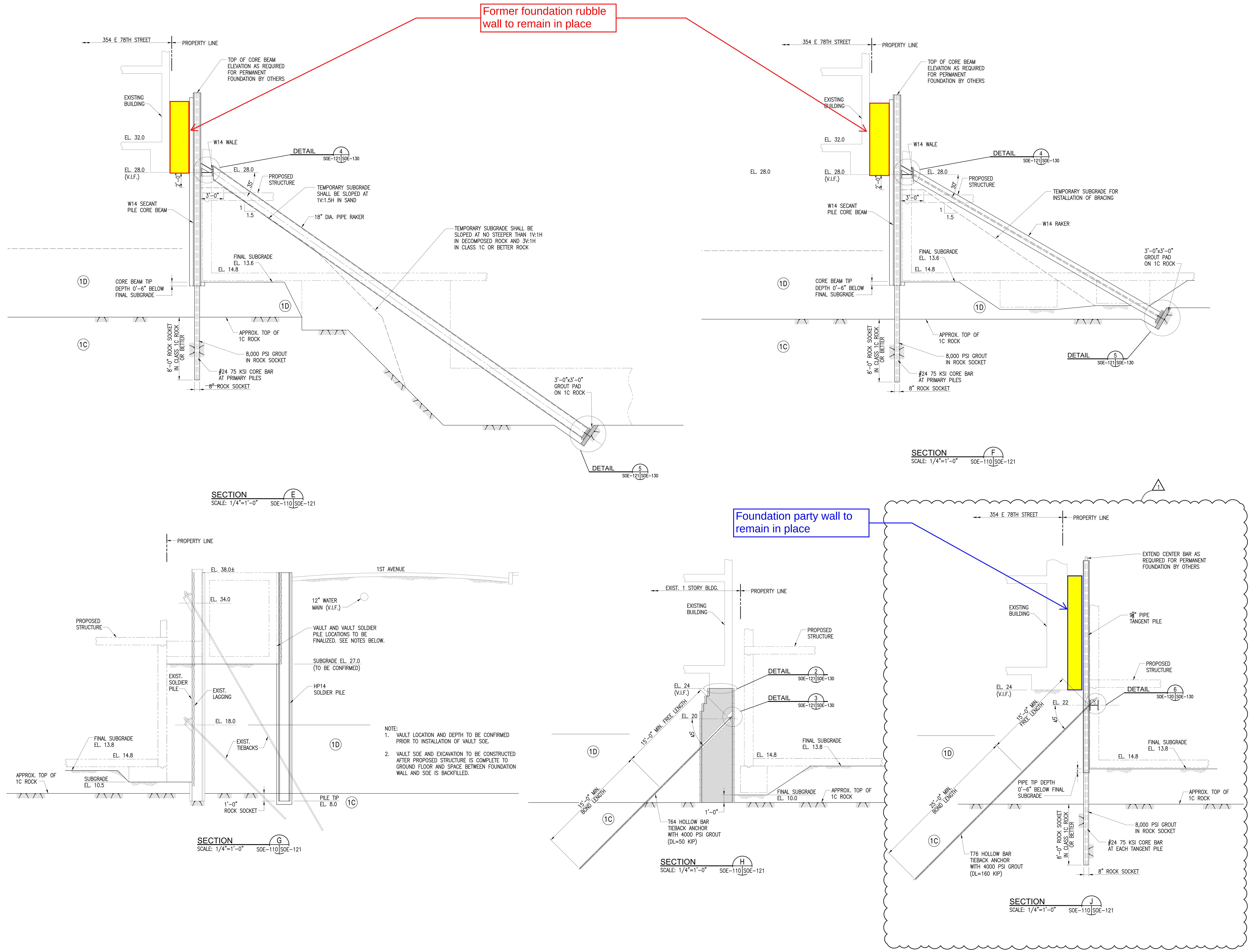
DOB STAMPS & SIGNATURES:

DWG TITLE:
SUPPORT OF EXCAVATION SECTIONS

SEAL & SIGNATURE:
STATE OF NEW YORK
JAN CERMAK
090694
LICENSED PROFESSIONAL ENGINEER

DATE: 02/06/2023
PROJECT #: 14536
SCALE: AS NOTED
SOE-120.01
DWG NO.

Last saved by: fwu on Thursday, Mar 23, 2023 - 3:57:43 PM
Printed on: Thursday, Mar 23, 2023 - 04:04:53 PM
Printed by: Foythe Wu
O:\DWGS\145\14536\SOE-120.01.DWG



NOTES:
1. FOR GENERAL NOTES, SEE DRAWING SOE-100.
2. LOCATE CENTER LINE OF WESTERN SECANT PILE WALL AS CLOSE TO WESTERN PROPERTY LINE AS POSSIBLE. PROVIDE AS-BUILT DIMENSIONS FOR COORDINATION WITH FOUNDATION DRAWINGS.

Last saved by: fwu on Thursday, Mar 23, 2023 - 3:58:21 PM
Printed on: Thursday, Mar 23, 2023 - 04:05:11 PM
Printed by: Foythe Wu

KEY PLAN

NOTES:

Number:	Date:	Revision:
1.	03/23/2023	ISSUED FOR PAA

Project:
1487 First Avenue
NEW YORK, NY 10075

Owner:
CP VII 78TH STREET OWNER, LLC
805 Third Avenue, 20th Floor
New York, NY 10022

Architect:
HILL | WEST ARCHITECTS
11 BROADWAY 17TH FLOOR NEW YORK, NY 10004 T. 212 213 8007

Expeditor:
Jam Consultants
104 W 29th St #9
New York, NY 10001
(212) 627-1050

Structural Engineer:
McNamara Salvia
45 West 45th Street, 10th Floor,
New York, NY 10036
(212) 246-9800

MEP Engineer:
Cosentini Associates
498 Seventh Avenue
New York, NY 10018
(212) 615-3600

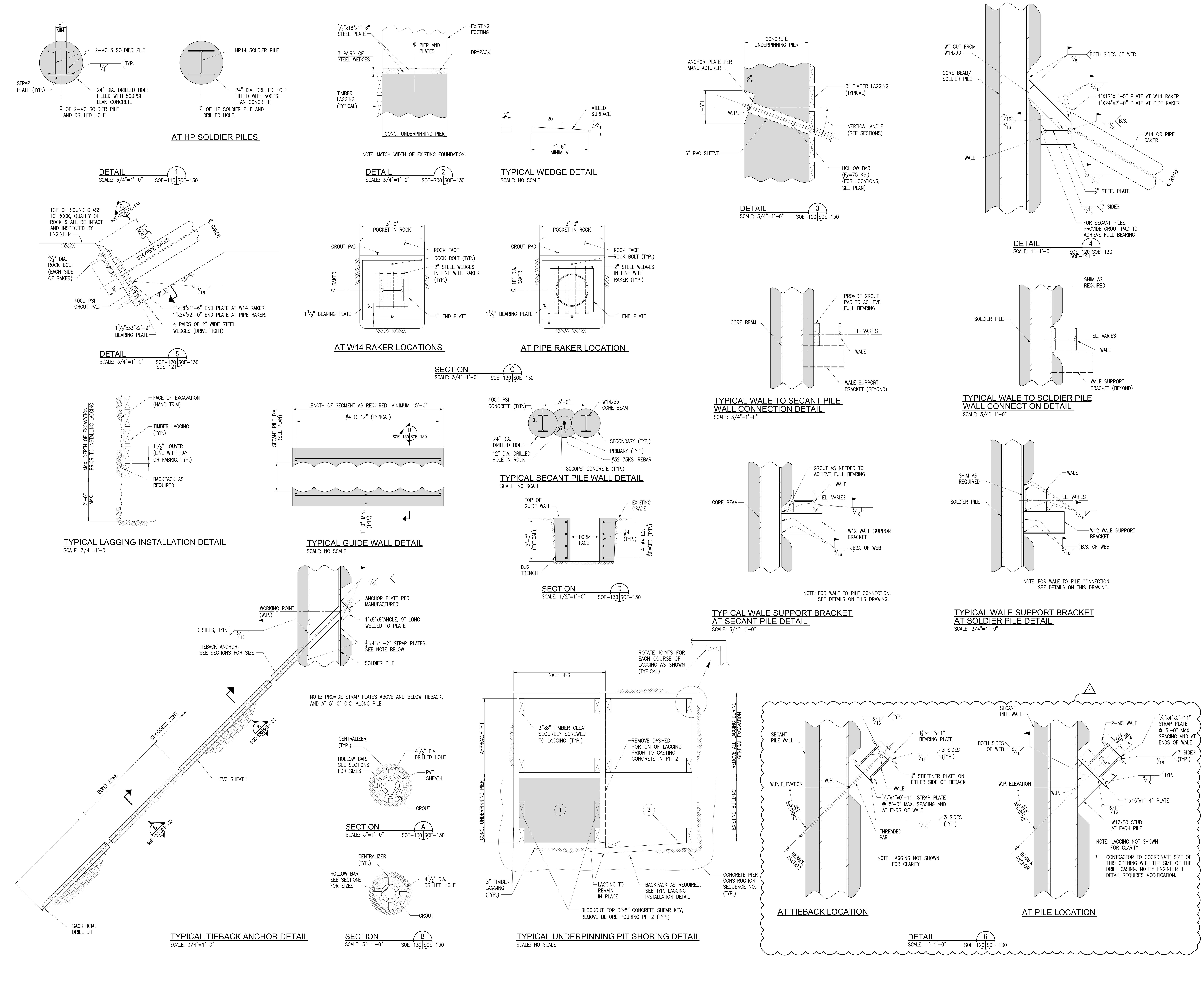
Geotechnical/SOE Engineer:
Mueser Rutledge Consulting Engineers PLLC
225 West 34th Street, 6th Floor
New York, NY 10122
(917)339-9300

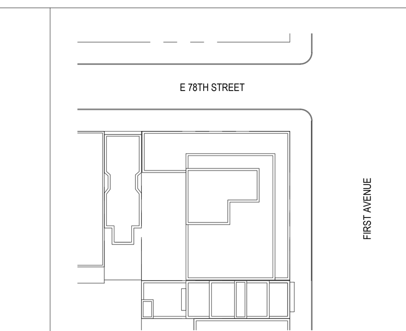
DOB STAMPS & SIGNATURES:

DWG TITLE:
SUPPORT OF EXCAVATION SECTIONS

SEAL & SIGNATURE:

DATE: 02/06/2023
PROJECT #: 14536
SCALE: AS NOTED
SOE-121.01
DWG NO.





KEY PLAN

NOTES:

Number:	Date:	Revision:
1.	03/23/2023	ISSUED FOR PAA

Project:

1487 First Avenue
NEW YORK, NY 10075

Owner:

CP VII 78TH STREET OWNER, LLC
805 Third Avenue, 20th Floor
New York, NY 10022

Architect:

HILL | WEST ARCHITECTS
11 BROADWAY
17TH FLOOR
NEW YORK, NY 10004
T. 212 213 8007

Expeditor:
Jam Consulants
104 W 29th St #9
New York, NY 10001
(212) 627-1050

Structural Engineer:
McNamara Salvia
45 West 45th Street, 10th Floor,
New York, NY 10036
(212) 246-9800

MEP Engineer:
Cosentini Associates
498 Seventh Avenue
New York, NY 10018
(212) 615-3600

Geotechnical/SOE Engineer:
Mueser Rutledge Consulting Engineers PLLC
225 West 34th Street, 6th Floor
New York, NY 10122
(917)339-9300

DOB STAMPS & SIGNATURES:

DWG TITLE:

SUPPORT OF EXCAVATION DETAILS

SEAL & SIGNATURE:

DATE: 02/06/2023
PROJECT #: 14536
SCALE: AS NOTED

SOE-130.01
DWG NO.