REMEDIAL ACTION WORK PLAN

for

250 WATER STREET
New York, New York
NYSDEC BCP No.: C231127

Prepared for:

250 Seaport District, LLC
c/o The Howard Hughes Corporation
199 Water Street, 28th Floor
New York, NY 10038

Prepared by:

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

Jason J. Hayes, PE, LEED AP
Principal/Vice President

9 November 2021
Langan Project No. 170381202

LANGAN

CERTIFICATION

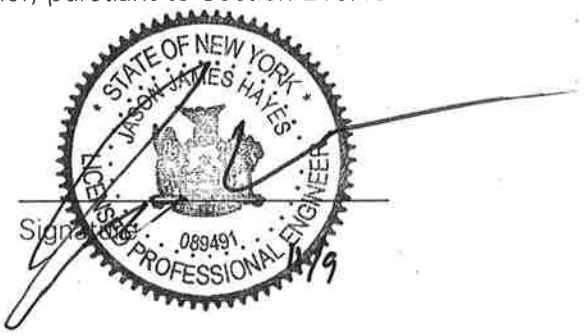
I, Jason J. Hayes, certify that I am currently a New York State (NYS) registered professional engineer and that this Remedial Action Work Plan was prepared in accordance with applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and 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 a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

Jason Hayes — NYS Professional Engineer #089491

11/09/2021 — 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.

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

LIST OF ACRONYMS

Acronym	Definition
Alpha	Alpha Analytical, Inc.
ALTA	American Land Title Association
AOC	Area of Concern
ASTM	ASTM International
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
Bgs	Below grade surface
BMP	Best Management Practices
BOD	Biological Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
C&D	Construction and Demolition
CAMP	Community Air Monitoring Plan
CFR	Code of Federal Regulations
CHASP	Construction Health and Safety Plan
COC	Contaminants of Concern
COD	Chemical Oxygen Demand
CQAP	Construction Quality Assurance Plan
CSM	Conceptual Site Model
CVOC	Chlorinated Volatile Organic Compounds
DER	Division of Environmental Remediation
DRO	Diesel Range Organic
DUSR	Data Usability Summary Report
EC	Engineering Control
EDD	Electronic Data Deliverable
El	Elevation
ELAP	Environmental Laboratory Approval Program
En-Zone	Environmental Zone
EPC	Exposure Point Concentration
ESA	Environmental Site Assessment
ESI	Environmental Site Investigation
Eurofins	Eurofins Lancaster Laboratories Environmental, Inc.
eV	Electron Volt
FEMA	Federal Emergency Management Agency
FER	Final Engineering Report
FWRIA	Fish and Wildlife Resources Impact Analysis
GPR	Ground Penetrating Radar
GRO	Gasoline Range Organics
HASP	Health and Safety Plan
HDPE	High-Density Polyethylene

Acronym	Definition
HRG	Hager-Richter Geoscience, Inc.
IC	Institutional Control
Langan	Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
mg/kg	Milligram per kilogram
mg/l	Milligram per liter
NSPS	National Society of Professional Surveyors
NYCDCP	New York City Department of City Planning
NYCDEP	New York City Department of Environmental Protection
NYCDOB	New York City Department of Buildings
NYCDOT	New York City Department of Transportation
NYCOER	New York City Mayor's Office of Environmental Remediation
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSHA	Occupational Safety and Health Administration
PAOC	Potential Area of Concern
PBS	Petroleum Bulk Storage
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethene/Tetrachloroethylene
PE	Professional Engineer
PFAS	Per- and Polyfluoroalkyl Substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PGW	Protection of Groundwater
PID	Photoionization Detector
PM10	Particulate matter less than 10 micrometers in diameter
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
RE	Remediation Engineer
REC	Recognized Environmental Condition
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan

Acronym	Definition
RR	Restricted Use – Restricted Residential
SBS	Small Business Services
SCG	Standards, Criteria, and Guidance
SCO	Soil Cleanup Objective
SGV	Standards and Guidance Values
the Site	250 Water Street, New York, New York
SFMP	Soil/Fill Management Plan
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SVOC	Semivolatile Organic Compound
SWPPP	Stormwater Pollution Prevention Plan
TAL	Target Analyte List
TCL	Target Compound List
TCE	Trichloroethene/Trichloroethylene
TOC	Total Organic Carbon
TOGS	Technical and Operational Guidance Series
TOV	Total Organic Vapor
TPH	Total Petroleum Hydrocarbons
UIR	Underground Injection/Recirculation
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
UU	Unrestricted Use
VOC	Volatile Organic Compound
The Volunteer	250 Seaport District, LLC
XRF	X-ray Fluorescence
$\mu g/m^3$	Micrograms per cubic meter

EXECUTIVE SUMMARY

250 Seaport District, LLC is a Volunteer in the New York State Brownfield Cleanup Program (BCP) and is responsible for the investigation and remediation of the property located at 250 Water Street, New York, New York (the site). The Brownfield Cleanup Agreement (BCA) was fully executed on 1 August 2019 (Index No. C231127-04-19) and BCP Site No. C231127 was assigned. One multi-story mixed-use building with one cellar level that encompasses the site footprint is planned. The proposed uses of each floor are still in the early planning stages; however, the proposed building would likely house a parking garage, utility rooms, storage areas, locker rooms, and property operations offices in the cellar, with commercial and residential spaces on the floors above.

This Remedial Action Work Plan (RAWP) identifies and evaluates remedial action alternatives and presents a recommendation for a Track 2 remedy. The proposed remedy was developed based on data gathered during the 2020 Remedial Investigation (RI) by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan). The remedy described in this document is consistent with the procedures defined in the New York State Department of Environmental Conservation (NYSDEC) Program Policy DER-10: Technical Guide for Site Investigation and Remediation (DER-10) and complies with applicable federal, state, and local laws, regulations, and requirements.

Site Description/Physical Setting/Site History

The site is located at 250 Water Street in the South Street Seaport neighborhood of New York, New York (Block 98, Lot 1 on the Borough of Manhattan tax map) and is about 48,057 square feet (±1.10 acres) in area. The site occupies the entire city block bordered by Pearl Street to the northwest (project north), Peck Slip to the northeast (project east), Water Street to the southeast (project south), and Beekman Street to the southwest (project west). It is used as an open-air, asphalt-covered commercial parking lot; a parking attendant kiosk and temporary storage shed are located near the center of the lot. The perimeter of the site is fenced with one automated barrier ingress/egress gate on Pearl Street.

The "project north" is perpendicular with Water Street and points towards Pearl Street. All directions described herein are referenced to the project north arrow unless otherwise noted.

The site was historically operated with various types of factories (about 1894 and 1927 to 1954), an oil company (about 1920 to 1927), a printer (about 1920 to 1927 and 1950), metal works (about 1923 to 1927), a chemicals and glue company (about 1927), a chemical company (about 1923), a thermometer factory and workshop (about 1833 to 1927), a machine shop (about 1950), and a gasoline service station (about 1953). A garage with two 550-gallon underground storage tanks (UST) was located along Peck Slip from about 1950 to 1996.

Summary of the Remedial Investigation

The findings and conclusions of the RI are as follows:

1. Stratigraphy: Site stratigraphy consists of historic fill underlain by sand with varying amounts of silt, gravel and clay. Historic fill, characterized as grey to brown fine sand with varying proportions of silt, gravel, brick, concrete, wood, ceramic, and coal, was encountered to depths ranging from about 5 to 17 feet below grade surface (bgs). Bedrock was not encountered and is expected to be about 125 feet bgs. The historical shoreline ran through the center of the site, parallel with Water and Pearl Streets.
2. Hydrogeology: Groundwater was observed at elevations in reference to the North American Vertical Datum of 1988 (NAVD88) ranging from about -0.65 to -1.10 (about 15.5 to 8.9 feet bgs) during the RI. The groundwater flow direction is to the southeast. Based on the results collected from pressure transducers, groundwater does not appear to be significantly tidally influenced. The tidal cycle fluctuation is about ±0.1 feet.
3. Historic Fill: Historic fill was encountered in all soil borings beneath the asphalt cover to depths ranging from about 5 to 17 feet bgs. Historic fill impacts include semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and metals in soil at concentrations above Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 375 Unrestricted Use (UU), Protection of Groundwater (PGW), and/or Restricted Use Restricted-Residential (RURR) Soil Cleanup Objectives (SCO).
4. Petroleum and Tar Impacts: Petroleum- and tar-related impacts, as evidenced by field observations and/or analytical data, were identified and are attributed to the potential USTs and associated open spill, historical site uses, and treated timber pile/cribbing.
    a. Petroleum impacts attributed to the open spill (Spill No. 1507371) were identified in the southeastern part of the site. An anomaly indicative of four USTs was identified in this area. Field observations within the capillary fringe and below the groundwater interface include petroleum-like odor, staining and/or photoionization detector (PID) readings above background. Petroleum-related volatile organic compounds (VOC) and/or SVOC were detected in soil samples at concentrations above UU, PGW, and/or RURR SCOs and in groundwater samples at concentrations above NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values (SGVs). Petroleum-related VOCs were also detected in all soil vapor samples, with the highest benzene, toluene, ethylbenzene, and xylenes (BTEX) concentration in the southeastern part of the site in soil vapor sample SV32.
    b. Petroleum impacts attributed to the historical site use as an oil company and garage with two 550-gallon USTs were identified in soil borings and monitoring

wells in the northeastern part of the site. Field observations in unsaturated soil, the capillary fringe, and below the groundwater interface include petroleum-like odor, staining and PID readings above background. Petroleum-related VOCs and/or SVOCs were detected in soil samples at concentrations above UU and/or RURR SCOs and in groundwater samples at concentrations above SGVs. Petroleum-related VOCs were detected in soil vapor samples in this area.

c. Creosote impacts attributed to treated timber piles or cribbing were identified in soil borings and a monitoring well in the southern and central parts of the site. Wood/timber was observed in several soil borings. Field observations within the capillary fringe and below the groundwater interface include tar-like odor, staining and/or PID readings above background were observed in soil borings. No petroleum-related VOCs and SVOCs were detected above UU SCOs in the soil borings. One petroleum-related VOC was detected at concentrations above the NYSDEC SGV in temporary monitoring well MW03 in the southcentral part of the site. Petroleum/creosote-related VOCs were detected in soil vapor samples in this area of the site.

5. Mercury Impacts Related to Historical Site Uses: Mercury impacts to soil related to historical site use, including a thermometer factory and three additional thermometer factories/workshops, were identified. The highest mercury concentrations in soil were detected primarily within the historical fill layer in and around the former thermometer factory located at 302 Pearl Street (mercury-impacted hotspot) and, to a lesser extent, within the three additional thermometer factories/workshops. Mercury detections outside of these areas are most likely associated with the quality of historic fill at the site. The major mercury species identified were mercury salts. Elemental mercury made up 0.01% to 10.87% of the total mercury concentrations in speciated samples. Mercury was not detected in groundwater samples. Mercury vapor was not detected in on-site soil vapor samples; however, mercury vapor was detected in soil vapor samples collected from 15 feet below the Pearl Street sidewalk adjoining the site at concentrations of 0.222 micrograms per cubic meter ($\mu g/m^3$) in SV39 and 0.271 $\mu g/m^3$ in SV38. The source of mercury contamination in soil is likely from the use of mercury-impacted building materials used as backfill within the historic fill layer in and around the former factory/workshop footprints.

6. PCB Impacts Related to Historical Site Uses: PCB-impacted soil was identified and may be related to historical site uses. PCB impacts to soil were observed primarily within the historical fill layer in and around the former oil company in the northeastern part of the site and the former oil company and factory on the western part of the site.

7. CVOC in Soil Vapor: The soil vapor samples collected at the site contained tetrachloroethene (PCE) and trichloroethene (TCE). Soil vapor samples from the center of the site and from near the northeastern corner of the site contained the highest concentrations of Chlorinated VOCs (CVOC). CVOCs were detected in soil and groundwater samples below regulatory criteria. A site source of CVOCs was not identified.
8. PFAS in Soil and Groundwater: Per- and polyfluoroalkyl substances (PFAS) -impacted soil and groundwater was identified at the site. No historical use consistent with PFAS use was identified. Based on the evaluation of the soil guidance values, per NYSDECs PFAS guidance document, no site source of PFAS was identified.
9. Sufficient analytical data were gathered during the RI to determine cleanup objectives and to develop a remedy for the site. The remedy is described and evaluated in this RAWP was prepared in accordance with New York State BCP guidelines. The remedy will address impacts to soil, groundwater, and soil vapor described in the RIR.

Qualitative Human Health Exposure Assessment

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.

Current Conditions

Under current conditions contaminant sources include 1) historic fill with varying levels of SVOCs, pesticides, PCBs, and metals; 2) an on-site spill resulting in petroleum-impacted soil, groundwater and soil vapor; 3) historical site uses, including thermometer factory/workshops and oil companies/factories, resulting in mercury-impacted soil and VOC- and PCB-impacted soil, respectively, 4) Unidentified historical on- or off-site uses that may have contributed to the presence of PFAS in soil and groundwater, and 5) historical uses of the adjacent and surrounding sites that may have contributed CVOCs impacts to soil vapor.

Contaminant release and transport mechanisms from the sources above include contaminated soil transported as dust, or overland flow in areas of exposed soil, contaminated groundwater flow and volatilization of contaminants from the soil and groundwater matrices to the soil vapor phase, and transport of existing soil vapor contaminants.

Under the current site conditions, the likelihood of exposure to humans is limited because the points of exposure are controlled by the sites impervious surface, the fact that potable water is obtained from an off-site source, and on-site accumulation sources of soil vapor (i.e., buildings, excluding the parking lot kiosk) are not present. CAMP action levels were not exceeded during

the RI and sinkhole repairs. Subsurface investigations, where exposure to humans is more likely, were conducted in accordance with the Remedial Investigation Work Plan (RIWP) and a Health and Safety Plan (HASP) to minimize exposure risk. The use of personal protective equipment (PPE) and other controls, including CAMP and vapor mitigation and dust suppression measures, will mitigate potential exposure pathways to site workers performing subsurface repairs.

As described in section 2.7, there is no complete exposure pathway for mercury vapor under current conditions. Vapor accumulation within the parking lot kiosk is possible; however, the kiosk is not a continuously occupied space and has a loose building envelope (i.e. well ventilated).

Construction/Remediation Activities

During remediation and/or development, sources of contamination are the same as under the current conditions; however, the points of exposures change due to disturbed and exposed soil during excavation, dust and organic vapors generated during excavation, and contaminated groundwater that may be encountered during excavation and/or localized dewatering operations.

Routes of exposure include ingestion and dermal absorption of contaminated soil and groundwater, inhalation of organic vapors volatilizing from contaminated soil and groundwater (specifically in the areas of petroleum impacts) or impacted vapors already in the vadose zone from an off-site source, and inhalation of dust arising from contaminated soil. The receptor population includes construction and remediation workers, authorized visitors to the site, and the public adjacent to the site.

The implementation of appropriate health and safety measures during construction and remediation, such as air monitoring, using vapor and dust suppression measures, cleaning trucks prior to exiting the site to prevent off-site soil tracking, maintaining site security, and wearing the appropriate PPE will mitigate potential exposure pathways during remediation and/or development.

In accordance with the RAWP, which includes a CHASP, Soil/Fill Management Plan (SFMP), and a CAMP, measures such as conducting an air-monitoring program, donning PPE, covering soil stockpiles, altering work sequencing, maintaining a secure construction entrance, proper housekeeping, and applying vapor and dust suppression measures to prevent off-site migration of contaminants during construction will be implemented to prevent completion of these potential on- and off-site exposure pathways.

P*roposed Future Conditions*

Residual contaminants may remain on-site, depending on the remedy, and will, to a lesser extent, include those listed under current conditions. Contaminant release and transport mechanisms include contaminated soil transported as dust, contaminated groundwater flow and volatilization of contaminants from the soil and groundwater matrices to the soil vapor phase, and transport

of existing soil vapor contaminants. However, a composite cover system (e.g., concrete building foundations and asphalt paving) will be installed, which will eliminate exposure to remaining potentially contaminated soil and groundwater in New York City is not used as a potable water. The use of Institutional Controls (IC) and/or Engineering Controls (EC) will mitigate points of potential exposure, including potential cracks in the foundation or slab of the proposed development and exposure during any future soil-disturbing activities. Routes of exposure include inhalation of vapors entering the building and direct contact with residual impacted soil during future soil-disturbing activities. The receptor population includes the building occupants and employees, visitors, maintenance workers, and the nearby community, including sensitive receptors. The possible routes of exposure can be addressed or mitigated by proper installation of soil vapor mitigation measures (i.e., sub-slab depressurization system), construction and maintenance of a site cover system (i.e., concrete foundation with a waterproofing/vapor barrier membrane) and implementation of a Site Management Plan (SMP) to manage institutional and engineering controls, if residual contamination is left in place. A soil vapor evaluation that may include sampling would be conducted after building construction.

The potential off-site migration of site contaminants in soil and groundwater is not expected to result in a complete exposure pathway. The potential for off-site migration of site contaminates will be addressed by the removal of the source material in soil and groundwater and/or mitigated by the use of ICs and ECs described above. The potential off-site migration of site contaminants in soil vapor is not an exposure concern.

Human Health Exposure Assessment Conclusions

1. Human exposure to site contaminants is controlled under current conditions on the site because the site is entirely covered by asphalt, groundwater is not potable and there are no on-site accumulation sources of soil vapor (i.e., buildings). There is no exposure risk to mercury vapor under the current conditions. The primary exposure pathways are for dermal contact, ingestion, and inhalation of soil, soil vapor, and/or groundwater by site investigation or repair workers. The exposure risks can be avoided or minimized by following the appropriate health and safety measures outlined in the site-specific CAMP and HASP during investigation and remedial/ground-intrusive activities and by PPE use by repair workers.
2. In the absence of ICs and ECs, there are potentially complete exposure pathways during construction and remediation activities. The primary exposure pathways are:
    a. Dermal contact, ingestion and/or inhalation of contaminated soil, groundwater and/or soil vapor by construction 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 risks can be avoided or mitigated by performing community air monitoring and by following the appropriate health and safety, vapor and dust suppression and site security measures outlined in the RAWP and site-specific CHASP.

3. The existence of a complete exposure pathway for site contaminants to human receptors during proposed future conditions is unlikely, as a significant volume of contaminant sources will be removed from the site through excavation and dewatering/pre-treatment, the building foundation will be constructed at or below the water table and will include a waterproofing/vapor barrier membrane, the lowest level use of the building includes actively ventilated parking, any exposure to remaining soil and groundwater will be controlled with an impermeable cover, regional groundwater is not used as a potable water source and ICs will be in place to maintain ECs at the site.
4. Monitoring and control measures will be used during ground-intrusive activities (i.e. investigation and construction) to prevent community exposure to contaminated dust and vapors.

Summary of the Remedy

A Track 2 remedy is proposed and will include implementation of the following remedial elements:

1) Development and implementation of a CHASP and CAMP for the protection of on-site workers, visitors, and the environment during remediation activities
2) As a pre-requisite to site remediation, removal of the surficial asphalt cover by the contractor and management of removed asphalt as construction and demolition (C&D) debris in accordance with Part 360 and 361 regulations. Review and certification of C&D transport and disposal methodologies is not a requirement of the Remediation Engineer (RE). The RE is responsible for documenting that C&D debris is not comingled with contaminated site soil and fill.
3) A remedial design investigation including waste characterization and supplemental delineation
4) Excavation and removal of the mercury-impacted soil/fill hotspot at 302 Peal Street
5) Excavation and removal of historic fill/soil across the site to meet RURR SCOs, including excavation below 15 feet for removal or treatment of grossly contaminated media (i.e. petroleum source material)
6) Decommissioning and removal of USTs, in accordance with NYSDEC DER-10 5.4(b)(5)
7) Appropriate off-site disposal of historic fill and soil removed from the site in accordance with federal, state, and local rules and regulations for handling, transport, and disposal

8) Installation of support of excavation (SOE) necessary to facilitate remedial excavation

9) Dewatering, as necessary, to accommodate remedial excavation and remediation of petroleum-impacted groundwater

10) Screening for indications of contamination source areas during any intrusive site work by visual, olfactory, or instrumental methods

11) Collection and analysis of confirmation soil samples, in accordance with DER-10, at the completion of the remedial excavation to document post-remediation soil quality

12) Import backfill, where required, in compliance with: a) RURR or PGW SCOs, whichever is more stringent; b) 6 NYCRR Part 360 regulations; and c) federal, state, and local rules and regulations for handling and transport of backfill

13) Completion of a soil vapor intrusion (SVI) evaluation

14) Recording of an Environmental Easement (EE) to memorialize the remedial action and the institutional controls to ensure that future owners of the site continue to maintain these controls as required

15) Preparation of an SMP that describes management of the ICs – Implementation of the SMP following completion of the remedy will be stipulated by the EE.

1.0 INTRODUCTION

This Remedial Action Work Plan (RAWP) was prepared on behalf of 250 Seaport District, LLC (The Volunteer) for the property located at 250 Water Street in the South Street Seaport neighborhood of New York, New York (the site). The Volunteer was accepted into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) to investigate and remediate the site pursuant to the NYSDEC Brownfield Cleanup Agreement (BCA) executed on 1 August 2019 (Index No. C231127-04-19). BCP Site No. C231127 was assigned to the site.

This RAWP identifies and evaluates remedial action alternatives and presents the preferred Track 2 remedy. The proposed remedy was developed based on data gathered during the Remedial Investigation (RI) completed by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) between June 15 and October 12, 2020. The remedy described in this document is consistent with the procedures defined in the NYSDEC Program Policy DER-10: Technical Guide for Site Investigation and Remediation (DER-10) and complies with applicable federal, state, and local laws, regulations, and requirements.

1.1 Site Location and Description

The site is approximately 48,057 square feet (1.10 acres) in area and is located at 250 Water Street in the South Street Seaport neighborhood of New York, New York (Block 98, Lot 1 on the Borough of Manhattan tax map). The site occupies the entire city block bordered by Pearl Street to the northwest (project north), Peck Slip to the northeast (project east), Water Street to the southeast (project south), and Beekman Street to the southwest (project west). It is used as an open-air, asphalt-covered commercial parking lot; a parking attendant kiosk and temporary storage shed are located near the center of the lot. The perimeter of the site is fenced with one automated barrier ingress/egress gate on Pearl Street.

The "project north" is perpendicular to Water Street and points towards Pearl Street. All directions described herein are referenced to the project north arrow unless otherwise noted. A site location map is provided as Figure 1 and a site plan is provided as Figure 2.

According to the New York City Zoning Map 12b, the site is located in a C6-2A commercial district. The C6-2A district is mapped within the South Street Seaport Subdistrict of the Special Lower Manhattan District. C6 districts allow for a wide range of mixed residential and commercial uses. According to the New York City Landmarks Preservation Commission, the site is located in the South Street Seaport Historic District. A site survey is included in Appendix A.

1.2 Redevelopment Plan

The proposed remedy is intended to make the site protective of human health and the environment consistent with the contemplated end use. The proposed redevelopment plan and end use are described here to provide the basis for this assessment; however, the contemplated remedy may be implemented independent of the proposed redevelopment plan.

The proposed development includes construction of a mixed-use commercial and residential building with one cellar level encompassing the entire site footprint. The proposed uses of each floor are still in the early planning stages; however, the proposed building cellar would likely house a parking garage, utility rooms, storage areas, locker rooms, and property operations offices, with commercial and residential spaces on the floors above. Conceptual cellar plans are included as Appendix B.

1.3 Description of Surrounding Properties

The site is located in an urban setting that is characterized by commercial, institutional, and residential properties. The site is bordered by Pearl Street followed by multiple-story residential buildings (at least one with a first-floor parking garage) known as Southbridge Towers and Bright Beginnings NYC (a preschool and child care facility) to the north, Peck Slip followed by the seven-story Peck Slip School (P.S. 343) building to the east, Water Street followed by multiple five- and six-story residential and commercial buildings and the Blue School Elementary School to the south, and Beekman Street followed by a seven-story residential and commercial building to the west. The following is a summary of surrounding property use:

Direction	Adjoining Properties			Surrounding Properties
	Block	Lot No.	Description	
North, across Pearl Street	94	1	Multiple-story residential buildings (at least one with first-floor parking garage) - Southbridge Towers	Multiple-story residential and commercial buildings, including Bright Beginnings NYC
East, across Peck Slip	106	9	Seven-story institutional building (Peck Slip School - P.S. 343)	Multiple-story residential and commercial buildings

Direction	Adjoining Properties			Surrounding Properties
	Block	Lot No.	Description	
South, across Water Street	97	49, 55, 57, 7501, 7502, and 7505	Blue School Elementary School and multiple five- and six-story residential and commercial buildings	Multiple-story residential and commercial buildings
West, across Beekman Street	95	7501	Seven-story residential and commercial building	Public parkland, multiple-story residential and commercial buildings

Major infrastructure (storm drains, sewers, and underground utility lines) exists within the streets surrounding the site. Land use within a half mile of the site is urbanized and includes mixed-use buildings, subway tunnels, parkland, and school facilities. The closest ecological receptor, the East River, is located about 550 feet south of the site.

Sensitive receptors (as defined in DER-10) located within a half mile of the site are listed below:

Number	Name (Approximate distance from site)	Address
1	The Peck Slip School (approximately 30 feet northeast)	1 Peck Slip New York, NY 10038
2	Blue School (approximately 30 feet southeast)	241 Water Street New York, NY 10038
3	Bright Beginnings NYC (approximately 200 feet northwest)	80 Beekman Street New York, NY 10038
4	St. Margaret's House (approximately 400 feet northwest)	49 Fulton Street New York, NY 10038
5	Smarter Toddler Nursery & Preschool (approximately 700 feet west)	101 John Street New York, NY 10038
6	Kidville FiDi (approximately 700 feet west)	40 Gold Street New York, NY 10038
7	Sitter's Studio (approximately 1,000 feet southwest)	125 Maiden Lane New York, NY 10038
8	Spruce Street School P.S. 397 (approximately 1,100 feet northwest)	8 Spruce Street New York, NY 10038

Number	Name (Approximate distance from site)	Address
9	Murry Bergtraum High School For Business Careers (approximately 1,150 feet north)	411 Pearl Street New York, NY 10038
10	Montessori School of Manhattan (approximately 1,200 feet west)	2 Gold Street New York, NY 10038
11	Downtown Little School (approximately 1,300 feet northwest)	15 Dutch Street New York, NY 10038
12	New York City Housing Authority's Smith Day Care Center (approximately 1,500 feet east)	10 Catherine Slip New York, NY 10038
13	Hamilton-Madison House (approximately 1,700 feet northeast)	50 Madison Street New York, NY 10038
14	Paradigm Kids (approximately 1,700 feet west)	8 Liberty Place, New York, NY 10045
15	Bright Horizons at 20 Pine (approximately 1,700 feet west)	20 Pine Street 1st floor New York, NY 10005
16	Jacob August Riis P.S. 126 (approximately 1,800 feet northeast)	80 Catherine Street, New York, NY, 10038
17	Alfred E Smith P.S. 001 (approximately 2,000 feet northeast)	8 Henry Street New York, NY 10038
18	The Quad Preparatory School (approximately 2,000 feet west)	25 Pine Street New York, NY 10005
19	Mei Wah Day Care Center (approximately 2,100 feet northeast)	69 Madison Street New York, NY 10002
20	Leman Manhattan Preparatory School (approximately 2,300 feet southwest)	41 Broad Street New York, NY 10004
21	High School of Economics & Finance (approximately 2,500 feet northwest)	100 Trinity Place New York, NY 10006
22	Leadership and Public Service High School (approximately 2,500 feet northwest)	90 Trinity Place New York, NY 10006
23	Downtown Dance Factory (approximately 2,600 feet northwest)	291 Broadway 5th Floor New York, NY 10007
24	Preschool of America (approximately 2,600 feet east)	25 Market Street New York, NY 10002
25	Southbridge Towers (approximately 100 feet northwest)	90 Beekman Street New York, NY 10038

Number	Name (Approximate distance from site)	Address
26	The Titus School (approximately 870 feet west)	90 John Street New York, NY 10038
Not Numbered	Other residences on adjoining streets	Beekman Street, Water Street, Pearl Street, Peck Slip

1.4 Environmental History

The site and surrounding area are located in an urban setting historically characterized by residential, commercial, and industrial development. Historical uses of the site include a factory (cast-iron stoves, boilers, radiators, and other unknown uses), an oil company, a printer, a metal works, a chemicals and glue company, a chemical company, thermometer factories/workshops, a garage with two 550-gallon underground storage tanks (USTs), a machine shop, and a gasoline service station.

Historical uses of the site listed below are based on the findings of the September 2015 and June 2018 Phase I Environmental Site Assessments (ESAs) prepared by Langan in accordance with the ASTM standards. Additional historical resources supplemented the site history identified by these documents.

Historical Site Use	Historical Address	Approximate Dates of Occupation
Factories (cast-iron stoves, boilers, radiators, and other unknown uses)	106 to 116 Beekman Street 12 Peck Slip 234 Water Street	1894 and 1927 to 1954
An oil company	306 Pearl Street 254 Water Street 246 Water Street 116 Beekman Street 12 Peck Slip	1920 to 1927
Printers	8-12 Peck Slip	1920 to 1927 and 1950
Metal works	234 Water Street	1923 to 1927
Chemicals and glue company	300 Pearl Street	1927
Chemical company	246 Water Street	1923
Thermometer factory	302 Pearl Street	1868* to 1927
Thermometer factory/workshop*	236 Water Street* 240 Water Street* 298 Pearl Street*	1833* to 1868*
Garage with two 550-gallon USTs	304 to 312 Pearl Street	1950 to 1996
Machine shop	238 Water Street	1950
Gasoline service station	292-294 pearl street	1953

* Historical information was obtained from resources outside of those required by the ASTM E1527-13 Standard for Phase I ESAs.

1.4.1 Previous Environmental Reports

Previous environmental reports were reviewed as part of the RIR and are summarized in chronological order below. Previous environmental reports are included in the RIR in Appendix C, and include the following:

- *Phase I Environmental Site Assessment, dated September 2015, prepared by Langan*
- *Phase II Environmental Site Investigation Report, dated November 2015, prepared by Langan*
- *Phase I Environmental Site Assessment, dated June 2018, prepared by Langan*

Phase I Environmental Site Assessment, dated September 2015, prepared by Langan

Langan prepared a Phase I ESA in accordance with the ASTM E-1527-13 standard for the previous owner of the site, Peck Slip Associates, LLC. The following summarizes the recognized environmental conditions (RECs) identified in this Phase I ESA:

- Historical use of the site as a factory, an oil company, a printer, a metal works, a chemicals and glue company, a chemical company, a trucking company, a thermometer factory, a garage with two 550-gallon USTs, a machine shop, and a gasoline service station.
- The presence of historic fill at the site.
- Historical use of adjoining and surrounding properties as a metals works, an "oils" facility, trucking companies, a garage, a machine shop, a printer, a substation, an automobile repair facility, a mercury warehouse[1], and facilities with petroleum bulk storage.

Based on additional research conducted by Langan after the completion of the Phase I ESA, the historical site use as a trucking company was determined to be located off-site.

Phase II Environmental Site Investigation Report, dated November 2015, prepared by Langan

In preparation for the future sale of the site, the previous owner commissioned a Phase II ESI to investigate the findings of the September 2015 Phase I ESA prepared by Langan. The Phase II ESI was designed as a preliminary due diligence type of investigation to provide some subsurface data to potential future purchasers and was not intended to fully characterize subsurface conditions. The Phase II ESI included a geophysical survey, advancement and sampling of 10 soil borings (21 soil samples), installation and sampling of 5 temporary groundwater monitoring wells (5 groundwater samples), and installation and sampling of 5 temporary soil vapor points (5 soil vapor and 1 ambient air sample). The following summarizes the findings of the Phase II ESI:

- Stratigraphy: A historic fill layer, predominantly consisting of loose grey to brown, fine to medium sand with varying proportions of silt, gravel, brick, concrete, wood and ash, extends from sidewalk grade to depths ranging from about 6 to 14.5 feet bgs. Native soil consisting of sand with varying proportions of gravel and silt underlies the historic fill.
- Hydrogeology: Groundwater was encountered at depths ranging from about 7 feet bgs in the southeastern portion of the site to about 14 feet bgs in the northwestern portion of the site.
- Potential USTs: The geophysical survey identified an anomaly consistent with a UST inside the eastern boundary of the site along Peck Slip.
- Petroleum Spill: Based on field observations and analytical results from soil and groundwater samples, a spill was reported to the NYSDEC on 13 October 2015 and Spill No. 1507371 was assigned.

[1] The business "Mercury Warehouse & Storage Co Inc" was identified in the Environmental Data Resources Inc. City Directory sourced from R.L. Polk & Company for 245 Water Street in 1920.

- Soil: Petroleum impacts were observed in four soil borings on the eastern portion of the site (near Peck Slip) in the vicinity of the potential UST. Petroleum-related compounds (volatile organic compounds [VOC] and Semivolatile Organic Compound [SVOC]); total polychlorinated biphenyl (PCB); and nine metals, including mercury, were detected at concentrations above the 6 NYCRR Part 375 Unrestricted Use (UU) Soil Cleanup Objectives (SCO) and/or Restricted Use Restricted Residential (RURR) SCOs. The highest detections of mercury (63 milligrams per kilogram [mg/kg] to 120 mg/kg) were identified in one soil boring that, based on historic mapping and the current site survey, was determined to have been advanced within the limits of a historical on-site thermometer factory (302 Pearl Street).
- Groundwater: Petroleum-related VOCs and SVOCs were identified in groundwater at concentrations above NYSDEC Division of Water Technical and Operation Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values (SGVs) in the eastern and northwestern portions of the site. A total of 14 VOCs and 9 SVOCs were detected above SGVs. A petroleum-like odor and sheen were observed in purge water from two monitoring wells. Eleven metals were detected in total concentrations exceeding SGVs. Dissolved antimony, iron, magnesium, manganese, and sodium were detected in filtered samples at concentrations exceeding SGVs. These metals are likely related to area-wide and naturally-occurring brackish groundwater conditions.
- Soil Vapor: Soil vapor sampling results indicated the presence of several VOCs, including chlorinated solvents and petroleum-related compounds, above ambient air concentrations. When the detected concentrations of trichloroethene (TCE) in soil vapor were applied to the NYSDOH decision matrices (in the absence of a co-located indoor air sample), the recommended actions ranged from "no further action" to "mitigate".

Soil, groundwater, and sub-slab vapor sample locations and analytical results from the Phase II ESI are included with the RI results figures and tables.

Phase I Environmental Site Assessment, dated September 2018, prepared by Langan

Langan prepared a Phase I ESA for the site for the current property owner prior to purchase in accordance with ASTM E-1527-13 standards, which took account of the November 2015 Phase II ESI. The following summarizes the findings specific to the site:

- One REC was identified as Hazardous Substances and Petroleum on the site; this was based on the Phase II ESI, which identified the following:
    - A petroleum release in the eastern portion of the site
    - Mercury above regulatory criteria in soil

- Chlorinated solvents and petroleum-related compounds in soil vapor

Petroleum, mercury and chlorinated solvent impacts may relate to historical use of the site and/or adjoining properties.

- One Business Environmental Risk was identified as Historic Fill:

Contaminants associated with historic fill, specifically SVOCs and metals at potentially hazardous concentrations, were detected in soil across the site.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The RI was completed between 15 June and 12 October 2020 to investigate potential areas of concern (PAOCs) and to determine, to the extent practical, the nature and extent of contamination in soil, groundwater, and soil vapor. The data from the RI was used to define the areas of concern (AOCs) that are addressed by this RAWP and are summarized in Section 2.1. The RI included the advancement of soil borings; installation of groundwater monitoring wells and soil-vapor probes; and collection of soil, groundwater, and soil-vapor samples. Sample locations are presented on Figure 3.

The RI consisted of the following:

- A baseline community air monitoring event, conducted before intrusive activities began, to establish background concentrations for total volatile organic compounds (VOCs), particulates, and mercury vapor.
- A geophysical survey to clear boring locations and to identify potential subsurface utilities, structures, and significant subsurface anomalies
- Advancement of 29 site-wide soil borings and collection of 100 soil samples (including quality assurance/quality control [QA/QC] samples) for laboratory analysis
- Advancement of 16 mercury delineation soil borings around Phase II Environmental Site Investigation (ESI) boring SB4 and collection of 136 soil samples (including QA/QC samples) for laboratory analysis
- Installation and development of 11 permanent groundwater monitoring wells and collection of 11 groundwater samples (plus QA/QC samples) for laboratory analysis
- Surveying and gauging monitoring wells to calculate groundwater elevation and establish flow direction, and installation of pressure transducers to determine tidal influence
- Installation of 17 soil vapor points (14 soil vapor points were installed to depths ranging from 7 to 15 feet bgs, three soil vapor points were installed within void spaces at about 1.5 feet bgs) plus QA/QC samples and one outdoor ambient air sample for laboratory analysis

The RI was conducted in accordance with the NYSDEC-approved 13 May 2020 Remedial Investigation Work Plan (RIWP); Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 375-1, 3.8, 6.8 (Part 375); NYSDEC DER-10; and the New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006, with updates in 2017.

2.1 Areas of Concern

The following areas of concerns (AOC) were identified and are described below.

AOC-1: Historic Fill Material

Historic fill was identified beneath asphalt to depths up to 17 feet bgs across the site. SVOC, pesticide, PCB, and metal in soil were attributed to the historic fill quality. SVOCs, PCBs, and total metals were detected in groundwater samples above SGVs and are attributed to sample turbidity based on several of the samples not meeting the turbidity goal of 5 NTUs; however, historic fill may be a contributing source of dissolved PCBs/SVOCs in groundwater. Dissolved metals, excluding arsenic and barium, are attributed to regional groundwater quality. Dissolved arsenic and barium in groundwater are associated with historic fill.

AOC-2: Petroleum-Like Impacts and Open Spill (Spill No. 1507371)

Petroleum-related VOCs and SVOCs were only detected above UU, Projection of Groundwater (PGW), and/or RURR SCO in soil samples collected from four of the five soil borings advanced around the potential UST near the eastern site boundary (Peck Slip) and two soil borings SB8 and SB36 (hydraulically upgradient from the potential USTs). In addition, stained or odorous soil was identified across the larger southern and eastern parts of the site. The highest concentrations of petroleum-related VOCs and/or SVOCs above NYSDEC SGVs were identified in TMW09 and MW31 installed to the west of the potential UST and monitoring well MW30 (hydraulically upgradient from the potential USTs). Based on the field observation of petroleum like impacts, petroleum-related VOCs and SVOCs in soil and groundwater above SGVs, and the inferred groundwater flow directions, three sources of petroleum- and creosote-related contamination exist at the site:

- Petroleum-related impacts to soil, groundwater and soil vapor in the southeastern part of the site (around the potential UST) are attributed to the open spill.
- Petroleum-related impacts to soil, groundwater and soil vapor in the northeastern part of the site (AOC 4) are attributed to historical site use and further discussed in AOC 4.
- All other occurrences of stained or odorous soil (generally located in the southern half of the site) are likely attributed to creosote-treated timber piles or cribbing.

AOC-3: Historical Thermometer Factories/Workshops

Mercury was detected in soil samples at concentrations above UU and RURR SCOs across the site, and mercury concentrations were highest in and around the former thermometer factory located at 302 Pearl Street and, to a lesser extent, in the three additional thermometer factories/workshops. Mercury impacts were predominantly limited to the historic fill layer, with maximum concentrations in the 2 to 4 feet bgs interval. The former factory and workshop buildings were likely contaminated by mercury through spills and/or mercury vaporization and

absorption onto building materials from the historical use. Historically, when buildings in Manhattan were demolished, the building materials would be re-used to backfill the former lots to grade. The source of mercury contamination is, therefore, suspected to be from the mercury-impacted building material used as backfill within the historic fill layer.

AOC-4: Historical Uses of the Site and Surrounding Properties

PCBs and petroleum-related VOCs were detected at concentrations above UU, PGW, and RURR SCOs in the northeastern part of the site near the corner of Pearl Street and Peck Slip. PCBs were detected at concentrations above UU, PGW, and RURR SCOs near the Beekman Street site boundary. PCBs and petroleum impacts are attributed to the historical site uses as an oil company and garage with two 550-gallon USTs on the northeastern part of the site near the corner of Pearl Street and Peck Slip, and an oil company/factory near the site boundary along Beekman Street.

PFAS were detected in soil samples at concentrations above the UU and Protection of Groundwater (PGW) SCOs and in groundwater samples above the NYSDEC screening levels. The two samples with PFAS above the PGW guidance values were detected in surficial soil samples (0 to 2 feet bgs) above the groundwater table. PFAS have been used in various industries and products since the 1940s and the historical site use as an oil company pre-dates the use of PFAS in firefighting systems. No historical use consistent with PFAS use was identified for the site. Based on the evaluation of the soil guidance values, per NYSDECs PFAS guidance document, no site source of PFAS was identified.

Chlorinated VOCs (CVOC) were not detected in soil above the UU SCOs or in groundwater samples above the SGVs; however, CVOCs, including 1,1,1–trichloroethane (1,1,1-TCA), cis-1,2-dichloroethene (cis-1,2-DCE), methylene chloride, tetrachloroethene (PCE), and TCE, were detected in soil vapor samples. A source of CVOCs in soil vapor was not identified.

2.2 Summary of the Remedial Investigation

The RI is documented in the Remedial Investigation Report (RIR), dated 23 June 2021 and prepared by Langan. Soil boring, monitoring well, and soil vapor probe locations are shown on Figure 3. Soil sample analytical results are presented on Figures 4A and 4B. Groundwater sample analytical results are presented on Figure 5. Soil vapor sample analytical results are presented on Figure 6. Groundwater elevation data is summarized in Figures 7A and 7B.

The findings and conclusions of the RI are as follows:

1. Stratigraphy: Site stratigraphy consists of historic fill underlain by sand with varying amounts of silt, gravel and clay. Historic fill, characterized as grey to brown fine sand with varying proportions of silt, gravel, brick, concrete, wood, ceramic, and coal, was encountered to depths ranging from about 5 to 17 feet bgs. Bedrock was not

encountered and is expected to be about 125 feet bgs. The historical shoreline ran through the center of the site, parallel with Water and Pearl Streets.

2. Hydrogeology: Groundwater was observed at elevations ranging from about -0.65 to -1.10 (about 15.5 to 8.9 feet bgs) during the RI. The groundwater flow direction is to the southeast. Based on the results collected from pressure transducers, groundwater does not appear to be significantly tidally influenced. The tidal cycle fluctuation is about ±0.1 feet.

3. Historic Fill: Historic fill was encountered in all soil borings beneath the asphalt cover to depths ranging from about 5 to 17 feet bgs. Historic fill impacts include SVOCs, pesticides, PCBs, and metals in soil at concentrations above UU, PGW, and/or RURR SCOs.

4. Petroleum and Tar Impacts: Petroleum- and tar-related impacts, as evidenced by field observations and/or analytical data, were identified and are attributed to the potential USTs and associated open spill, historical site uses, and treated timber pile/cribbing.

    a. Petroleum impacts attributed to the open spill (Spill No. 1507371) were identified in soil borings SB9, SB10, and SB31 through SB34 and in monitoring wells TMW09 and MW31 through MW34. An anomaly indicative of four USTs was identified in this area. Field observations within the capillary fringe and below the groundwater interface include petroleum-like odor, staining and/or PID readings above background. Petroleum-related VOCs and/or SVOCs were detected in soil samples at concentrations above UU, PGW, and/or RURR SCOs and in groundwater samples at concentrations above SGVs. Petroleum-related VOCs were also detected in all soil vapor samples, with the highest benzene, toluene, ethylbenzene, and xylenes (BTEX) concentration in soil vapor locations in this area (SV32).

    b. Petroleum impacts attributed to the historical site use as an oil company and garage with two 550-gallon USTs were identified within the northeast corner of the site in borings SB8, SB29, SB30, and SB36 and monitoring well TMW08 and MW30. Field observations in unsaturated soil, the capillary fringe, and below the groundwater interface include petroleum-like odor, staining and PID readings above background. Petroleum-related VOCs and/or SVOCs were detected in soil samples at concentrations above UU and/or RURR SCOs and in groundwater samples at concentrations above SGVs. Petroleum-related VOCs were detected in soil vapor samples in this area.

    c. Creosote impacts attributed to treated timber piles or cribbing were generally identified within the southern half of the site in soil borings SB3, SB17, SB20, SB21, SB23, SB27, SB35, SB4NE3, SB4S3, SB4SE3, and SB4S2 and in monitoring well

TMW03. Wood/timber was observed in several soil borings. Field observations within the capillary fringe and below the groundwater interface include tar-like odor, staining and/or PID readings above background were observed in soil borings. No petroleum-related VOCs and SVOCs were detected above UU SCOs in the soil borings. One petroleum-related VOC was detected at concentrations above the NYSDEC SGV in temporary monitoring well MW03. Petroleum/creosote-related VOCs were detected in soil vapor samples in this area of the site.

5. Mercury Impacts Related to Historical Site Uses: Mercury impacts to soil are related to historical site use, including a thermometer factory and three additional thermometer factories/workshops. The highest mercury concentrations in soil were detected primarily within the historical fill layer in and around the former thermometer factory located at 302 Pearl Street and, to a lesser extent, within the three additional thermometer factories/workshops. The major mercury species identified were mercury salts. Elemental mercury made up 0.01% to 10.87% of the total mercury concentrations in speciated samples. Mercury was not detected in groundwater samples. Mercury vapor was not detected in on-site soil vapor samples; however mercury vapor was detected in soil vapor samples collected from 15 feet below the Pearl Street sidewalk adjoining the site at concentrations of 0.222 micrograms per cubic meter ($\mu g/m^3$) in SV39 and 0.271 $\mu g/m^3$ in SV38. The source of mercury contamination in soil is likely from the use of mercury-impacted building materials used as backfill within the historic fill layer in and around the former factory/workshop footprints.

6. PCB Impacts Related to Historical Site Uses: PCB-impacted soil was identified and may be related to historical site uses. PCB impacts to soil were observed primarily within the historical fill layer in and around the former oil company in the northeastern part of the site and the former oil company and factory on the western part of the site.

7. CVOCs in Soil Vapor: The soil vapor samples collected at the site contained PCE and TCE. Soil vapor samples from the center of the site and from near the northeastern corner of the site contained the highest concentrations of CVOCs. CVOCs were detected in soil and groundwater sample below regulatory criteria. A site source of CVOCs was not identified.

8. PFAS in Soil and Groundwater: Per- and polyfluoroalkyl substances (PFAS)-impacted soil and groundwater was identified at the site. No historical use consistent with PFAS use was identified for the site. Based on the evaluation of the soil guidance values, per NYSDECs PFAS guidance document, no site source of PFAS was identified.

9. Sufficient analytical data were gathered during the RI to determine cleanup objectives and to develop a remedy for the site. The remedy is described and evaluated in this RAWP

was prepared in accordance with New York State BCP guidelines. The remedy will address impacts to soil, groundwater, and soil vapor described in the RIR.

2.3 Significant Threat Determination

NYSDEC and NYSDOH have determined that the site does not pose a significant threat to human health and the environment.

2.4 Geological Conditions

2.4.1 Regional and Site Geology

According to the Sanitary and Topographical Map of the City and Island of New York created by Egbert L. Viele in 1865 (Viele Map), the site is within a former meadow on the edge of the historical shoreline of the East River. The area was infilled for development purposes in the 1700s. According to a historical map obtained from the New York Public Library online Digital Collections, the historical shoreline ran through the center of the site, parallel with Water and Pearl Streets.

The United States Geological Survey (USGS) "Bedrock and Engineering Geologic Maps of New York County and Parts of Kings and Queens Counties, New York, and Parts of Bergen and Hudson Counties, New Jersey, dated 1994" indicates that the bedrock underlying the site is Manhattan Schist, and is comprised primarily of gray, medium- to coarse grained, layered sillimanite-muscovite-biotite-kyanite schist and gneiss interlayered with layered tourmaline-garnet-plagioclase-biotite-quartz schist and gneiss with blank amphibolite layers. Bedrock is expected to be about 125 feet below grade surface (bgs).

Site stratigraphy consists of historic fill underlain by sand with varying amounts of silt, gravel, and clay. Historic fill, predominantly consisting of grey to brown fine sand with varying proportions of silt, gravel, brick, concrete, wood, ceramic, and coal, was encountered from immediately below the asphalt pavement to depths ranging from about 5 to 17 feet bgs.

2.4.2 Regional and Site Hydrogeology

Groundwater flow is typically topographically influenced, as shallow groundwater tends to originate in areas of topographic highs and flows toward areas of topographic lows, such as rivers, stream valleys, ponds, and wetlands. A broader, interconnected hydrogeological network often governs groundwater flow at depth or in the bedrock aquifer. Groundwater depth and flow direction are also subject to hydrogeologic and anthropogenic variables such as precipitation, evaporation, extent of vegetation cover, and coverage by impervious surfaces. Other factors influencing groundwater flow include depth to bedrock, the presence of artificial fill, and variability in local geology and groundwater sources or sinks. The majority of runoff in this area drains to the city sewers, which connect to one of the several wastewater treatment plants servicing the

city. Groundwater in New York City is not used as a potable water source. Potable water provided to New York City is sourced from reservoirs in the Catskill and Delaware watersheds.

Groundwater was observed at elevations ranging from about el -0.65 to -1.10 (about 8.9 to 15.5 feet bgs) on 10 October 2020. Groundwater flow direction was evaluated during the RI and was determined to flow to the southeast. Tidal influence on groundwater elevations resulted in a maximum fluctuation between about 0.1 to 0.2 feet per cycle across the site.

2.5 Contamination Conditions

2.5.1 Conceptual Model of Site Contamination

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

2.5.1.1 Sources of Contamination

Potential sources of contamination have been identified and include historic fill, potential USTs, and historical uses of the site and surrounding properties. The site-wide presence of historic fill has been established as a source of SVOCs, pesticides, PCBs, and metals, including mercury, in soil and/or groundwater. The suspected USTs have been established as a source of petroleum-related VOCs and/or SVOCs in soil, groundwater, and/or soil vapor. Historical site uses as a thermometer factory and workshops have been established as a source of mercury impacts in soil. Historical site uses as an oil company and factory have been established as a source of petroleum and PCBs in soil within the former oil company and factory footprints. The uses of adjacent and surrounding properties for industrial and commercial uses are a potential source of CVOCs (PCE and TCE) in soil vapor. Historical uses of the site, adjoining, and surrounding properties included various unknown manufacturers and factories. No historical use consistent with PFAS use was identified for the site. Based on the evaluation of the soil guidance values, per NYSDECs PFAS guidance document, a site source of PFAS was not identified.

2.5.1.2 Exposure Media and Contaminants of Concern

Impacted media include the following:

- Soil: VOCs, SVOCs, PCBs, pesticides, and metals
- Groundwater: VOCs, SVOCs, PCBs, and metals
- Soil vapor: VOCs

2.5.1.3 Receptor Populations

The site is currently used as an open-air commercial parking lot. Current receptor populations include the parking lot staff, customers, and staff completing inspections or investigations at the site, and the public and pedestrians, including children, staff and teachers, adjacent to the site.

During site development, human receptors will be limited to construction and remediation workers, authorized guests visiting the site, and the public and pedestrians adjacent to the site.

Under future conditions, receptors will include the residential and commercial use occupants, building employees, and the public and pedestrians adjacent to the site.

2.5.2 Nature and Extent of Contamination

This section evaluates the nature and extent of soil, groundwater and soil vapor contamination.

2.5.2.1 Soil Contamination

Soil contamination at the site, characterized by field observations and soil sample analytical results exceeding UU, PGW, and/or RURR SCOs, is attributed to the presence of historic fill, potential USTs, and historical site uses (thermometer factory/workshops, oil company/factory, and industrial/manufacturing). Based on the results of the RI, contaminated soil is not migrating off-site.

Historic Fill Material

Historic fill, predominantly consisting of grey to brown fine grained sand with varying amounts of silt, gravel, brick, concrete, wood, ceramic, ash, and coal, was encountered across the site to depths ranging from about 5 to 17 feet bgs.

The site-wide historic fill impacts include SVOCs, pesticides, PCBs, and metals detected at concentrations above the Part 375 UU, PGW, and/or RURR SCOs. Higher concentrations of mercury and PCBs were identified within the historic fill layer in specific areas associated with historical site uses as oil companies and a thermometer factory, respectively. Historic fill impacts are delineated vertically by native soil in RI soil borings, except for borings SB16, SB17, SB21, and SB29 due to refusal. Vertical delineation of borings SB16, SB17, SB21, and SB29 by native soil is assumed to be within two feet of the refusal depths at each location based on observations at surrounding soil borings (SB2, SB3, SB4S3, SB10, SB13, SB14, SB15, SB17, SB20, SB23, SB26, SB28, SB26, and SB36).

Petroleum-Impacted Soil

Open Spill (Spill No. 1507371)

Petroleum-like impacts on the southeastern part of the site, evidenced by odor, staining, PID readings above background levels and by petroleum-related VOCs and SVOCs detected above

UU, PGW, and/or RURR SCOs in soil, are attributed to the open spill associated with anomalies indicative of four USTs near the Peck Slip site boundary. Petroleum impacts attributed to the open spill were identified in borings SB9, SB10, and SB31 through SB34 at depths ranging from about 7.5 to 28 feet bgs.

The on-site petroleum-impacted area attributed to the open spill is roughly 3,700 square feet. Petroleum-related VOCs and SVOCs detected above UU, PGW, and/or RURR SCOs in soil were delineated vertically in all boring locations, with the exception of boring SB31, where total xylene exceeded the UU SCO at 32 feet bgs (0.66 mg/kg compared to UU SCO of 0.26 mg/kg). The horizontal extent of petroleum-related VOCs and SVOCs detected above UU, PGW, and/or RURR SCOs were delineated to the north by SB7 and SB30; to the east by SB34; to the south by SB10 and SB35; and to the west by SB5, SB6, and SB27.

Historical Site Use

Petroleum-related impacts on the northeastern part of the site, evidenced by odor, staining, and PID readings above background levels and by VOCs detected above UU and/or RURR SCOs in soil, are attributed to the historical site use as an oil company and garage with two 550-gallon USTs. Petroleum-like impacts attributed to this historical site use were observed in soil borings SB8, SB29, SB30, and SB36 at depths ranging from about 2 to 28 feet bgs.

Petroleum-related VOCs detected above UU and/or RURR SCOs in soil were delineated vertically in all boring locations. The horizontal extent of petroleum-related VOCs detected above UU and/or RURR SCOs were delineated to the north and east by the Pearl Street and Peck Slip site boundaries, to the south by SB7, and to the west by SB24 and SB25.

Treated Timber Piles or Cribbing

Creosote-like impacts, evidenced by odor, staining, and PID readings above background levels were attributed to treated timber piles or cribbing in borings SB3, SB17, SB20, SB21, SB23, SB27, SB35, SB4NE3, SB4S3, SB4SE3, and SB4S2 at depths ranging from about 6 to 28 feet bgs. Wood/timber was observed in soil borings SB23 from about 2 to 10 feet bgs (including tar-like impacts at 7 feet bgs), SB35 from about 10 to 15 feet bgs, and the refusal depths of SB16, SB21, and SB22. Petroleum-related VOCs or SVOCs were not detected above UU SCOs in soil borings with odors and stained soils related to treated timber piles or cribbing.

<u>Mercury-impacted Soil from Historical Thermometer Factories/Workshops</u>

Mercury associated with historical on-site uses as a thermometer factory and workshops was generally identified within the historic fill layer in and around the former thermometer factory located at 302 Pearl Street (mercury-impacted hotspot) and, to a lesser extent, in the three additional thermometer factories/workshops in soil samples at concentration above UU and RURR SCOs. However, lower concentrations of mercury were identified in historic fill at other

areas across the site. Evidence of free liquid-phase elemental mercury was not observed during field investigations; however 0.01% to 10.87% elemental mercury was identified to be present in select soil analyzed through speciation. The table below includes maximum and average mercury concentrations of historic fill samples within and adjacent to 302 Pearl Street, within the three thermometer workshop footprints, and all other site-wide mercury samples collected from the historic fill layer:

Area	Average Hg Conc.	Maximum Hg Conc.
302 Pearl Street (within and adjacent to)	32.6 mg/kg	730 mg/kg
Three Historical Thermometer Workshops	4.1 mg/kg	13 mg/kg
All Other Site-Wide Samples	1.4 mg/kg	11 mg/kg

The source of mercury contamination is likely from incidental releases of mercury during historical thermometer factory/workshop operations or from the mercury-impacted building material used as backfill within the historic fill layer. Soil borings associated with the mercury delineation at 302 Pearl Street include SB4, SB4R, SB24, SB25, SB4N1, SB4N3, SB4E1, SB4E2, SB4S2, SB4S3, SB4W1, SB4W2, SB4W3, SB4NW3, SB4NE3, SB4SE3, and SB4SW3. Soil borings advanced within the three former thermometer factory/workshops include SB3, SB16, and SB17 at 236 Water Street; SB18, SB19, SB20, and SB38 at 298 Pearl Street; and SB21, SB22 and SB23 at 240 Water Street.

302 Pearl Street Hotspot

The highest mercury concentrations were identified within the historic fill layer in soil borings SB4, SB4R, SB24, SB25, SB4N1, SB4S2, SB4W2, SB4S3, and SB39, in and around the former thermometer factory at 302 Pearl Street. Based on the results of mercury selective sequential extraction, mercury salts are the predominant mercury species present. Vertical delineation of the hotspot was achieved at the former thermometer factory located at 302 Pearl Street at all boring locations from about 0 to 20 feet bgs. Horizontal extent of mercury impacts of the hotspot from the former thermometer factory were limited to the historical footprint of 302 Pearl Street (which extends off-site to the north) and to about 20 feet southeast. The horizontal extent of the mercury hotspot is delineated by soil borings SB4N3, SB4E2, SB4W3, SB4NW3, SB4NE3, SB4SE3, SB4SW3, and SB26.

298 Pearl Street and 236 and 240 Water Street

The average mercury concentration from within the three additional thermometer factories/workshops (4.1 mg/kg) was an order of magnitude lower than the average mercury concentration from the thermometer factory at 302 Pearl Street. Vertical delineation of mercury impacts was achieved at all boring locations from about 0 to 15 feet bgs, except for SB16, SB17, and SB21, where refusal was encountered before native soil was reached. Soil samples collected from the native layer within the three footprints demonstrated that mercury impacts are confined

to the historic fill layer. The horizontal extent of mercury impacts from the former workshops are delineated to the north by soil boring SB38; to the west by SB29, SB36, and SB27; to the south SB17 and SB23; and to the east by SB13, SB14, and SB15.

Other Mercury Results

Mercury was detected at concentrations above UU and RURR SCOs in samples collected from soil borings outside of the former thermometer factory/workshop footprints. The average mercury concentration in historic fill samples outside of the thermometer factory/workshop footprints is 1.4 mg/kg and the highest mercury concentration is 11 mg/kg in soil boring SB26 (near the center of the site). Mercury impacts are delineated vertically in RI soil borings from 0 to 20 feet bgs, except for borings SB16, SB17, and SB21 due to refusal.

PCB-impacted Soil

Historical on-site uses included an oil company and garage with two 550-gallon USTs on the northeastern part of the site (corner of Peck Slip and Pearl Street) and an oil company/factory near the site boundary along Beekman Street. PCBs were detected at concentrations above UU, PGW, and RURR SCOs in samples collected from soil borings SB1, SB29, SB36, and SB37 from within the two former footprints. Petroleum-like impacts and petroleum-related VOCs were detected at concentrations above UU and RURR SCOs in soil borings SB8 and SB36 near the corner of Pearl Street and Peck Slip.

The vertical extent of petroleum and PCB impacts was delineated in all soil borings from 0 to 15 feet bgs. Soil boring SB29 encountered refusal at 15 feet bgs. Based on soil boring SB36 that was completed in close proximity to SB29, native soil is estimated to be at or near the refusal depth. Horizontal extent of PCB impacts in the northeastern part of the site are delineated to the north by the Water Street site boundary; to the east by SB8 and SB30; to the south by SB5; and to the west by SB24 and SB25. Horizontal extent of PCB impacts near the western site boundary are delineated to the north the SB12; to the east by SB13; to the south by SB11 and SB14; and to the west by the Beekman Street site boundary.

PFAS-Impacted Soil

Historical use of the site, adjoining, and surrounding properties included various unknown manufacturers and factories. PFAS were detected at various depths in soil throughout the site at concentrations above UU guidance values but below RURR guidance values. The two samples with PFAS above the PGW guidance values were detected in surficial soil samples (0 to 2 feet bgs) above the groundwater table. PFAS in soil are at concentrations below the guidance values for the reasonably anticipated site uses.

The vertical extent of PFAS impacts were delineated in all soil borings from 0 to 15 feet bgs, except for borings SB16, SB21, SB22, and SB29 due to refusal. Vertical delineation of borings

SB21, SB22, and SB29 by native soil is assumed to be within two feet of the refusal depths at each location based on observations at surrounding soil borings (SB3, SB16, SB17, SB20, SB23, SB26, and SB36).

2.5.2.2 Groundwater Contamination

Evaluation of the groundwater analytical results identified two petroleum-related compounds (1,2,4-trimethylbenzene and naphthalene) in one monitoring well and site-wide presence of SVOCs and metals above applicable regulatory standards. The source of 1,2,4-trimethylbenzene and naphthalene is residual petroleum associated with historic fill from unknown sources and/or an unidentified source; this impact has been delineated by the lack of petroleum-related compounds in surrounding groundwater samples. SVOCs and metals concentrations detected above SGVs in groundwater are likely related to entrained sediments, and dissolved metals (including iron, magnesium, manganese, and sodium) are characteristic of naturally-occurring conditions. Emerging contaminants (including perfluorooctanoic acid [PFOA] and perfluorooctanesulfonic acid [PFOS]) were detected in groundwater samples across the site at concentrations above the NYSDEC screening levels. Based on the results of the RI, contaminated groundwater has a potential to migrate off-site.

Groundwater contamination, characterized by field observations and groundwater sample analytical results exceeding SGVs, is attributed to the potential USTs, historical uses of the site and to off-site sources.

<u>Petroleum-Impacted Groundwater</u>

Petroleum-like odors, PID readings above background, and/or petroleum-related VOC and/or SVOC concentrations above SGVs were identified within the southeast corner of the site at temporary monitoring wells TMW08, TMW09, TMW10 and monitoring wells MW30, MW31, MW32, MW33, and MW34. 0.01 inches of LNAPL was observed in monitoring well MW31 during placement of a pressure transducer.

Petroleum impacts in TMW08 and MW30 are related to the historical site uses as an oil company and garage with two 550-gallon USTs. Total VOC concentrations were 0.068 milligrams per liter (mg/l) in TMW08 and 0.24 to 0.257 mg/l in the parent and duplicate samples at MW30.

The greatest degree of petroleum impacts to groundwater was observed on the west side of the potential USTs within the southeast corner of the site in temporary monitoring well TMW09. Total VOCs in TMW09 (about 32.6 mg/l) were one to two orders of magnitude higher than surrounding monitoring wells (MW31 [4.0 mg/l] and MW32 [about 0.127 mg/l], MW33 [about 0.208 mg/l], and MW34 [about 0.148 mg/l], respectively). The horizontal extent of the open spill is about a 25- to 50-foot radius around the potential USTs.

Metals-Impacted Groundwater

Total and dissolved metals concentrations above SGVs were identified in groundwater samples collected across the site. Total metals in unfiltered samples are likely the result of suspended solids in groundwater derived from historic fill as these compounds are not readily dissolvable in groundwater. Dissolved metals, excluding arsenic and barium, are attributed to regional groundwater conditions. Arsenic and barium in dissolved groundwater samples are likely associated with historic fill material.

PFAS-Impacted Groundwater

PFAS concentrations above SGVs were observed in groundwater samples collected across the site. The highest concentrations of PFOA and PFOS in groundwater were in monitoring wells MW25 and MW30, located within the northeast corner of the site. Historical use of the site, adjoining, and surrounding properties included various unknown manufacturers and factories. PFAS were detected in groundwater above the MCL; however based on the evaluation of the soil guidance values, per NYSDEC's PFAS guidance document, no site source of PFAS was identified.

2.5.2.3 Soil Vapor Contamination

Twenty-eight VOCs, including petroleum-related VOCs and CVOCs (1,1,1–TCA, cis-1,2-DCE, methylene chloride, PCE, and TCE) were detected in soil vapor samples. Total VOC concentrations ranged from about 386 µg/m^3 in SV19 to 39,300 µg/m^3 in SV32. BTEX concentrations detected in soil vapor ranged from 15.8 µg/m^3 in SV17 to 6,030 µg/m^3 in SV32. PCE concentrations detected in soil vapor ranged from 3.36 µg/m^3 in SV01 to 827 µg/m^3 in SV28. TCE concentrations detected in soil vapor ranged from 1.09 µg/m^3 in SV08 to 27.3 µg/m^3 in SV28. Petroleum-related VOCs are associated with the open spill and timber piles/cribbing and were highest near the UST along the eastern site boundary. Concentrations of TCE and PCE in soil vapor samples were highest in the central part and northeastern corner of the site. Soil and groundwater samples in these areas had detections of CVOCs but were below the soil and groundwater regulatory criteria. An on-site source of CVOCs was not identified in soil or groundwater at the site. Based on the results of the RI, contaminated soil vapor has a potential to migrate off-site.

Soil analytical results are presented on Figures 4A and 4B. Groundwater analytical results are presented on Figure 5. Soil vapor analytical results are presented on Figure 6. A groundwater elevation contour map and groundwater elevation over time are presented on Figures 7A and 7B, respectively.

2.6 Qualitative Human Health Exposure Assessment

Human health exposure risk was evaluated in the RIR for both current and future site and off-site conditions, in accordance with DER-10. The assessment includes an evaluation of potential sources and migration pathways of site contamination, potential receptors, exposure media, and receptor intake routes and exposure pathways.

In addition to the human health exposure assessment, 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, an FWRIA is not needed for the site.

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.

2.6.1 Current Conditions

Under current conditions contaminant sources include 1) historic fill with varying levels of SVOCs, pesticides, PCBs, and metals; 2) an on-site spill resulting in petroleum-impacted soil, groundwater and soil vapor; 3) historical site uses, including thermometer factory/workshops and oil companies/factories, resulting in mercury-impacted soil and VOC- and PCB-impacted soil, respectively, 4) Unidentified historical on- or off-site uses that may have contributed to the presence of PFAS in soil and groundwater, and 5) historical uses of the adjacent and surrounding sites that may have contributed CVOCs impacts to soil vapor.

Contaminant release and transport mechanisms from the sources above include contaminated soil transported as dust or overland flow in areas of exposed soil, contaminated groundwater flow and volatilization of contaminants from the soil and groundwater matrices to the soil vapor phase, and transport of existing soil vapor contaminants.

Under the current site conditions, the likelihood of exposure to humans is limited because the points of exposure are controlled by the sites impervious surface, the fact that potable water is obtained from an off-site source, and on-site accumulation sources of soil vapor (i.e., buildings, excluding the parking lot kiosk) are not present. Action levels established for VOCs in the RIWP were not exceeded during the RI. The mercury vapor action level was not exceeded during the RI, with the exception of one instance due to suspected equipment malfunction. Subsurface investigations, where exposure to humans is more likely, were conducted in accordance with the RIWP and a HASP to minimize exposure risk. The use of PPE and other controls, including CAMP and vapor mitigation and dust suppression measures, mitigates potential exposure pathways to site workers performing subsurface repairs. There is no complete exposure pathway for mercury vapor under current conditions.

2.6.2 Construction/Remediation Activities

During remediation and/or development, sources of contamination are the same as under the current conditions; however, the points of exposures change due to disturbed and exposed soil during excavation, dust and organic vapors generated during excavation, and contaminated groundwater that may be encountered during excavation and/or localized dewatering operations.

Routes of exposure include ingestion and dermal absorption of contaminated soil and groundwater, inhalation of organic vapors volatilizing from contaminated soil and groundwater (specifically in the areas of petroleum impacts) or impacted vapors already in the vadose zone from an off-site source, and inhalation of dust arising from contaminated soil. The receptor population includes construction and remediation workers, authorized visitors to the site, and the public adjacent to the site.

The implementation of appropriate health and safety measures during construction and remediation, such as air monitoring, using vapor and dust suppression measures, cleaning trucks prior to exiting the site to prevent off-site soil tracking, maintaining site security, and wearing the appropriate personal protective equipment (PPE) will mitigate potential exposure pathways during remediation and/or development.

In accordance with this RAWP, which includes a CHASP, SFMP, and a CAMP, measures such as conducting an air-monitoring program, donning PPE, covering soil stockpiles, altering work sequencing, maintaining a secure construction entrance, proper housekeeping, and applying vapor and dust suppression measures to prevent off-site migration of contaminants during construction will be implemented to prevent completion of these potential on- and off-site exposure pathways.

2.6.3 Proposed Future Conditions

Residual contaminants may remain on-site, depending on the remedy, and will, to a lesser extent, include those listed under current conditions. Contaminant release and transport mechanisms include contaminated soil transported as dust, contaminated groundwater flow and volatilization of contaminants from the soil and groundwater matrices to the soil vapor phase, and transport of existing soil vapor contaminants. However, a composite cover system (e.g., concrete building foundations and asphalt paving) will be installed, which will eliminate exposure to remaining potentially contaminated soil and groundwater in New York City is not used as a potable water. The use of institutional and/or engineering controls will mitigate points of exposure include potential cracks in the foundation or slab of the proposed development and exposure during any future soil-disturbing activities. Routes of exposure include inhalation of vapors entering the building and direct contact with residual impacted soil during future soil-disturbing activities. The receptor population includes the building occupants and employees, visitors, maintenance workers, and the nearby community, including sensitive receptors.

The possible routes of exposure can be addressed or mitigated by proper installation of soil vapor mitigation measures (i.e. sub-slab depressurization system), construction and maintenance of a site cover system (i.e., concrete foundation with a waterproofing/vapor barrier membrane) and implementation of a Site Management Plan (SMP) to manage institutional and engineering controls, if residual contamination is left in place. A soil vapor evaluation that may include sampling would be conducted after building construction.

The potential off-site migration of site contaminants in soil and groundwater is not expected to result in a complete exposure pathway. The potential for off-site migration of site contaminates will be addressed by the removal of the source material in soil and groundwater and/or mitigated by the use of ICs and ECs described above. The potential off-site migration of site contaminants in soil vapor is not an exposure concern.

2.6.4 Human Health Exposure Assessment Conclusions

1. Human exposure to site contaminants is controlled under current conditions on the site because the site is entirely covered by asphalt, groundwater is not potable and there are no on-site accumulation sources of soil vapor (i.e., buildings). There is no exposure risk to mercury vapor under the current conditions. The primary exposure pathways are for dermal contact, ingestion, and inhalation of soil, soil vapor, and/or groundwater by site investigation or repair workers. The potential exposure to site contaminants will be addressed by following the appropriate health and safety measures outlined in the site-specific CAMP and HASP during investigation and remedial/ground-intrusive activities and by PPE use by repair workers.
2. In the absence of institutional and engineering controls, there are complete exposure pathways during construction and remediation activities. The primary exposure pathways are:
    a. Dermal contact, ingestion and/or inhalation of contaminated soil, groundwater and/or soil vapor by construction 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 risks will be addressed by performing community air monitoring and by following the appropriate health and safety, vapor and dust suppression and site security measures outlined in this RAWP and the CHASP (Appendix D).
3. The existence of a complete exposure pathway for site contaminants to human receptors during proposed future conditions is unlikely, as a significant volume of contaminant sources will be removed from the site through excavation and dewatering/pre-treatment, the building foundation will be constructed at or below the water table and will include a

waterproofing/vapor barrier membrane, the lowest level use of the building includes actively ventilated parking, any exposure to remaining soil and groundwater will be controlled with an impermeable cover, regional groundwater is not used as a potable water source and institutional controls will be in place to maintain engineering controls at the site.

4. Monitoring and control measures will be used during ground-intrusive (i.e. investigation and construction) to prevent community exposure to contaminated dust and vapors.

2.7 Remedial Action Objectives

Based on the results of previous investigations and the RI, the following Remedial Action Objectives (RAO) were identified:

2.7.1 Soil

RAOs for Public Health Protection:

- Prevent ingestion/direct contact/inhalation (dust) of contaminated soil
- Prevent inhalation exposure to contaminants volatilizing from soil

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:

- Restore the on-site groundwater aquifer to pre-disposal/pre-release conditions, to the extent practicable
- Remove the on-site source of groundwater contamination

2.7.3 Soil Vapor

RAOs for Public Health Protection:

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at the site

3.0 DESCRIPTION OF REMEDIAL ACTION

This section presents an evaluation of the proposed remedial action. The proposed remedial alternatives are a Track 1 remedy for Alternative I, a Track 2 remedy for Alternative II, and a Track 4 remedy for Alternative III. All three alternatives are expected to achieve the established RAOs.

This section is organized as follows:

- Section 3.1 provides an explanation of the Standards, Criteria, and Guidance
- Sections 3.2 through 3.4 provide technical descriptions of:
    - Alternative I, a Track 1/Unrestricted Use remedy
    - Alternative II, a Track 2/Restricted Use – Restricted Residential remedy
    - Alternative III, a Track 4/ Restricted Use – Restricted Residential remedy
- Section 3.5 evaluates the remedial alternatives based on the BCP Remedy Selection Evaluation Criteria
- Section 3.6 summarizes the recommended remedial alternative

3.1 Alternative I – Technical Description

Alternative I, a Track 1 remedy, will include implementation of the following remedial elements:

1) Development and implementation of a CHASP and CAMP for the protection of on-site workers, visitors, and the environment during remediation activities
2) As a pre-requisite to site remediation, removal of the surficial asphalt cover by the contractor and management of removed asphalt as construction and demolition (C&D) debris in accordance with Part 360 and 361 regulations. Review and certification of C&D transport and disposal methodologies is not a requirement of the Remediation Engineer (RE). The RE is responsible for documenting that C&D debris is not comingled with contaminated site soil and fill.
3) A remedial design investigation including waste characterization and supplemental delineation.
4) Excavation and removal of the mercury-impacted soil/fill hotspot at 302 Peal Street
5) Excavation and removal of all historic fill/soil exceeding UU SCOs to depths up to about 34 feet bgs or until UU SCOs are achieved,
6) Screening for indications of contamination source areas during any intrusive site work by visual, olfactory, or instrumental methods
7) Decommissioning and removal of USTs in accordance with NYSDEC DER-10 5.4(b)(5)

8) Appropriate off-site disposal of soil and historic fill removed from the site in accordance with federal, state, and local rules and regulations for handling, transport, and disposal

9) Installation of support of excavation necessary to facilitate remedial excavation

10) Dewatering, as necessary, to accommodate remedial excavation and remediation of petroleum impacted groundwater

11) Collection and analysis of confirmation soil samples in accordance with DER-10 to evaluate the performance of the remedy with respect to attainment of Track 1 SCOs

12) Import of backfill, where required, in compliance with: a) UU SCOs b) Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 360 regulations; and c) federal, state, and local rules and regulations for handling and transport of backfill

The requirements for each of the Track 1 tasks are described below.

3.1.1 Remedial Design Investigation

Prior to the start of remediation, a remedial design investigation work plan will be submitted to the NYSDEC for approval. The remedial design investigation is anticipated to consist of waste characterization sampling. The remedial design investigation will be implemented to refine the proposed remedial elements and obtain a soil dataset for off-site disposal facility approvals.

The full scope of the remedial design investigation will be summarized in a Remedial Design Investigation Work Plan and submitted to NYSDEC and NYSDOH for review. Following the remedial design investigation implementation, a Remedial Design Memorandum (RDM) will be prepared to describe the results and findings of the remedial design investigation. The RDM will include a review of the site data and may also include a refinement of the remedial elements for the selected remedy. The RDM will supplement this RAWP.

3.1.2 On-Site Worker, Public Health and Environmental Protection

A site-specific CHASP was developed and will be enforced to protect on-site workers from accidents and acute and chronic exposures from the identified contaminated media. The site CHASP is included as Appendix D. Each contractor performing RAWP operations on the site will have and enforce a HASP that, at a minimum, meets the CHASP criteria. Public health will be protected by implementing and enforcing dust, odor, and vapor control as specified in the CAMP. The CAMP includes continuous perimeter monitoring of dust, organic vapors, and mercury vapor, as discussed in section 5.4.10, using DustTrak aerosol monitors, PIDs, and Jerome mercury vapor analyzers capable of recording data and calculating 15-minute averages. Field personnel, supervised by the RE, will monitor site perimeters for visible dust and odors. In addition, field personnel will be equipped with a handheld PID and Jerome J505 mercury vapor analyzer during

excavation. The environment will be protected by implementing and enforcing the appropriate soil erosion prevention measures.

3.1.3 Mercury-Impacted Soil Hotspot

The mercury-impacted soil hotspot will be remediated through excavation and off-site disposal. The hotspot was identified in the former location of the thermometer factory at 302 Pearl Street and was delineated during the remedial investigation. The estimated depth of excavation required to remove the hotspot ranges from about 4 to 16 feet bgs. The mercury-impacted soil hotspot will be removed as the first step of the remedial excavation. The extent of the hotspot removal is shown on Figure 8. During excavation of the hotspot, the CAMP will include mercury vapor monitoring.

3.1.4 Fill and Soil Removal

Remedial excavation will include the removal of historic fill/soil exceeding the UU SCOs across the site. The estimated volume of historic fill and soil requiring removal and off-site disposal for a Track 1 cleanup is about 28,300 cubic yards. This estimate is based on the complete removal of historic fill and soil exceeding UU SCOs across the site. The estimated depth of excavation required to achieve a Track 1 ranges from about 8 to 34 feet bgs (el. 6 to -24.5). The extent of the Track 1 remedial excavation is shown on Figure 9. A support of excavation (SOE) system and a dewatering system will be designed, constructed and operated (dewatering only) to accommodate Track 1 excavation depths. See Section 3.1.6 for more detail on dewatering.

3.1.5 UST System Removal

Four potential USTs were identified underneath a reinforced concrete slab near the Peck Slip site boundary and an additional potential UST was identified near the corner of Beekman Street and Water Street. Any USTs, and/or associated appurtenances will be decommissioned, disposed of off-site, and registered with the NYSDEC Petroleum Bulk Storage (PBS) unit. If encountered, petroleum-impacted soil in the unsaturated zone will be excavated. Petroleum-impacts at the groundwater table will be addressed through excavation and dewatering. Excavated petroleum-impacted historic fill and soil will be stockpiled separately from historic fill, characterized, and disposed of off-site at a permitted disposal facility in accordance with applicable regulations.

3.1.6 Excavation Dewatering and Treatment

Dewatering of groundwater will be required to accommodate excavation of soil exceeding UU SCOs and will also act as a method of groundwater remediation through source removal. Prior to mobilization, the contractor will follow the Rules of the City of New York (RCNY) Title 15, Chapter 19, Use of the Public Sewers and the NYCDEP "Procedure for Obtaining Letter of Approval for Groundwater Discharge to Sanitary or Combined Sewer" and will use the approval to obtain a Temporary Discharge of Groundwater into the City Sewer System Permit. The

dewatering system will include pretreatment (e.g., bag filters, carbon filtration) to reduce contaminant concentrations below NYCDEP effluent limitations prior to discharge to the New York City Sewer system. If the contractor will discharge more than 10,000 gallons per day, they will also have to obtain approval from the NYCDEP's Bureau of Water and Sewer Operations, Chief of Permitting and Compliance. The dewatering and treatment system will be designed, operated and maintained by the Contractor's New York State-licensed Professional Engineer. If the dewatering system has a capacity to withdraw 100,000 gallons per day or more, the contractor will have to obtain a Water Withdrawal Permit or its equivalent from the NYCDEC.

Once excavation and dewatering activities are completed, groundwater samples will be collected to confirm achievement of groundwater RAOs. If the RAOs are not achieved, an in-situ remedy will be implemented to achieve the groundwater RAOs. The contingent in-situ remedy may consist of an application of Oxygen Release Compound (ORC) or a chemical oxidant within the open excavation to treat the residual impacted groundwater. The in-situ treatment area and approach will be determined based on the post-excavation soil and groundwater samples, and will be subject to NYSDEC approval. Groundwater will be sampled from within the treatment area within 2 to 3 months following any in-situ groundwater treatment to confirm achievement of groundwater RAOs.

3.1.7 Excavation Backfill

In areas that are excavated deeper than development grade for remedial purposes, the excavation areas will be backfilled to raise the site to development grade. Backfill material will consist of soil/fill meeting the UU SCOs. All imported fill material must be sourced from appropriately licensed facilities with no history of environmental contamination. If sampling of the proposed soil/fill is required, qualified environmental personnel will collect representative samples at a frequency consistent with DER-10. The samples will be analyzed for 6 NYCRR Part 375 VOCs, SVOCs, pesticides/herbicides, PCBs, metals, and emerging contaminants, including PFAS, and 1,4-dioxane, by a NYSDOH ELAP-certified laboratory. Virgin crushed stone with less than 10% by weight passing through a No. 10 sieve will not require sampling prior to import.

An estimated 3,800 cubic yards of backfill would be required to raise the site to development grade upon completion of the Track 1 remediation.

3.1.8 Confirmation Soil Sampling

Confirmation soil samples will be collected from the excavation base at a frequency of one per 900 square feet per NYSDEC DER-10 5.4(b)(5)(ii). Sidewall samples will be collected from within the building footprint unless SOE measures (e.g., sheeting, lagging or sloping) preclude access to soil sidewalls. An estimated 54 confirmation endpoint soil samples, plus QA/QC samples, will be collected to confirm remedial performance and will be analyzed for the Part 375 list of VOCs, SVOCs, PCBs, pesticides, metals including hexavalent and trivalent chromium, PFAS, and 1,4-

dioxane. Over-excavation may be required as necessary to remove soil that does not comply with the SCOs. If over-excavation is completed, additional confirmation samples will be required.

Considering that groundwater is shallower than the remedial excavation depth in most places, samples may be collected in-situ prior to excavation during the remedial design investigation. A reduced-frequency endpoint sampling plan may be proposed, with supporting rationale, in accordance with DER-10 Section 1.6.

3.2 Alternative II – Technical Description

Alternative II, a Track 2 remedy, will include implementation of the following remedial elements:

1) Development and implementation of a CHASP and CAMP for the protection of on-site workers, visitors, and the environment during remediation activities
2) As a pre-requisite to site remediation, removal of the surficial asphalt cover by the contractor and management of removed asphalt as construction and demolition (C&D) debris in accordance with Part 360 and 361 regulations. Review and certification of C&D transport and disposal methodologies is not a requirement of the Remediation Engineer (RE). The RE is responsible for documenting that C&D debris is not comingled with contaminated site soil and fill.
3) A remedial design investigation including waste characterization and supplemental delineation
4) Excavation and removal of the mercury-impacted soil/fill hotspot at 302 Peal Street
5) Excavation and removal of historic fill/soil across the site to meet RURR SCOs, including excavation below 15 feet for removal or treatment of grossly contaminated media (i.e. source material)
6) Decommissioning and removal of USTs in accordance with NYSDEC DER-10 5.4(b)(5)
7) Appropriate off-site disposal of historic fill and soil removed from the site in accordance with federal, state, and local rules and regulations for handling, transport, and disposal
8) Installation of support of excavation necessary to facilitate remedial excavation
9) Dewatering, as necessary, to accommodate remedial excavation and remediation of petroleum impacted groundwater
10) Screening for indications of contamination source areas during any intrusive site work by visual, olfactory, or instrumental methods
11) Collection and analysis of confirmation soil samples in accordance with DER-10 at the completion of the remedial excavation to document post-remediation soil quality

12) Import of backfill, where required, in compliance with: a) RURR or PGW SCOs, whichever is more stringent; b) 6 NYCRR Part 360 regulations; and c) federal, state, and local rules and regulations for handling and transport of backfill

13) Completion of a soil vapor intrusion (SVI) evaluation

14) Recording of an Environmental Easement (EE) to memorialize the remedial action and the institutional controls to ensure that future owners of the site continue to maintain these controls as required

15) Preparation of an SMP that describes management of the ICs – Implementation of the SMP following completion of the remedy will be stipulated by the EE.

The requirements for each of the Track 2 tasks are described below.

3.2.1 Remedial Design Investigation

Prior to the start of remediation, a remedial design investigation work plan will be submitted to the NYSDEC for approval. The remedial design investigation is anticipated to consist of waste characterization sampling. The remedial design investigation will be implemented to refine the proposed remedial elements and obtain a soil dataset for off-site disposal facility approvals.

The full scope of the remedial design investigation will be summarized in a Remedial Design Investigation Work Plan and submitted to NYSDEC and NYSDOH for review. Following the remedial design investigation implementation, an RDM will be prepared to describe the results and findings of the remedial design investigation. The RDM will include a review of the site data and may also include a refinement of the remedial elements for the selected remedy. The RDM will supplement this RAWP.

3.2.2 On-Site Worker, Public Health and Environmental Protection

A site-specific CHASP was developed and will be enforced to protect on-site workers from accidents and acute and chronic exposures from the identified contaminated media. The site CHASP is included as Appendix D. Each contractor performing RAWP operations will have and enforce a HASP that, at a minimum, meets the CHASP criteria. Public health will be protected by implementing and enforcing dust, odor, and vapor control as specified in the CAMP. The CAMP includes continuous perimeter monitoring of dust, organic vapors, and mercury vapor, as discussed in section 5.4.10, using DustTrak aerosol monitors, PIDs, and Jerome mercury vapor analyzers capable of recording data and calculating 15-minute averages. Field personnel, supervised by the RE, will monitor site perimeters for visible dust and odors. In addition, field personnel will be equipped with a handheld PID and Jerome J505 mercury vapor analyzer during excavation. The environment will be protected by implementing and enforcing the appropriate soil erosion prevention measures.

3.2.3 Mercury-Impacted Soil Hotspot

The mercury-impacted soil hotspot will be remediated through excavation and off-site disposal. The hotspot was identified in the former location of the thermometer factory at 302 Pearl Street and was delineated during the remedial investigation. The estimated depth of excavation required to remove the hotspot ranges from about 4 to 16 feet bgs. The extent of the hotspot removal is shown on Figure 8. The mercury-impacted soil hotspot will be removed as the first step of the remedial excavation. During excavation of the hotspot, the CAMP will include mercury vapor monitoring.

3.2.4 Fill and Soil Removal

To achieve a Track 2 RURR cleanup, site-wide excavation will extend to between about 6 to 15 feet bgs across the site. Excavation below 15 feet bgs is anticipated on the eastern side of the site to remove petroleum-impacted soil associated with the open spill. Source material, as defined in NYCRR Part 375, encountered during remedial excavation will be excavated and disposed of off-site to the extent practical.

The estimated volume of historic fill and soil requiring removal and off-site disposal for a Track 2 cleanup is about 21,700 cubic yards. This estimate is based on site-wide excavation to remove historic fill and soil exceeding Track 2 RURR SCOs to a maximum of 15 feet bgs, and excavation to about 18 feet bgs (about el -7 to -8) in the petroleum-impacted area. The extent of the Track 2 remedial excavation is shown on Figure 10.

3.2.5 UST System Removal

Four potential USTs were identified underneath a reinforced concrete slab near the Peck Slip site boundary and an additional potential UST was identified near the corner of Beekman Street and Water Street. Any USTs, and/or associated appurtenances will be decommissioned, disposed of off-site, and registered with the NYSDEC PBS unit. If encountered, petroleum-impacted soil in the unsaturated zone will be excavated. Petroleum-impacts at the groundwater table will be addressed through excavation and dewatering, and if required in-situ treatment. Excavated petroleum-impacted historic fill and soil will be stockpiled separately from historic fill, characterized, and disposed of off-site at a permitted disposal facility in accordance with applicable regulations.

3.2.6 Excavation Dewatering and Treatment

Dewatering of groundwater will be required to accommodate excavation of soil exceeding RURR SCOs and will also act as a method of groundwater remediation in conjunction with source removal. Prior to mobilization, the contractor will follow the Rules of the City of New York (RCNY) Title 15, Chapter 19, Use of the Public Sewers and the NYCDEP "Procedure for Obtaining Letter of Approval for Groundwater Discharge to Sanitary or Combined Sewer" and will use the approval

to obtain a Temporary Discharge of Groundwater into the City Sewer System Permit. The dewatering system will include pretreatment (e.g., bag filters, carbon filtration) to reduce contaminant concentrations below NYCDEP effluent limitations prior to discharge to the New York City Sewer system. If the contractor will discharge more than 10,000 gallons per day, they will also have to obtain approval from the NYCDEP's Bureau of Water and Sewer Operations, Chief of Permitting and Compliance. The dewatering and treatment system will be designed, operated and maintained by the Contractor's New York State-licensed Professional Engineer. If the dewatering system has a capacity to withdraw 100,000 gallons per day or more, the contractor will have to obtain a Water Withdrawal Permit or its equivalent from the NYCDEC.

After excavation and dewatering activities are completed, groundwater samples will be collected to confirm achievement of groundwater RAOs. If the RAOs are not achievement an in-situ remedy will be implemented at the site to achieve the groundwater RAOs. The contingent in-situ remedy may consist of an application of ORC or a chemical oxidant within the open excavation to treat the residual impacted groundwater. The in-situ treatment area and approach will be determined based on the post-excavation soil and groundwater samples, and will be subject to NYSDEC approval. Groundwater will be sampled from within the treatment area within 2 to 3 months following the in-situ groundwater treatment to confirm achievement of groundwater RAOs.

3.2.7 Confirmation Soil Sampling

Confirmation soil samples will be collected from the excavation base at a frequency of one per 900 square feet per NYSDEC DER-10 5.4(b)(5)(ii). Sidewall samples will be collected from within the building footprint unless SOE measures (e.g., sheeting, lagging or sloping) preclude access to soil sidewalls. An estimated 54 confirmation endpoint soil samples, plus QA/QC samples, will be collected to confirm remedial performance and will be analyzed for the Part 375 list of VOCs, SVOCs, PCBs, pesticides, metals including hexavalent and trivalent chromium, PFAS, and 1,4-dioxane. Over-excavation may be required as necessary to remove soil that does not comply with the SCOs. If over-excavation is completed, additional confirmation samples will be required.

Considering that groundwater is shallower than the remedial excavation depth in most places, samples may be collected in-situ prior to excavation during the remedial design investigation. A reduced-frequency endpoint sampling plan may be proposed, with supporting rationale, in accordance with DER-10 Section 1.6.

3.2.8 Excavation Backfill

In areas that are excavated deeper than development grade for remedial purposes, the excavation areas will be backfilled to raise the site to development grade. Backfill material will consist of soil/fill meeting the RURR or PGW SCOs, whichever is more stringent. All imported fill material must be sourced from appropriately licensed facilities with no history of

environmental contamination. If sampling of the proposed soil/fill is required, qualified environmental personnel will collect representative samples at a frequency consistent with DER-10. The samples will be analyzed for 6 NYCRR Part 375 VOCs, SVOCs, pesticides/herbicides, PCBs, metals, and emerging contaminants, including PFAS, and 1,4-dioxane, by a NYSDOH ELAP-certified laboratory. Virgin crushed stone with less than 10% by weight passing through a No. 10 sieve will not require sampling prior to import.

An estimated 650 cubic yards of backfill would be required to raise the site to development grade upon completion of the Track 2 remediation.

3.2.9 Soil Vapor Intrusion Evaluation

An SVI evaluation will be conducted after remedial elements are completed. The method of remediation and development construction (i.e., removal of all site soil, concrete foundation below the water table, monolithic waterproofing/vapor barrier membrane, and cellar mechanical ventilation) will mitigate the potential for SVI. The SVI evaluation will include documentation of the installation of the above-listed construction measures. The objective of the SVI evaluation is to confirm that the development-specific construction elements are implemented.

3.2.10 Site Management Plan and Environmental Easement

An EE would be recorded referencing institutional controls that are part of the selected remedy, which would be binding upon all subsequent owners and occupants of the property. The institutional controls would: 1) restrict the site use of 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 the completion and submission to the NYSDEC of periodic certifications of institutional controls in accordance with Part 375; and 4) include notice-of-use restrictions of the site soil. As a construction element, a vapor barrier/waterproofing membrane and ventilated parking garage will be installed and will serve to mitigate potential soil vapor intrusion into the planned building. The SMP would identify all use restrictions and long-term monitoring and maintenance requirements to ensure the institutional controls remain in place and are effective.

3.3 Alternative III – Technical Description

Alternative III, a Track 4 remedy, will include implementation of the following remedial elements:

1) Development and implementation of a CHASP and CAMP for the protection of on-site workers, visitors, and the environment during remediation activities
2) As a pre-requisite to site remediation, removal of the surficial asphalt cover by the contractor and management of removed asphalt as construction and demolition (C&D) debris in

accordance with Part 360 and 361 regulations. Review and certification of C&D transport and disposal methodologies is not a requirement of the Remediation Engineer (RE). The RE is responsible for documenting that C&D debris is not comingled with contaminated site soil and fill.

3) A remedial design investigation including waste characterization and supplemental hot spot delineation
4) Excavation and removal of the mercury-impacted soil/fill Hotspot at 302 Peal Street
5) Site-wide excavation to a minimum of 2 feet bgs to install a cover system, and deeper excavation of petroleum impacted soil and PCB-impacted soil,
6) Decommissioning and removal of USTs in accordance with NYSDEC DER-10 5.4(b)(5)
7) Appropriate off-site disposal of historic fill and soil removed from the site in accordance with federal, state, and local rules and regulations for handling, transport, and disposal
8) Installation of support of excavation that is necessary to facilitate remedial excavation
9) Dewatering, as necessary, to accommodate remedial excavation and remediation of petroleum impacted groundwater
10) Screening for indications of contamination source areas during any intrusive site work by visual, olfactory, or instrumental methods
11) Collection and analysis of documentation soil samples in accordance with DER-10 at the completion of the remedial excavation to document post-remediation soil quality
12) Import of backfill, where required, in compliance with: a) RURR or PGW SCOs, whichever is more stringent; b) 6 NYCRR Part 360 regulations; and c) federal, state, and local rules and regulations for handling and transport of backfill
13) Completion of an SVI evaluation
14) Recording of an 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
15) Preparation of an SMP that describes management of the ECs and ICs – implementation of the SMP following completion of the remedy will be stipulated by the EE.

The requirements for each of the Track 4 tasks are described below.

3.3.1 Remedial Design Investigation

Prior to the start of remediation, a remedial design investigation work plan will be submitted to the NYSDEC for approval. The remedial design investigation is anticipated to consist of waste

characterization sampling. The remedial design investigation will be implemented to refine the proposed remedial elements and obtain a soil dataset for off-site disposal facility approvals.

The full scope of the remedial design investigation will be summarized in a Remedial Design Investigation Work Plan and submitted to NYSDEC and NYSDOH for review. Following the remedial design investigation implementation, an RDM will be prepared to describe the results and findings of the remedial design investigation. The RDM will include a review of the site data and may also include a refinement of the remedial elements for the selected remedy. The RDM will supplement this RAWP.

3.3.2 On-Site Worker, Public Health and Environmental Protection

A site-specific CHASP was developed and will be enforced to protect on-site workers from accidents and acute and chronic exposures from the identified contaminated media. The site CHASP is included as Appendix D. Each contractor performing RAWP operations will have and enforce a HASP that, at a minimum, meets the CHASP criteria. Public health will be protected by implementing and enforcing dust, odor, and vapor control as specified in the CAMP. The CAMP includes continuous perimeter monitoring of dust, organic vapors, and mercury vapor, as discussed in section 5.4.10, using DustTrak aerosol monitors, PIDs, and Jerome mercury vapor analyzers capable of recording data and calculating 15-minute averages. Field personnel, supervised by the RE, will monitor site perimeters for visible dust and odors. In addition, field personnel will be equipped with a handheld PID and Jerome J505 mercury vapor analyzer during excavation. The environment will be protected by implementing and enforcing the appropriate soil erosion prevention measures.

3.3.3 Mercury-Impacted Soil Hotspot

The mercury-impacted soil hotspot will be remediated through excavation and off-site disposal. The hotspot was identified in the former location of the thermometer factory at 302 Pearl Street and was delineated during the remedial investigation. The estimated depth of excavation required to remove the hotspot ranges from about 4 to 16 feet bgs. The extent of the hotspot removal is shown on Figure 8. The mercury-impacted soil hotspot will be removed as the first step of the remedial excavation. During excavation of the hotspot, the CAMP will include mercury vapor monitoring.

3.3.4 Fill and Soil Removal

To achieve a Track 4 remedy, remedial excavation will extend across the entire site footprint to a minimum of 2 feet bgs for remediation purposes to accommodate the 2-foot thick cover system. Deeper excavations will extend to about 18 feet bgs to remove petroleum-impacted soil and about 10 feet bgs to remove PCB-impacted soil. Any source material encountered during remedial excavation will be excavated and disposed of off-site to the extent practical. The

estimated volume of historic fill and soil requiring removal and off-site disposal for a Track 4 cleanup is about 11,100 cubic yards. The extent of the Track 4 remedial excavation is shown on Figure 11.

3.3.5 UST System Removal

Four potential USTs were identified underneath a reinforced concrete slab near the Peck Slip site boundary and an additional potential UST was identified near the corner of Beekman Street and Water Street. Any USTs, and/or associated appurtenances will be decommissioned, disposed of off-site, and registered with the NYSDEC PBS unit. If encountered, petroleum-impacted soil in the unsaturated zone will be excavated. Petroleum-impacts at the groundwater table will be addressed through excavation and in-situ treatment. Excavated petroleum-impacted historic fill and soil will be stockpiled separately from historic fill, characterized, and disposed of off-site at a permitted disposal facility in accordance with applicable regulations.

3.3.6 Excavation Dewatering and Treatment

Dewatering of groundwater will be required to accommodate excavation of petroleum-impacted soil and will also act as a method of groundwater remediation in conjunction with source removal. Prior to mobilization, the contractor will follow the Rules of the City of New York (RCNY) Title 15, Chapter 19, Use of the Public Sewers and the NYCDEP "Procedure for Obtaining Letter of Approval for Groundwater Discharge to Sanitary or Combined Sewer" and will use the approval to obtain a Temporary Discharge of Groundwater into the City Sewer System Permit. The dewatering system will include pretreatment (e.g., bag filters, carbon filtration) to reduce contaminant concentrations below NYCDEP effluent limitations prior to discharge to the New York City Sewer system. If the contractor will discharge more than 10,000 gallons per day, they will also have to obtain approval from the NYCDEP's Bureau of Water and Sewer Operations, Chief of Permitting and Compliance. The dewatering and treatment system will be designed, operated and maintained by the Contractor's New York State-licensed Professional Engineer. If the dewatering system has a capacity to withdraw 100,000 gallons per day or more, the contractor will have to obtain a Water Withdrawal Permit or its equivalent from the NYCDEC.

Once excavation and dewatering activities are completed, groundwater samples will be collected to confirm achievement of groundwater RAOs. If the RAOs are not achievement an in-situ remedy will be implemented at the site to achieve the groundwater RAOs. The contingent in-situ remedy may consist of an application of ORC or a chemical oxidant within the open excavation to treat the residual impacted groundwater. The in-situ treatment area and approach will be determined based on the post-excavation soil and groundwater samples, and will be subject to NYSDEC approval. Groundwater will be sampled from within the treatment area within 2 to 3 months following the in-situ groundwater treatment to confirm achievement of groundwater RAOs.

3.3.7 Excavation Backfill

In areas that are excavated deeper than development grade for remedial purposes, the excavation areas will be backfilled to raise the site to development grade. Backfill material will consist of soil/fill meeting the RURR or PGW SCOs, whichever is more stringent. All imported fill material must be sourced from appropriately licensed facilities with no history of environmental contamination. If sampling of the proposed soil/fill is required, qualified environmental personnel will collect representative samples at a frequency consistent with DER-10. The samples will be analyzed for 6 NYCRR Part 375 VOCs, SVOCs, pesticides/herbicides, PCBs, metals, and emerging contaminants, including PFAS, and 1,4-dioxane, by a NYSDOH ELAP-certified laboratory. Virgin crushed stone with less than 10% by weight passing through a No. 10 sieve will not require sampling prior to import.

An estimated 650 cubic yards of backfill would be required to raise the site to development grade upon completion of the Track 4 remediation.

3.3.8 Documentation Soil Sampling

Documentation soil samples will be collected from the excavation base at a frequency of one per 900 square feet per NYSDEC DER-10 5.4(b)(5)(ii). Sidewall samples will be collected if SOE measures consist of sloping. An estimated 54 confirmation endpoint soil samples, plus QA/QC samples, will be collected to document remedial performance and will be analyzed for the Part 375 list of VOCs, SVOCs, PCBs, pesticides, metals including hexavalent and trivalent chromium, PFAS, and 1,4-dioxane.

Documentation soil samples will be collected after the excavation is complete, except in the hot spot excavation areas that extend below the groundwater table. Samples may be collected in-situ prior to excavation during the remedial design investigation in the hot spot areas because the excavation sidewalls may collapse upon reaching the final depth within the saturated zone. A reduced-frequency endpoint sampling plan may be proposed, with supporting rationale, in accordance with DER-10 Section 1.6.

3.3.9 Composite Cover System

Under a Track 4 scenario, a composite cover system will be installed to allow for mixed-use commercial and residential use of the site. The composite cover system will consist of concrete extending across the entire footprint of the site. The composite cover system will serve as an EC for the protection of human health by preventing direct contact with remaining contaminated soil.

3.3.10 Soil Vapor Intrusion Evaluation

An SVI evaluation will be conducted after the remedial elements are completed. The method of remediation and development construction (i.e., removal of all site soil, concrete foundation

below the water table, monolithic waterproofing/vapor barrier membrane, and cellar mechanical ventilation) will mitigate the potential for SVI. The SVI evaluation will include documentation composite cover system. The objective of the SVI evaluation is to confirm that the development-specific construction elements, specifically the building foundation, vapor barrier and ventilated parking garage, are implemented.

3.3.11 Site Management Plan and Environmental Easement

An EE would be recorded referencing institutional controls that are part of the selected remedy, which would be binding upon all subsequent owners and occupants of the property. The institutional controls would: 1) restrict the site's use 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 the completion and submission to the NYSDEC a periodic certification of institutional controls in accordance with Part 375; and 4) include notice-of-use restrictions of the site's soil. The composite cover system will serve as an EC for the protection of human health by establishing an incomplete exposure pathway to residual contaminated soil on-site. As a construction element, a vapor barrier/waterproofing membrane and ventilated parking garage will be installed and will serve to mitigate potential soil vapor intrusion into the planned building. The SMP would identify all use restrictions and long-term monitoring and maintenance requirements to ensure the institutional controls and remain in place and are effective.

3.4 Evaluation of Remedial Alternatives

The following is an evaluation of the proposed remedy 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 to be considered and evaluated further under the balancing criteria.

A. Protection of human health and the environment;

B. Compliance with standards, criteria, and guidance;

C. Short-term effectiveness and impacts;

D. Long-term effectiveness and permanence;

E. Reduction of toxicity, mobility, or volume of contaminated material;

F. Implementability;

G. Cost effectiveness;

H. Community acceptance; and

l. Land use.

3.4.1 Protection of Public Health and the Environment

Alternative I – The Track 1 remedy will completely mitigate the potential for complete exposure pathways through the complete removal of all on-site contaminated media. Remediating the site to Track 1 standards will result in the removal of soil exceeding Track 1 SCOs. Groundwater contamination will also be remediated through dewatering and possible treatment of residual impacts after the remedial excavation is complete. It is anticipated that soil vapor will be remediated through the removal of contaminated soil and groundwater source areas. The RAOs for public health and environmental protection will be met through the complete removal of contaminated soil and remediation of groundwater, which will eliminate any possibility for ingestion and inhalation of or dermal contact with contaminated soil groundwater and/or soil vapor.

Alternative II – Under Alternative II, future exposure will be limited by the establishment of an EE, governed by an SMP. The RAOs for public health and environmental protection will be met through a combination of contaminant removal and institutional controls (including an EE and SMP). Remediating the site to Track 2 standards will result in the removal of site soil that exceeds RURR (to a maximum depth of 15 feet bgs) and the removal of grossly impacted petroleum soil associated with the open spill below 15 feet bgs. Potential exposure pathways from soil vapor will be mitigated by constructing the building foundation below the water table, vapor barrier, and ventilated parking garage.

Alternative III – Under Alternative III, future exposure will be limited by the establishment of an EE, governed by an SMP. The RAOs for public health and environmental protection will be met through the combination of contaminant removal and institutional controls (including an EE and SMP). The remedy will mitigate exposure pathways to on-site contaminated media by removing surficial historic fill from across the site and grossly impacted petroleum soil associated with the open spill, mercury-impacted soil, and PCB-impacted soil below the surficial 2 foot bgs cut. A composite cover will preclude direct contact, ingestion and inhalation of contaminated soil particles. Potential exposure pathways from soil vapor will be mitigated by constructing the building foundation below the water table, vapor barrier, and ventilated parking garaged.

Public health will be protected during remediation activities under all remedial alternatives by implementing and enforcing dust, odor, and organic vapor control and mitigation procedures when needed. The environment will be protected by implementing and enforcing the selected soil erosion plans.

3.4.2 Compliance with Standards, Criteria, and Guidance

Alternative I – Remediating the site to Track 1 Unrestricted Use standards will demonstrate compliance with all applicable SCGs through the removal of impacted on-site soil and groundwater treatment.

Alternative II – The Track 2 remedy includes removal of soil exceeding the RURR SCOs, as set forth in DER-10 Technical Guidance for Site Investigation and Remediation, CP-51 and 6 NYCRR Part 375 and groundwater treatment. Soil vapor will be mitigated by constructing the building foundation below the water table, vapor barrier, and ventilated parking garaged. Alternative II complies with the SCGs.

Alternative III – This remedy was designed to achieve a Track 4 Restricted Use – Restricted-Residential cleanup. To meet the requirements of applicable SCGs the remedy will include removal of the top two feet of historic fill across the site, engineering controls to prevent contact with remaining soil contamination exceeding RURR SCOs, removal of hotspots of petroleum-, mercury- and PCB-impacted soil with the potential to impact groundwater and soil vapor, and/or treatment of contaminated groundwater. Soil vapor will be mitigated by constructing the building foundation below the water table, vapor barrier, and ventilated parking garaged. Alternative III complies with the SCGs.

All remedial alternatives will also comply with SCGs that involve protection of the public health and environment during the remedial action by implementing and enforcing a site-specific CHASP. Occupational Safety and Health Administration (OSHA) requirements for on-site construction safety will be followed by the site contractors.

3.4.3 Short-Term Effectiveness and Impacts

All Alternatives – Short-term adverse impacts from migration of contaminants carried in dewatering fluid, soil, vapor and dust to the community, site workers and the environment will be minimized by implementing appropriate control plans (including the CHASP, CAMP, SFMP, and dust, odor and vapor control measures). Additional short-term adverse impacts include increased noise, potential obstructions on roadway, and pedestrian traffic associated with construction. A Track 1 will require a longer duration than the Track 2 and Track 4 remedies.

All alternatives will require 25-cubic-yard capacity truck trips to haul excavated fill required for the baseline remediation program. A Track 1 remedy will require about 1,280 25-cubic yard truck trips, a Track 2 remedy will require about 900 25-cubic yard truck trips, and a Track 4 remedy will require about 440 25-cubic yard truck trips. The volume of dewatering fluid for a Track 1 remedy will also be greater due to the site-wide excavation extent and depth. Truck traffic under all remedies will be routed on the most direct course by the Contractor using major thoroughfares where possible and flaggers will be used to protect pedestrians at site entrances and exits.

3.4.4 Long-Term Effectiveness and Impacts

Alternative I – The Track I remedy will remove all historic fill and soil exceeding UU SCOs from the site and remediate impacted groundwater through the dewatering system. Because an EE and SMP are not required as part of the Track 1 remedy, Article 141 of the NYSDOH code 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 potential environmental exposure and satisfy the objectives of this criterion.

Alternative II – Under a Track 2 remedy, all soil above RURR SCOs will be removed down to 15 feet bgs and the removal of grossly impacted petroleum soil associated with the open spill below 15 feet bgs. Contaminated groundwater will be treated in the same manner as Alternative I – treatment through dewatering. An SMP and environmental easement will restrict the use of groundwater on the site and Soil vapor intrusion is not a concern considering the building foundation slab is located at or below the groundwater table and the building construction will include a vapor barrier and ventilated parking garage. Long-term effectiveness and permanence of this alternative will be achieved through the implementation of the SMP and through enforcement of an EE, which will require annual inspections and reporting in perpetuity.

Alternative III – Residual soil contamination left in place under a Track 4 remedy will be addressed with the composite site cover system. Contaminated groundwater will be treated in the same manner as Alternatives I and II. The exposure pathways to residual soil contaminants will be controlled by installation of the composite cover system and potential exposure to soil vapor intrusion will be prevented by installation of a concrete foundation below the groundwater table, vapor barrier, and ventilated parking garage. Long-term management of these ECs and the ICs will be accomplished through adherence to the SMP and EE. The long-term effectiveness of the Track 4 remedy will mitigate potential exposure to site contaminants and satisfy the objectives of this criterion.

3.4.5 Reduction of Toxicity, Mobility, or Volume of Contaminated Material

Alternative I – The Track 1 remedy will permanently and completely reduce the toxicity, mobility, and volume of contamination through excavation and removal of all on-site historic fill exceeding the UU SCOs. Extensive dewatering required by this remedy will be expected to also remediate VOCs in groundwater above SGVs. Extensive removal of soil and groundwater from the site under a Track 1 remedy is expected to significantly reduce soil vapor contamination. Therefore, Alternative I provides the greatest reduction of the toxicity, mobility, and volume of contaminated historic fill and soil.

Alternative II – The Track 2 remedy will also reduce the toxicity, mobility, and volume of soil contamination across the site through the excavation of soil exceeding RURR SCOs to 15 feet

bgs and mercury and petroleum source areas below 15 feet. Extensive dewatering required by this remedy will be expected to also remediate VOCs in groundwater above SGVs, though potentially to a somewhat lesser extent than under Alternative I. The removal of contaminated soil and groundwater from the site under the Track 2 remedy is expected to improve soil vapor conditions at the site.

Alternative III – The Track 4 remedy will also reduce the toxicity, mobility, and volume of soil contamination across the site through the excavation of 2 feet of historic fill from across the surface of the site plus removal of deeper petroleum-, PCB- and mercury-impacted source areas. The Track 4 remedy will reduce the toxicity, mobility and volume of VOCs in groundwater above SGVs, but potentially to a lesser extent than under Alternatives I and II. The removal of contaminated soil and groundwater from the site under the Track 4 remedy is expected to improve soil vapor conditions, but potentially to a lesser extent than under Alternatives I and II.

3.4.6 Implementability

Alternative I – Implementing the Track 1 remedy is feasible; however, it is more technically challenging to design and achieve because of the significant increase in excavation depth/volume and backfill volume required for the Track 1 remedial excavation, and significant increase in dewatering and support of excavation to reach the excavation depths (up to 34 feet bgs compared to 18 feet bgs). Due to these technical challenges, the duration of a Track 1 remedy would be greater than a Track 2 or Track 4 remedy.

Alternatives II and III – Implementing the Track 2 and Track 4 remedies are feasible and more easily implementable because the depth of remedial excavation is shallower than a Track 1 excavation, therefore less excavation support and less dewatering is necessary. The resulting duration and costs of the cleanup are less. For these reasons the Track 2 and 4 remedies are easier to implement than the Track 1 remedy.

Contractors experienced in implementing all described remedies are readily available in the area of the site.

3.4.7 Cost Effectiveness

The estimated remediation cost of each cleanup track is as follows:

- Track 1 remedy: about $19.0 million
- Track 2 remedy: about $11.7 million
- Track 4 remedy: about $9.4 million

Tables 2 (Track 1), 3 (Track 2), and 4 (Track 4) detail the estimated costs of the engineering and contractor individual components needed to achieve each remedy.

Based on the assumptions detailed for Alternative I, including much greater depth of excavation, support, dewatering and removal of petroleum and mercury source areas, all historic fill and soil exceeding UU SCOs, and dewatering, the estimated remediation cost of a Track 1 cleanup is $19.0 million. As the site will be remediated to an UU level, there will not be any long-term operations, maintenance, or monitoring costs associated with the proposed remedy.

Based on the assumptions detailed for Alternative II, including removal of the petroleum spill and mercury hot spots, soil exceeding RURR SCOs above 15 feet bgs, dewatering, and implementation of ICs, the estimated remediation cost of a Track 2 cleanup is $11.7 million. In this scenario, long-term operations, maintenance, or monitoring costs associated with ICs are required.

Based on the assumptions detailed for Alternative III, including removal of 2 feet of historic fill from across the surface of the site plus removal of deeper petroleum, PCB, and mercury source areas, dewatering, and implementation of ECs and ICs, the estimated remediation cost of a Track 4 is $9.4 million. In this scenario, long-term operations, maintenance, or monitoring costs associated with ECs and ICs are required.

3.4.8 Community Acceptance

All alternatives should be acceptable to the community because the potential complete exposure pathways will be eliminated through source removal and/or mitigated upon completion of the remedial actions. The Track 1 remedy may be less acceptable to the community because of the increased short-term impacts and remediation duration associated with complete removal of soil above Track 1 SCOs. The Track 2 and Track 4 remedies may be more acceptable to the community because of decreased short-term impacts and remediation duration and achieve the RAOs through removal of contaminated fill and the use of ECs and/or ICs.

The selected remedy will be subject to a 45-day public comment period. Any substantive public comments received will be addressed before the remedy is approved.

3.4.9 Land Use

The current, intended, and reasonably anticipated future land use of the site and its surroundings are compatible with the selected remedy. The future proposed development is a mixed-use commercial and residential buildings with one cellar level. Review of previous environmental and public documents for the site reflect to the following conclusions:

1. The current and proposed use of the site and its surroundings will be compatible with the selected remedy.
2. The proposed site use conforms to applicable zoning requirements.
3. The proposed site use conforms to historical and/or recent development patterns in the area.

4. The site does not fall within the boundaries of an existing Brownfield Opportunity Area (BOA) and New York State Environmental Zone (En-Zone).
5. The site is located in an urban area characterized by mixed-use commercial, institutional, and residential uses.
6. According to the New York City Landmarks Preservation Commission, the site is located in the South Street Seaport historic district.
7. There are no federal or state land designations.
8. The population growth patterns and projections support the proposed land use.
9. The site is accessible to existing infrastructure.
10. Groundwater is not used as a potable water source in New York City. Potable water provided to the City of New York is derived from surface impoundments in the Croton, Catskill, and Delaware watersheds.
11. According to the Effective National Flood Insurance Rate map for the City of New York published by the Federal Emergency Management Agency (FEMA) (Community Panel No. 3604970184F, dated September 5, 2007), the southern portion of the Subject Property falls within the advisory limit of the 0.1 percent Annual Chance Flood Hazard Area "special flood hazard", as defined by the 2014 New York City Building Code. The northern part of the site is located within Zone X, which is defined as 0.2% annual chance flood areas.

3.5 Summary of the Proposed Remedy

The Track 2 (Alternative II) RURR remedy achieves the remedial action objectives established for the project, and is effective in the short- and long-terms. The selected remedy effectively reduces mobility, toxicity, and volume of contaminants. Potential vapor intrusion into the building will be controlled through construction of the future building foundation at or within the water table and by the vapor barrier/waterproofing membrane and ventilated parking garage. ICs are designed to make the remedy protective of human health and the environment in the future. The remedy is considered feasible and cost effective because the excavation depths do not present significant technical challenges (e.g., depth of excavation, support and dewatering), and can be achieved through conventional construction measures. Alternative II can be feasibly and practically implemented, while providing protection to human health and the environment, should be acceptable to the community because it eliminates complete exposure pathways. Alternative II is the recommended remedial alternative for this site.

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 plans are provided in the appendices.

4.1.1 Standards, Criteria and Guidance

The parts 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:

- NYSDEC Title 6 of the New York Codes, Rules and Regulations
- NYSDEC CP-51- Soil Cleanup Guidance (2010)
- EPA Title 40, Code of Federal Regulations
- NYSDEC Sampling, Analysis and Assessment of PFAS Substances under NYSDEC's Part 375 Remedial Programs, dated January 2020, Revised January 2021

4.1.1.1 Standards and criteria typically applicable to UST closures

- 6 NYCRR Part 613 - Petroleum Bulk Storage
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes
- 6 NYCRR Subpart 374-2 - Standards for the Management of Used Oil
- 6 NYCRR Parts 700-706 - Water Quality Standards
- 40 CFR Part 280 - Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks

4.1.1.2 Guidance typically applicable to UST closures

- STARS #1 - Petroleum-Contaminated Soil Guidance Policy (1992) (Sections III and IV have been replaced CP-51)
- CP-51- Soil Cleanup Guidance (2010)
- Spill Response Guidance Manual (1995)
- Permanent Closure of Petroleum Storage Tanks (2003)
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations (1998, Addenda 2000 and 2004)
- DAR-1 (formerly Air Guide 1) (1997) - Guidelines for the Control of Toxic Ambient Air Contaminants

4.1.1.3 Standards and Criteria Typically Applicable to Remedial Actions

- 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 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 Parts 700-706 - Classifications and Standards of Quality and Purity
- 6 NYCRR Part 750 - State Pollutant Discharge Elimination System (SPDES) Permits

4.1.1.4 Guidance Typically Applicable to Remedial Actions

- CP-51 - Soil Cleanup Guidance (2010)
- DER-2 - Making Changes To Selected Remedies (Revised April, 2008)
- STARS #1 - Petroleum-Contaminated Soil Guidance Policy (1992) (Sections III and IV have been replaced by CP-51)
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- DER-23 – Citizen Participation Handbook for Remedial Programs (March, 2010)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- TOGS 1.3.8 - New Discharges to Publicly Owned Treatment Works
- TOGS 2.1.2 - Underground Injection/Recirculation (UIR) at Groundwater Remediation Sites
- DAR-1 (formerly Air Guide 1) - Guidelines for the Control of Toxic Ambient Air Contaminants (1997)
- U.S. EPA OSWER Directive 9200.4-17 - Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (December 1997)
- CP-43 – Commissioner Policy on Groundwater Monitoring Well Decommissioning (December 2009)

- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006, with updates in 2017)
- New York State Department of Environmental Conservation Sampling, Analysis and Assessment of Per and Polyfluorinated Alkyl Substances (PFAS) under NYSDEC's Part 375 Remedial Programs, dated January 2020, Revised January 2021

4.1.2 Site-Specific Construction Health & Safety Plan (CHASP)

The RE prepared a site-specific CHASP (Appendix D). The CHASP will apply to all remedial and construction-related work on site. The CHASP provides a mechanism for establishing a site safety office, on-site safe working conditions, safety organization, procedures, and PPE requirements. 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; and
- Safety Data Sheets (SDS).

Remedial work performed under this plan will be in full compliance with governmental requirements, including site and worker safety requirements mandated by OSHA.

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 the CHASP and applicable laws. All contractors performing work on the site must prepare their own CHASP that, at a minimum, meets the requirements of the CHASP in Appendix D.

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. Confined space entry will

comply with all OSHA requirements to address the potential exposure posed by combustible and toxic gases.

4.1.3 Quality Assurance Project Plan (QAPP)

The RE prepared a Quality Assurance Project Plan (QAPP) that describes the quality control components employed so 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 E 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, and 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 (CQAP)

The RE oversaw the preparation of this Construction Quality Assurance Plan (CQAP) that describes the quality control components employed so that the proposed remedy accomplishes the remedial goals and RAOs and is completed in accordance with the design specifications. The contractor and construction manager will have the primary responsibility to provide construction quality. A list of personnel involved in implementation of the CQAP and procedures that will be carried out by the remedial team are identified in Section 4.2.1.

The RE will directly supervise field personnel 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 NYSDEC and NYSDOH and will include reporting of any CAMP results that exceed the specified action levels.

The RE will directly supervise field personnel that will meet with the Construction Superintendent on a daily basis to discuss the plans for that day and schedule upcoming activities. The field personnel will document remedial activities in daily reports. This document will be forwarded to the Field Team Leader, Project Manager, and NYSDEC on a daily basis and to the RE on a weekly basis.

The RE will directly supervise field personnel that will screen the excavation with a PID and Jerome J505 mercury vapor analyzer (or equivalent) during intrusive activities. All readings will be noted in the record. Readings that exceed the CAMP action levels will be reported to NYSDEC and NYSDOH in the daily reports. The field personnel will collect the excavation documentation 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 all sampling activities and how they correspond to the RAWP. Observations and field and 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 submittal document files.

4.1.5 Soil/Fill Management Plan (SFMP)

The RE prepared an SFMP that includes detailed plans for managing soil/fill that is disturbed at the site, including excavation, handling, storage, transport and disposal. It also includes controls that will be applied to these efforts to facilitate effective, nuisance-free performance in compliance with applicable federal, state and local laws and regulations (see Section 5.4).

4.1.6 Erosion and Sediment Control Plan

The erosion and sediment controls will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control. Erosion and sediment controls that will be implemented are briefly described in Section 5.4.9 (Stormwater Pollution Prevention) and will be further detailed in the Soil Sediment and Erosion Plan provided in Appendix F. A Stormwater Pollution Prevention Plan (SWPPP) is not necessary because there is not a water body adjacent to the site and the storm drains adjacent to the site flow to a combined sewer and not to the river. Stormwater discharge, as required, will be to a combined sewer in accordance with the New York City SPDES General Permit for Stormwater Discharges from Construction Activities. Best Management Practices (BMP) for soil erosion will be selected and implemented, as needed, to minimize erosion and sedimentation off-site.

4.1.7 Community Air Monitoring Plan (CAMP)

A CAMP has been prepared by the RE and is included as section 5.4.10 below and part of the CHASP in Appendix D.

4.1.8 Contractors Site Operations Plan (SOP)

The RE will review plans and submittals for this remedial project (including those listed above as well as contractor and sub-contractor document submittals) and document their compliance with this RAWP. The RE is responsible for documenting that contractor and subcontractor document submittals are in compliance with this RAWP. Remedial documents will be submitted to NYSDEC and NYSDOH in a timely manner and before the start of work.

4.1.9 Citizen Participation Plan

A certification of mailing will be sent by the Volunteer to the NYSDEC project manager following the distribution of Fact Sheets and notices that includes: (1) certification that the Fact Sheets were mailed, (2) the date they were mailed; (3) a copy of the Fact Sheet, (4) a list of recipients (contact list); and (5) a statement that the repository was inspected on (specific date) and that it contained all of the applicable project documents.

No changes will be made to the approved Fact Sheets authorized for release by NYSDEC without written consent from NYSDEC. No other information, such as brochures and flyers, will be included with the Fact Sheet mailing.

The approved Citizen Participation Plan for this project is included as Appendix G.

A project specific website contain project documents can be found at https://250bcp.com/. Document repositories were established at the following locations and contain project documents and can also be accessed using the following link: https://gisservices.dec.ny.gov/gis/dil/

New York Public Library – Chatham Square Branch
33 E Broadway
New York, NY 10002
Phone: (212) 964-6598

Manhattan Community Board No. 1
Tammy Meltzer, Chairperson
1 Centre Street, Room 2202
New York, NY 10007
Phone: (212) 669-7070

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.

Remediation Engineer (RE):	Jason J. Hayes, P.E.
Project Leader/Program Manager :	Mimi S. Raygorodetsky
Quality Assurance Officer	Michael D. Burke, PG, CHMM
Project Manager:	Paul McMahon, P.E.
Langan Health & Safety Officer:	Tony Moffa, CHMM, CSP
Site Safety Coordinator:	William Bohrer, PG
Field Team Leader:	Joseph Yanowitz

Project personnel resumes are provided in Appendix H.

4.2.2 Remedial Engineer

The RE for this project will be Jason J. Hayes, P.E. The RE is a registered Professional Engineer licensed by the State of New York who will have primary direct responsibility for implementation of the remedial program. The RE will certify in the FER that the remedial activities were observed by personnel under his supervision and that the remediation requirements set forth in the RAWP and any other relevant provisions of ECL 27-1419 were achieved in full conformance with that plan. Other RE certification requirements are listed later in this RAWP.

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

In the FER, the RE will provide the certifications listed in Section 8.1.

4.2.3 Project/Remediation Schedule

The anticipated project/remediation construction schedule is provided in Appendix I. Proposed changes, delays or deviations will be promptly communicated to the NYSDEC.

4.2.4 Work Hours

The hours of operation for remedial construction will either conform to the requirements of the New York City Department of Buildings (NYCDOB) construction code or to a site-specific variance issued by the NYCDOB. The NYSDEC will be notified by the Volunteer of any variances issued by the NYCDOB. The 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 in accordance with the 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.

Once remedial excavating begins, the site entrance will be manned during working hours. The project will be guarded in accordance with the NYCDOB codes and requirements.

4.2.6 Traffic Control

Site traffic will be controlled through designated points of access along Pearl Street. 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. Proposed inbound and outbound truck routes to the site are discussed in Section 5.4.

4.2.7 Contingency Plans

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

4.2.7.1 Discovery of Additional Contaminated Soil

During remediation and construction activities, the soil will be continuously monitored by the RE's field representatives using a PID and Jerome J505 mercury vapor analyzer (or equivalent) as well as visual and olfactory field screening techniques to identify soil that may not be suitable for the selected disposal facility(ies). This historic fill and soil will be segregated and sampled for lab analysis in accordance with disposal facility requirements. If the proposed facility is not permitted to receive the suspect historic fill and soil, 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 invasive site work will be promptly communicated by phone to the NYSDEC Project Manager. These findings will be detailed in daily reports and subsequent monthly BCP progress reports.

4.2.7.2 Discovery of USTs

Previously unidentified USTs may be discovered during site-wide excavation. Unexpected USTs encountered during remedial and/or construction activities will be decommissioned in accordance with 6 NYCRR Parts 612.2 and 613.9 and NYSDEC DER-10 Section 5.5. After the tank, its contents, and associated piping are removed, post-excavation soil samples will be collected per the requirements of NYSDEC DER-10. If encountered, petroleum-impacted soils will be excavated, stockpiled separately, and disposed of off-site at a permitted disposal facility in accordance with applicable regulations. UST closure documentation, including contractor

affidavits, waste manifests, and tank disposal receipts, will be included as appendices to the FER. USTs will be registered with the NYSDEC Petroleum Bulk Storage unit, as necessary.

If USTs are encountered during invasive site work, the findings will be promptly communicated by phone to the NYSDEC's Project Manager and detailed in daily reports and subsequent monthly BCP progress reports.

4.2.8 Worker Training and Monitoring

Worker training and monitoring will be conducted in accordance with the CHASP (Appendix D).

4.2.9 Agency Approvals

Permits or government approvals required for remedial construction will be obtained prior to the start of remediation and included in the FER. The planned end use as mixed use commercial and residential building conforms to current zoning for the property. The proposed development will require the approval of the New York City Landmarks & Preservation Commission (NYCLPC); however the NYCLPC approval does not impact the remedy.

4.2.10 Pre-Construction Meeting with the NYSDEC

Prior to the start of remedial construction, a meeting will be conducted with the RE, Volunteer, Construction Manager, remediation contractor and the NYSDEC to discuss project roles, responsibilities, and expectations associated with this RAWP.

4.2.11 Emergency Contact Information

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

4.2.12 Remedial Action Costs

The estimated engineer and contractor cost of the preferred Track 2 remedy is about $11.7 million. An itemized and detailed summary of estimated costs for remedial activity is provided as Table 4. This estimate will be revised based on actual costs and submitted as an appendix to the FER.

4.3 Site Preparation

The RE will work with the Volunteer and its contractors so that any site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this RAWP.

4.3.1 Mobilization

Before commencing site remediation, the remediation contractor will mobilize to the site and prepare for remedial activities. Mobilization and site preparation activities may include the following:

- Identifying the location of all aboveground and underground utilities (e.g., power, gas, water, sewer, telephone), equipment, and structures (as necessary to implement the remediation);
- Mobilizing necessary remediation personnel, equipment, and materials to the site;
- Constructing one or more stabilized construction entrances consisting of virgin crushed stone or RCA at or near the site exit, which takes into consideration the site setting and site perimeter;
- Constructing a 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 Monitoring Well Decommissioning

Existing groundwater monitoring wells will be properly decommissioned in accordance with NYSDEC CP-43, when no longer required. The only exception to this is if the full length of the well is to be excavated during remediation. Well decommissioning will be performed by an experienced driller and logged by Langan field personnel. Decommissioning documentation will be provided in the FER.

4.3.3 Stabilized Construction Entrance(s)

Stabilized entrance areas will be constructed to prevent cleaned/washed trucks from being re-contaminated by site soil before exiting. The areas will be covered with virgin crushed stone or RCA and graded so that runoff water will be directed onto the site. The contractor will protect and maintain the existing sidewalks and roadway at site entrance points.

4.3.4 Utility Marker and Easements Layout

The Volunteer and its contractors are solely responsible for the identification of utilities that might be affected by work under this RAWP; the implementation of required, appropriate or necessary health and safety measures during performance of work under this RAWP; and the safe execution of invasive and other work performed under this RAWP. The Volunteer and its contractors must obtain local, state or federal permits and/or approvals that may be required to

perform work under this RAWP. Approval of this RAWP by the NYSDEC does not constitute satisfaction of these requirements.

The presence of utilities and easements on the site will be investigated by the Volunteer and its contractors. No impediments to the planned work under this RAWP are expected by known utilities or easements on the site.

4.3.5 Sheeting and Shoring

Appropriate management of structural stability of on-site and off-site structures during on-site activities, including excavation, is the responsibility of the Volunteer and its contractors. The Volunteer and its contractors must obtain local, state or federal permits and/or approvals that may be required to perform this work. The Volunteer and its contractors are solely responsible for the implementation of required, appropriate, or necessary health and safety measures during performance of work under the approved RAWP.

4.3.6 Equipment and Material Staging

The contractor will notify the RE and the Volunteer in writing with receipt confirmed, of pending site work 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 usage by all site personnel. The contractor will provide drinking water for all site personnel.

4.3.7 Truck and Equipment Wash/Cleaning Area

The contractor will construct wash/cleaning pads within the site boundary at each site entrance/exit planned for construction vehicle usage. The location of wash/cleaning pads may change periodically to accommodate the Contractor's sequencing of work. Where required, the pads will be constructed by the contractor so wastewater stays on-site. If the pads cannot be constructed onsite, then they will be constructed to collect wastewater for off-site disposal or treatment and discharge, if generated during wash/cleaning activities. The design will consider adequate space to wash/cleaning equipment and vehicles, and sloping and liners to facilitate the proper handling of wastewater. If collected, wastewater shall be either discharged in accordance with the Contractor's New York City Department of Environmental Protection (NYCDEP) permit or tested and transported to an off-site disposal facility that is permitted to accept this waste, in accordance with applicable local, state and federal regulations. The contractor will maintain the pad(s) throughout the duration of site work. Prior to demobilization, the contractor will deconstruct the pads and dispose of materials as required.

If the contractor uses high pressure washing methods, the contractor shall provide splash protection around the vehicle cleaning/washing station to prevent splatter and mist migrating off-

site during the vehicle cleaning process. Splash protection shall be temporary and stable and capable of being dismantled in the event of high winds.

4.3.8 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 and maintain site security.

4.3.9 Demobilization

The contractor will be responsible for demobilizing all labor, equipment and materials not designated for off-site disposal. The RE will be required to document that the remediation contractor has decontaminated all equipment and materials before removal from the site. The RE will document performance by the contractor of any follow-up coordination and maintenance for the following activities: removal of sediment and erosion control measures and disposal of materials in accordance with acceptable rules and regulations; removal of residual contaminated material or wastes; equipment decontamination; and general refuse disposal.

4.4 Reporting

Daily and monthly reports and an FER will be required to document the remedial action. The RE responsible for certifying the FER will be an individual licensed to practice engineering in the State of New York; Jason Hayes, P.E., of Langan, will have this responsibility. Should Mr. Hayes become unable to fulfill this responsibility, another suitably qualified New York State professional engineer will take his place. All daily and monthly reports will be included in the FER. In addition to the periodic reports and the FER, copies of all relevant contractor documents will be submitted to the NYSDEC.

4.4.1 Daily Reports

Daily reports will be submitted to the NYSDEC and NYSDOH Project Managers by the end of the following day, or at a frequency acceptable to them, and will include:

- An update of progress made during the reporting day, including a photographic log;
- Locations of work and quantities of material imported and historic fill/soil exported from the site;
- References to alpha-numeric map for site activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP findings, including any exceedances and actions taken to address the exceedances;
- An explanation of notable site conditions;

- A description of anticipated site activities; and
- The NYSDEC-assigned project number will appear on all reports.

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 include a description of daily activities keyed to an alpha-numeric map for the site that identifies work areas. These reports will include a summary of air sampling results, odor and dust problems and corrective actions, and all complaints received from the public.

4.4.2 Monthly Reports

Monthly reports will be submitted to the NYSDEC and NYSDOH Project Managers by the tenth of the following month of 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 (i.e. tons of historic fill/soil exported and material imported, etc.);
- Description of approved activity modifications, including changes to the scope of work 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 will be taken of remedial activities and submitted to the NYSDEC in digital (JPEG) format. Photographs will illustrate the remedial program elements and will be of acceptable quality. Representative photographs of the site before any remedial actions and of each contaminant source area and site structures before, during and after remediation will be provided. Photographs will be submitted to NYSDEC in digital format (e.g. jpeg files). A photograph log keyed to photo file ID numbers will be prepared to provide explanation for all representative photos.

Site records for remedial work will be appropriately documented and maintained on-site at all times during the project and 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 will be minimized and mitigation measures will be 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. Each entry will include the following information: • Time, date and nature of complaint; • Type of communication (telephone, letter, personal, etc.); • Name, contact address and contact number; and • Response and investigation undertaken as a result of the complaint and action taken with the signature of the responsible person. Each complaint will be investigated as soon as practicable in relation to the requirements.
Monitoring	A representative from the Volunteer or the RE will follow up on the complaint within two weeks of receipt to ensure it has been resolved.
Reporting	Upon receipt, the NYSDEC will be notified. Complaints and resolutions will be documented in the 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; and • Investigate the complaint and action follow-up according to the investigation results.

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). Addendums to the RAWP will be prepared, as 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: SOIL/FILL REMOVAL FROM SITE

5.1 Soil Cleanup Objectives

A Track 2 remediation is proposed; therefore, the applicable site-specific SCOs are the NYSDEC RURR SCOs listed in 6 NYCRR Part 375-6.8(b).

Soil and historic fill management on- and off-site will be conducted in accordance with the SFMP described below (Section 5.4). UST closures will conform to the criteria defined in 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements including DER-10 Chapter 5.5. Track 2 SCOs are shown in Table 1.

5.2 Remedial Performance Evaluation

5.2.1 Soil

Confirmation soil samples will be collected from the final bottom of excavation at a frequency of one per 900 square feet per NYSDEC DER-10 5.4(b)(5)(ii). Sidewall samples will not be collected from the excavation perimeter because support of excavation measures will preclude collection of sidewall samples. A reduced sample frequency, or utilizing RI grab samples results in place of new Track 2 endpoint samples, may be allowed with NYSDEC approval. The proposed confirmation sampling locations are presented on Figure 12.

Confirmation samples will be transported under standard chain-of-custody protocol to an NYSDOH ELAP-approved laboratory for 6 NYCRR Part 375 VOCs, SVOCs, pesticides/herbicides, PCBs, and metals analysis. Laboratory analyses will be conducted in accordance with EPA SW-846 methods and NYSDEC Analytical Services Protocol (ASP) Category B deliverable format. QA/QC procedures required by the NYSDEC ASP and SW-846 methods will be followed, including instrument calibration, standard compound spikes, surrogate compound spikes, and analysis of quality control samples. The laboratory will provide sample bottles, which are pre-cleaned and preserved. Where there are differences in the SW-846 and NYSDEC ASP requirements, the NYSDEC ASP shall take precedence.

5.2.1.1 Mercury-Impacted Soil Hotspot

The mercury-impacted soil hotspot is located in the former location of the thermometer factory at 302 Pearl Street. The mercury-impacted soil hotspot is shown on Figure 8. It was delineated during the remedial investigation and will be further defined during the remedial design investigation/waste characterization. Mercury vapor monitoring will be conducted in accordance with the CAMP (see section 5.4.10 and the CHASP in Appendix E).

After removal of the mercury-impacted soil hotspot, perimeter mercury vapor monitoring may be discontinued or reduced with approval of DEC/DOH based on an evaluation of air monitoring

results during hotspot removal. Handheld mercury vapor monitoring will continue throughout the remainder of excavation.

5.2.2 Groundwater

Groundwater sampling will be performed after the petroleum source material is removed and dewatering is complete to assess the performance of the remedy and whether the groundwater source has been sufficiently remediated.

The influent groundwater of the dewatering system will be sampled, containerized, and transported under standard chain-of-custody protocol to an NYSDOH ELAP-approved laboratory for 6 NYCRR Part 375/TCL VOC and SVOC analysis. Laboratory analyses will be conducted in accordance with EPA SW-846 methods and NYSDEC ASP Category B deliverable format. QA/QC procedures required by the NYSDEC ASP and SW-846 methods will be followed, including instrument calibration, standard compound spikes, surrogate compound spikes, and analysis of quality control samples. The laboratory will provide sample bottles, which are pre-cleaned and preserved. Where there are differences in the SW-846 and NYSDEC ASP requirements, the NYSDEC ASP shall take precedence.

Laboratory Analysis and Reporting

A data usability summary report (DUSR) will be included in the FER and in post-remedial groundwater sampling reports. Quality control procedures for the sampling are included in the QAPP (Appendix E). Documentation sample results will be provided in NYSDEC electronic data deliverable (EDD) format for EQuIS™. Guidance on sampling frequency is presented in Section 5.4 of DER-10.

The FER will provide a tabular and map summary of all documentation sample results.

5.3 Estimated Soil/Fill Removal Quantities

The estimated quantity of soil/fill to be removed from the site for a Track 2 cleanup is about 21,700 cubic yards. Over-excavated areas will require backfill meeting the more stringent of the RURR or PGW SCOs or virgin stone. The remedial excavation extents are shown on Figure 8 and 10.

5.4 Soil/Fill Management Plan

This section presents the approach to management, disposal and reuse of soil and fill excavated from the site. This plan is based on the current knowledge of site conditions, and will be augmented with the additional data collected during remediation. Langan field personnel, under the direction of the RE or qualified environmental professional (QEP), will monitor and document the handling and transport of contaminated soil and historic fill removed from the site for disposal as a regulated solid waste. Field personnel, under the direction of the RE or QEP, will assist the

remedial contractor in identifying impacted soil and historic fill during excavation, determining soil and historic fill suitable for direct load-out versus temporary on-site stockpiling, selection of samples for waste characterization, and determining the proper off-site disposal facility for soil and historic fill. Separate stockpile areas will be constructed as needed to stage various excavated materials with the intent to more efficiently manage and characterize the soil and historic fill and to avoid comingling of impacted soil and historic fill with non-impacted soil.

5.4.1 Soil Screening Methods

Visual, olfactory and PID/Jerome soil screening and assessment will be performed by Langan field personnel under the direct supervision of the RE or QEP during excavations into known or potentially contaminated soil and historic fill. Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during the remedy and during any development phase, such as excavations for foundations and utility work before issuance of the Certificate or Completion.

Field screening for evidence of contamination will be performed by field personnel under the direct supervision of the RE or QEP. Resumes will be provided for personnel responsible for field screening (i.e., those representing the RE) of invasive work for known or unknown contaminant sources during remediation and any development work.

5.4.2 Stockpile Methods

Soil stockpile areas, if needed for the different types of soil and historic fill, will be constructed for staging of site soil, pending loading or waste characterization testing. Separate stockpile areas will be constructed to avoid comingling soil and historic fill of differing waste types. All stockpile areas will meet the following minimum requirements:

- The excavated soil and historic fill will be placed onto an impermeable surface or on minimum thickness of 8 mil low-permeability plastic sheeting or tarps of sufficient strength to prevent puncture during use; separate stockpiles will be created where soil and historic fill types are different (e.g., historic fill on areas where historic fill is present.). The use of multiple layers of thinner liners is permissible.
- Equipment and procedures will be used to place and remove the soil and historic fill so as to minimize the potential to jeopardize the integrity of the liner.
- Stockpiles will be covered at the designated times (see below) with minimum 8-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 of approximately 1,000 cubic yards, until ready for loading.
- Active stockpiles (e.g. stockpiles that have not reached their capacity) will be covered at the end of each workday.

- Each stockpile area 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 off-site.
- Stockpiles will be inspected at a minimum once each day and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC.
- Mercury and petroleum-impacted soil and historical fill stockpiles will be promptly removed from the site, and the vapor, dust, odor and nuisance controls discussed in section 5.4.12 will be implemented.

5.4.3 Soil/Fill Characterization, Excavation and Loading

Excavated soil and historic fill will be characterized 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 data will be reported in the FER. All data available for soil or subsurface material to be disposed of at a given facility must be submitted to the disposal facility for review and approval before shipment and receipt. Disposal facility approvals will be received prior to the start of site-wide excavation to minimize the need for stockpiling.

The Volunteer and its contractors are solely responsible for safe execution of invasive work, the excavation support, structures that may be affected by excavations, and other work performed under this RAWP. Field personnel under the direct supervision of the RE or QEP will observe and document all invasive work and the excavation and loading of excavated soil and historic fill. Remediation areas will be excavated and post-excavation confirmation sampling completed before excavations related to site development can move forward in the remediated area of the site. Development-related grading cuts and fills will not be performed without NYSDEC approval of the RAWP, and the RE will provide that any site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this RAWP. The means and methods to complete the remedial excavation will be refined upon completion of the RDI.

The RE's field personnel will be responsible for monitoring egress points for truck and equipment transport from the site and ensuring that the Contractor is notified of their obligation to immediately clean the sidewalks and streets of dirt and other materials derived from the site during site remediation. Non-compliance will be reported to the NYSDEC. Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site sediment tracking. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials. Loaded vehicles leaving the site will be appropriately lined, securely covered, manifested, and placarded in accordance with appropriate federal, state, and local requirements, and all other applicable transportation requirements. On-site, mechanical

processing of historic fill and contaminated soil is prohibited unless otherwise approved by the NYSDEC.

5.4.4 Soil/Fill Transport Off-Site

Transport of soil and historic fill will be performed by licensed haulers in accordance with appropriate local, state and federal regulations, including 6 NYCRR Part 364. Trucks entering or leaving the site will be securely covered with tight fitting covers. Haulers will be appropriately licensed and trucks properly placarded. Trucks will enter and exit the site using dedicated ingress/egress points. Trucks loaded with site soil and historic fill will exit the vicinity of the site using only approved truck routes. Trucks will be prohibited from stopping and idling unnecessarily in the neighborhood outside the site. To the extent possible, queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be minimized.

Proposed inbound and outbound truck routes to the site are shown on Figure 13. This is the most appropriate route and takes into account:

- Limiting transport through residential areas and past sensitive sites;
- 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.

A truck wash/cleaning area will be operated on-site. The RE's field personnel will be responsible for documenting that outbound trucks are washed and cleaned at the truck wash 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's field personnel will be responsible for documenting that egress points for truck and equipment transport from the site are free of dirt and other subsurface materials derived from the site during remediation. Cleaning of the adjacent streets will be performed by the remediation contractor as needed to maintain a clean condition with respect to site-derived materials.

5.4.5 Soil/Fill Disposal Off-Site

Excavated soil/fill material and other solid wastes removed from the site will be handled, transported and disposed of in accordance with local, state (including 6 NYCRR Parts 360 and 361) and federal regulations. If disposal of fill material is proposed for unregulated disposal (i.e., clean soil removed for development purposes), a formal request with an associated plan will be

made to the NYSDEC's Project Manager. Unregulated off-site management of materials from this site is prohibited without formal NYSDEC approval.

Excavated fill material must be disposed of at an in-state or out-of-state facility licensed to accept the material. Non-hazardous fill material can be sent to a construction and demolition debris handling and recovery facility only with written approval from the NYSDEC. Hazardous waste is prohibited from being sent to a construction and demolition debris handling and recovery facility (6 NYCRR Part 361-5). Hazardous wastes derived from the site will be managed, transported and disposed of in full compliance with applicable local, state and federal regulations.

The following documentation will be obtained and reported by the RE for each off-site disposal location used in this project to fully demonstrate and document that the disposal of soil and historic fill derived from the site conforms to applicable laws:

1) A letter from the RE or BCP Volunteer to the receiving facility describing the soil or historic fill to be disposed of and requesting formal written acceptance of the material. This letter will state that the soil or historic fill to be disposed of 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 soil or historic fill being transported (including site characterization data); and
2) A letter from each receiving facility stating it is in receipt of the correspondence (above) and is approved to accept the soil or historic fill. These documents will be included in the FER.

The FER will include an account of the destination of all soil and historic fill removed from the site during the remedy, including excavated soil, contaminated soil, historic fill, hazardous waste, and fluids. Documentation associated with disposal of soil and historic fill must also include records (i.e., manifests and scale tickets) and approvals for receipt of the material by the facilities. This information will also be presented in the FER.

5.4.6 Soil/Fill Reuse On-Site

Soil or historic fill excavated during the remedy is not anticipated to be reused on this site under the proposed remedy. If soil reuse is considered, it will be reused if the requirements in this section and 6 NYCRR Part 360 are met. Grossly contaminated soil or soil with petroleum staining or odor will not be reused on-site. Soil acceptable for reuse must be non-hazardous and meet the lower of the RURR SCOs and Protection of Groundwater SCOs, unless a determination for a remedial track other than Track 2 is pursued. The Protection of Groundwater SCOs apply only to compounds or analytes detected in groundwater at concentrations that exceeded the Ambient Water Quality SGVs for Class GA water.

Soil or historic fill removed during implementation of the remedy or removed for grading or other purposes will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines. Soil and historic fill deemed unfit for reuse will be transported for off-site disposal. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review.

5.4.7 Fluids Management

Remedial excavation will extend below the current groundwater table and dewatering will be required to lower the groundwater table below the remedial excavation depths. Dewatering will occur prior to mass excavation below the current groundwater table. A temporary dewatering and treatment system will be designed by the Remediation Contractor's NYS-licensed Professional Engineer. Liquids to be removed from the site, including dewatering fluids, will be handled, transported, and disposed of in accordance with applicable local, state, and federal regulations. Liquids discharged into the New York City sewer system will be addressed through approval by NYCDEP. For the remedy, dewatering is considered a remedial component inasmuch as it is necessary to facilitate excavation of contaminated material.

During remedial excavation, sediment and erosion controls will be implemented to prevent groundwater encountered during excavation in saturated soils from flowing outside of the site. Trucks will be lined to contain free liquids in saturated soils from leaking out of the truck beds.

Dewatering fluids will not be recharged back to the land surface or subsurface. Dewatering fluids will be managed off-site. Discharge of water generated during remedial construction to surface waters (i.e., a local pond, stream, and/or river) is prohibited without a SPDES permit.

5.4.8 Backfill from Off-site Sources

Materials proposed for import will be approved by the RE and will be in compliance with provisions in this RAWP prior to receipt at the site. Imported soil for backfill must meet the requirements of 6 NYCRR Part 375-6.7(d) and NYSDEC DER-10 Section 5.4(e), Table 5.4(e)10, and Appendix 5. 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 to the site.

The FER will include the following certification by the RE: "I certify that all import of soil 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".

Backfill material will consist of clean fill (as described in the following paragraph) or other acceptable fill material such as virgin stone from a quarry or RCA. 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. Import of RCA will require a site-specific Beneficial Use Determination (BUD) by NYSDEC. 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. RCA is not acceptable for and will not be used as cover or drainage material. RCA or virgin stone must contain less than 10% by weight passing a No. 10 sieve to be excluded from NYSDEC DER-10 sampling requirements.

Imported soil (i.e., clean fill) will meet the lower of RURR and Protection of Groundwater SCOs. Non-compliant soil will not be imported to the site. 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 CP-51. The samples will be analyzed for Part 375 VOCs (USEPA Method 8260), SVOCs (USEPA Method 8270), pesticides/PCBs (USEPA Method 8082/8081), metals (USEPA Method 6010), and per and polyfluoroalkyl substances (USEPA Method 537) by NYSDOH ELAP-certified laboratory. Upon meeting these criteria, the certified-clean fill be transported to the site and segregated from impacted material, as necessary, on plastic until the certified-clean fill is used as backfill.

Soil that meets 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives, will not be imported to the site without prior approval by NYSDEC. The contents of this RAWP and NYSDEC approval of this RAWP should not be construed as an approval for this purpose.

Facilities will be identified in the FER. A Professional Engineer (PE) or QEP will review the 6 NYCRR Part 360 registrations and permits for the facilities for the period of acquisition of RCA. Imported RCA, virgin gravel, or rock or stone from mines or quarries must have no more than 10% by weight passing through a No. 10 sieve and will not require additional testing unless required by NYSDEC under its terms for operation of the facility. Additional exemptions from testing requirements may be approved by NYSDEC Project Manager based on their review of requests by the PE/QEP.

Trucks entering the site with imported soil will be securely covered with tight fitting covers.

5.4.9 Typical Storm Water Pollution Prevention

Silt fencing or hay bales will be installed around the perimeter of the remedial construction area, as required. Barriers and hay bale checks will be installed and inspected once per week and after every storm event; necessary repairs shall be made immediately. Results of inspections will be recorded in a logbook maintained at the site and available for inspection by the NYSDEC. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. Undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for

replacing silt fence damaged due to weathering. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

5.4.10 Extreme Storm Preparedness and Response Contingency Plan

In the event of emergency conditions caused by an extreme storm event, the remediation contractor will undertake the following steps for site preparedness prior to the event and in response after the event.

5.4.10.1 Storm Preparedness

Preparations in advance of an extreme storm event will include the following: containerized hazardous materials and fuels will be removed from the property; loose materials will be secured to prevent dislocation and blowing by wind or water; heavy equipment such as excavators and generators will be removed from excavated areas, trenches and depressions to high ground or removed from the property; an inventory of the property with photographs will be performed to establish conditions for the site and equipment prior to the event; stockpile covers for soil and fill will be secured by adding weights such as sandbags for added security and worn or ripped stockpile covers will be replaced with competent covers; stockpiled hazardous wastes will be removed from the property; storm water management systems will be inspected and fortified, including, as necessary: clean and reposition silt fences, hay bales; clean storm sewer filters and traps; and secure and protect pumps and hosing.

5.4.10.2 *Storm Response*

At the conclusion of an extreme storm event, as soon as it is safe to access the property, a complete inspection of the property will be performed. Potential hazards will be addressed immediately. Emergency and spill conditions will be reported to NYSDEC.

Public safety structures related to remediation, such as construction security fences, will be repaired promptly to eliminate potential public safety threats. Debris will be collected and removed. Dewatering will be performed in compliance with existing laws and regulations and consistent with emergency notifications, if any, from proper authorities. Eroded areas of soil including unsafe slopes will be stabilized and fortified. Dislocated materials will be collected and appropriately managed. Support of excavation structures will be inspected and fortified as required by DOB. Impacted stockpiles will be contained and damaged stockpile covers will be replaced. Storm water control systems and structures will be inspected and maintained as necessary.

5.4.11 Community Air Monitoring Plan

Community air monitoring will be conducted in compliance with the NYSDOH Generic CAMP outlined below and included in the CHASP (Appendix D). Continuous monitoring at the perimeter

of the site will be performed during ground-intrusive activities such as investigation and excavation. To comply with the Special Requirements in DER-10 Appendix 1A, when intrusive work is being conducted at the site boundary along Peck Slip, Water Street, and Beekman Street, the closest CAMP station at the boundary will be relocated to the sidewalk of the street opposite the site. Work zone action levels will be lowered to the community air monitoring levels and monitored via a portable PID and mercury vapor analyzer.

The CAMP will include perimeter CAMP stations, one weather station, and one handheld mercury vapor analyzer. CAMP stations will monitor for VOCs with a PID, for mercury vapor with a Jerome® J405, and dust emissions with equipment using real-time monitoring capable of measuring PM-10 (e.g., DustTrak). The day-to-day location of CAMP stations will be fluid and dynamic based on wind direction and work zone location and will take into account the location of sensitive receptors and ground level air-intakes. The weather and perimeter air monitoring stations will utilize a wireless telemetry system to monitor real-time wind direction, temperature, concentrations. In accordance with the CAMP, downwind camp monitoring data will be compared to upwind CAMP monitoring data, to provide a real-time comparison to ambient conditions.

A portable PID will be used to monitor the work zone and for monitoring for VOCs during activities such as soil and groundwater sampling. A portable mercury vapor analyzer (Jerome® J505 or equivalent) will be used to capture instantaneous mercury vapor concentrations around the site and downwind from the work zone. The site perimeter will be monitored for fugitive dust emissions by visual observations as well as instrumentation measurements. Particulate or dust will be monitored continuously with real-time field instrumentation that will meet, at a minimum, the performance standards from DER-10 Appendix 1B.

Remedial Design Investigation

The first task to be completed under the RAWP will be the RDI. The CAMP for the RDI will be conducted in accordance with the NYSDEC-approved May 2020 RIWP. A baseline community ambient air monitoring event may be conducted as part of the RDI.

Ground-intrusive Activities after RDI

After completion of the RDI and acceptance of the RDM by the NYSDEC, the mercury-impacted hotspot will be removed prior to the site-wide remedial excavation. Continuous monitoring of VOCs, mercury, and dust emissions will be conducted at the perimeter of the site during ground intrusive, soil handling, and soil staging activities. A total of six perimeter CAMP stations, one weather station, and one handheld mercury vapor analyzer will be used for community air monitoring during the hotspot removal. No changes to the CAMP will be implemented without approval from NYSDEC and NYSDOH.

CAMP Action Levels

For VOC monitoring, the following actions will be taken based on VOC levels measured:

- If total VOC levels exceed 5 parts per million (ppm) above background for the 15-minute average at the site perimeter, work activities will be halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background at the site perimeter, work activities will resume with continued monitoring.
- If total VOC levels at the downwind perimeter of the site persist at levels in excess of 5 ppm above background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the work 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 downwind total VOC level persist above 25 ppm at the perimeter of the site, activities will be shut down.

All 15-minute readings will be recorded and be available for State (NYSDEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

For dust monitoring with field instrumentation, the following actions will be taken based on instrumentation measurements:

- If the downwind particulate level is 100 µg/m³ greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work zone, then dust suppression must be employed. Work may continue with dust suppression techniques provided that downwind PM10 levels do not exceed 150 µg/m³ above the background level and provided that no visible dust is migrating from the work zone.
- 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 upwind level and in preventing visible dust migration.

For mercury vapor monitoring with field instrumentation, the following actions will be taken based on instrumentation measurements:

- If the downwind mercury vapor level is greater than 1 µg/m³ above background for the 15-minute period, then work activities will be halted and monitoring continued. The source of the vapors will be identified, and corrective actions will be taken to abate emissions, and monitoring continued. Corrective actions will include covering any exposed stockpiles with polyethylene sheeting, and MERCON–X® will be sprayed onto any exposed soil exhibiting elevated Jerome meter readings. If levels readily decrease (per instantaneous readings) below 1 µg/m³ above background, work activities will resume with continued monitoring.
- If mercury vapor levels within the work zone persist at levels in excess of 10 µg/m³ above background, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the mercury vapor level at the site perimeter, is below 1 µg/m³ above background for the 15-minute average.

The Safety Data Sheet for MERCON–X® is included as Appendix I.

5.4.12 Vapors, Odor, Dust and Nuisance Control Plan

Vapors, dust, odor and nuisance control will be accomplished by the contractor as described in this section. The FER will include the following certification by the RE: "I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology defined in the RAWP."

Mercury Vapor Control Plan

Specific mercury vapor control methods to be used on a routine basis will include application of MERCON–X®, tarps/plastic sheeting over soil stockpiles, and tarps/plastic sheeting over hotspot excavation areas when excavation is not active. If mercury vapor action levels are exceeded, as defined in the CAMP, work will be halted and the source of mercury vapor will be identified and corrected. Work will not resume until the mercury vapor is abated. The NYSDEC and NYSDOH will be notified of all mercury vapor events. Implementation of mercury vapor monitoring, including informing the contractor of a condition warranting the halt of work, will be the responsibility of the RE, who is responsible for certifying the FER. Application of mercury vapor controls is the responsibility of the contractor.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, procedures may include: (a) direct load-out of soils to trucks for off-site disposal, (b) limiting the area of open excavations; (c) shrouding open excavations with tarps and other covers; and (d) using MERCON–X® to cover exposed soils.

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 will include application of foam suppressants or tarps over any odorous or VOC source areas. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until nuisance odors are abated. The NYSDEC and NYSDOH will be notified of all odor events and of all other odor complaints about the project. Implementation of odor monitoring, including notifying the contractor of a condition that warrants the halt of work, will be the responsibility of the RE, who is responsible for certifying the FER. Application of odor controls is the responsibility of the contractor.

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

Dust Control Plan

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, on-site water trucks, or an alternate source with suitable supply and pressure for use in dust control.
- Gravel will be used for on-site roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water spraying.

Other Nuisances

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

A plan for noise control will be developed and utilized by the contractor for all remedial work and will conform, at a minimum, to the NYCDEP noise control standards.

6.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

Since residual contaminated soil and groundwater will exist beneath the site after the Track 2 remedy is complete, ICs are required to protect human health and the environment. These ICs are described hereafter. Long-term management of ICs and of residual contamination will be executed under a Site-Specific SMP that will be developed and included in the FER.

Achievement of a Track 2 cleanup is contingent upon achieving Track 2 SCOs before the Certificate of Completion. If these conditions are not met, the site will achieve a Track 4 Restricted-Residential Use remedy and the composite cover system will serve as long-term engineering control.

The FER will provide tables and figures documenting residual contamination at the site. This will include presentation of concentrations exceeding both UU and RURR cleanup standards.

7.0 INSTITUTIONAL CONTROLS

Following completion of the remedy, contamination above Track 2 SCOs may remain in place; therefore, ICs will be required as part of the remedial action. An SMP will be implemented to manage and monitor the ICs and define restricted uses of the site.

7.1 Environmental Easement

An environmental easement, as defined in Article 71 Title 36 of the Environmental Conservation Law, is required when residual contamination is left on-site after the remedy is complete. A Track 2 cleanup requires that an environmental easement approved by the NYSDEC will be filed and recorded with the New York County Office before the Certificate of Completion can be issued by the NYSDEC. The environmental easement will be submitted as part of the FER.

The environmental easement renders the site a Controlled Property. The easement will list the ICs required under this remedy to prevent future exposure to residual contamination, including controlling disturbances of the subsurface soil and restricting the use of the site to restricted residential, commercial, and industrial uses only. ECs will not be required if the Track 2 is achieved. If a Track 2 remedy is not achieved, the site will achieve a Track 4 Restricted-Residential Use remedy with ECs. The ICs are generally subdivided between controls that support ECs and those that place general restrictions on site usage or other requirements. ICs in both of these groups are closely integrated with the SMP, which provides the methods and procedures to be followed to comply with this remedy.

The ICs that support ECs if a Track 4 remedy is achieved are:

- Compliance with the environmental easement by the grantor and the grantor's successors and adherence of all elements of the SMP is required;
- ECs must be operated and maintained as specified in the SMP;
- ECs on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;
- Data and information pertinent to site management must be reported at the frequency and in a manner defined in the SMP; and
- ECs may not be discontinued without an amendment or extinguishment of the environmental easement.

Adherence to these ICs is mandated by the environmental easement and will be implemented under the SMP (discussed in the next section). The site restrictions that apply to the site are:

- Vegetable gardens and farming in residual site soil on the site are prohibited;
- Use of groundwater underlying the site is prohibited without treatment rendering it safe for intended purpose;

- All future activities on the site that will disturb residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in the SMP;
- The site may be used for restricted-residential, commercial, and industrial uses use only, provided the long-term ECs and ICs included in the SMP are employed; and
- The site may not be used for a higher level of use without an amendment or extinguishment of the environmental easement.

Grantor agrees to submit to the NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the site 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. This certification shall be submitted annually, or at a specified frequency allowed by the NYSDEC. The NYSDEC retains the right to access the site at any time in order to evaluate the continued maintenance of any and all controls.

7.2 Site Management Plan

A Track 2 cleanup requires an SMP. Site management is the last phase of remediation and begins with the approval of the FER and issuance of the Certificate of Completion for the remedy. The SMP is submitted as part of the FER, but will be written in a manner that allows its removal and use as a complete and independent document. Site management continues in perpetuity or until released in writing by the NYSDEC. The property owner is responsible for all site management responsibilities defined in the environmental easement and performance of the SMP. ECs will not be required if the Track 2 is achieved. If a Track 2 remedy is not achieved, the site will achieve a Track 4 Restricted-Residential Use remedy with ECs.

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 remedy in accordance with the NYSDEC BCA. This includes: (1) development, implementation, and management of all ECs and ICs; (2) development and implementation of monitoring systems and a Monitoring Plan; (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); (4) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of site information to the NYSDEC; and (5) defining criteria for termination of treatment system operation.

To address these needs, this SMP will include four plans: (1) an EC and IC Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems; and (4) 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 DER-10 and the guidelines provided by the NYSDEC.

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

No exclusions for handling of residual contaminated soils will be provided in the SMP. All handling of residual contaminated material will be subject to provisions contained in the SMP.

8.0 FINAL ENGINEERING REPORT

An FER, prepared in accordance with DER-10, will be submitted to the NYSDEC following implementation of the remedial action defined in this RAWP. The FER provides documentation that the remedial work required under this RAWP was completed and was performed in compliance with this plan. The FER will include the following documentation:

1. A written and photographic documentation (via daily field reports) of the completed remedy;
2. A description of any deviations from the RAWP;
3. An account of waste material exported from the site, including waste types and volumes, waste characterization documentation, facility-signed manifests and scale tickets, facility approvals and other waste disposal documentation;
4. An account of materials imported to the site;
5. A tabular summary of post-excavation documentation sampling results and other sampling and laboratory analysis completed as part of the remedial action;
6. As-built drawings for ECs; and
7. An itemized description of actual costs incurred during the remedy.

Before approval of a FER and issuance of a Certificate of Completion, all project reports must be submitted in digital form on electronic media (PDF).

8.1 Certification

The following certification will appear in front of the Executive Summary of the FER. The certification will be signed by the RE, Jason Hayes, who is a Professional Engineer registered in New York State. This certification will be appropriately signed and stamped. The certification will include the following statements:

I, _____, am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the 250 Water Street Site.

I certify that the site description presented in this Final Engineering Report is identical to the site descriptions presented in the Brownfield Cleanup Agreement for the 250 Water Street site and related amendments.

I certify that the Remedial Action Work Plan dated [month day year] and Stipulations [if any] in a letter dated [month day year] and approved by the NYSDEC were implemented and that all requirements in those documents have been substantively complied with.

I certify that the remedial activities were observed by Langan personnel under my supervision and that the remediation requirements set forth in the Remedial Action Work Plan and any other relevant provisions of ECL 27-1419 have been achieved.

I certify that the export of contaminated soil, fill, stone, water, or tanks from the property was performed in accordance with the Remedial Action Work Plan, and were taken to facilities licensed to accept this material in full compliance with all federal, state, and local laws.

I certify that import of soils from off-site, including source approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan.

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 Remedial Action Work Plan.

I certify that community air monitoring conducted during remediation and development-related construction was conducted in compliance with the NYSDOH Generic CAMP and Remedial Action Work Plan.

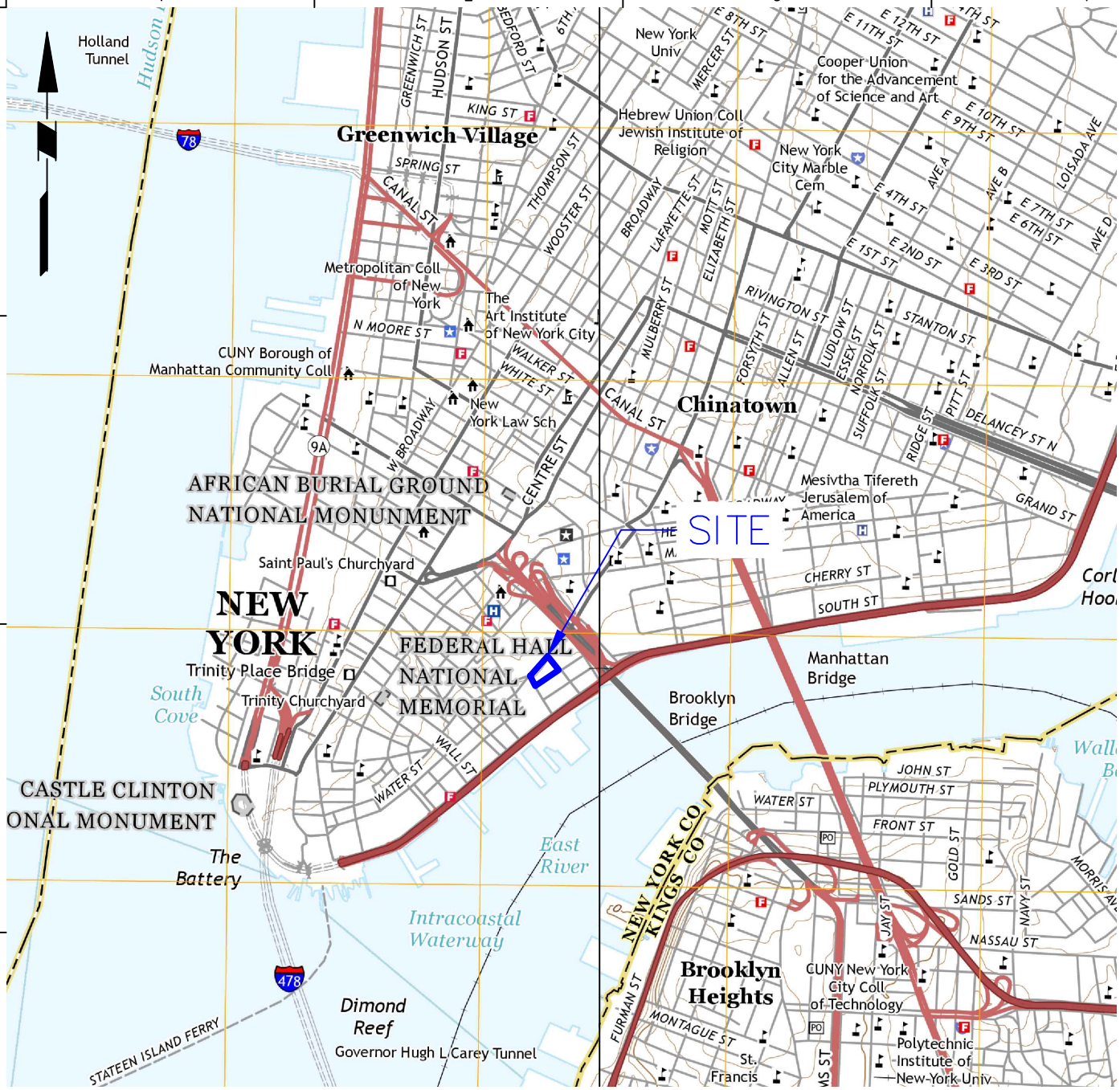
I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

9.0 SCHEDULE

Mobilization will commence before remedial activities at the site and is expected to take about two weeks. Once mobilization is complete, the remedial activities can begin, and are anticipated to take about 10 months. Within 60 days of completion of remedial activities at the site, an FER will be submitted to the NYSDEC as detailed in Section 8.0. A detailed project schedule is included in Appendix J.

The RDI will be completed followed by the submission of the RDM to the NYSDEC. After approval of the RDM, the first remedial task completed will be the removal of the mercury-impacted soil hotspot. The schedule and phasing of remedial work will be refined based on the results of the RDI.

Figures



NOTES:

1. BASE MAP REFERENCE: USGS 7.5 MINUTE SERIES QUADRANGLE MAP OF JERSEY CITY, NJ, AND BROOKLYN, NY, DATED 2016

2000 0 1000 2000

SCALE IN FEET

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

LANGAN

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

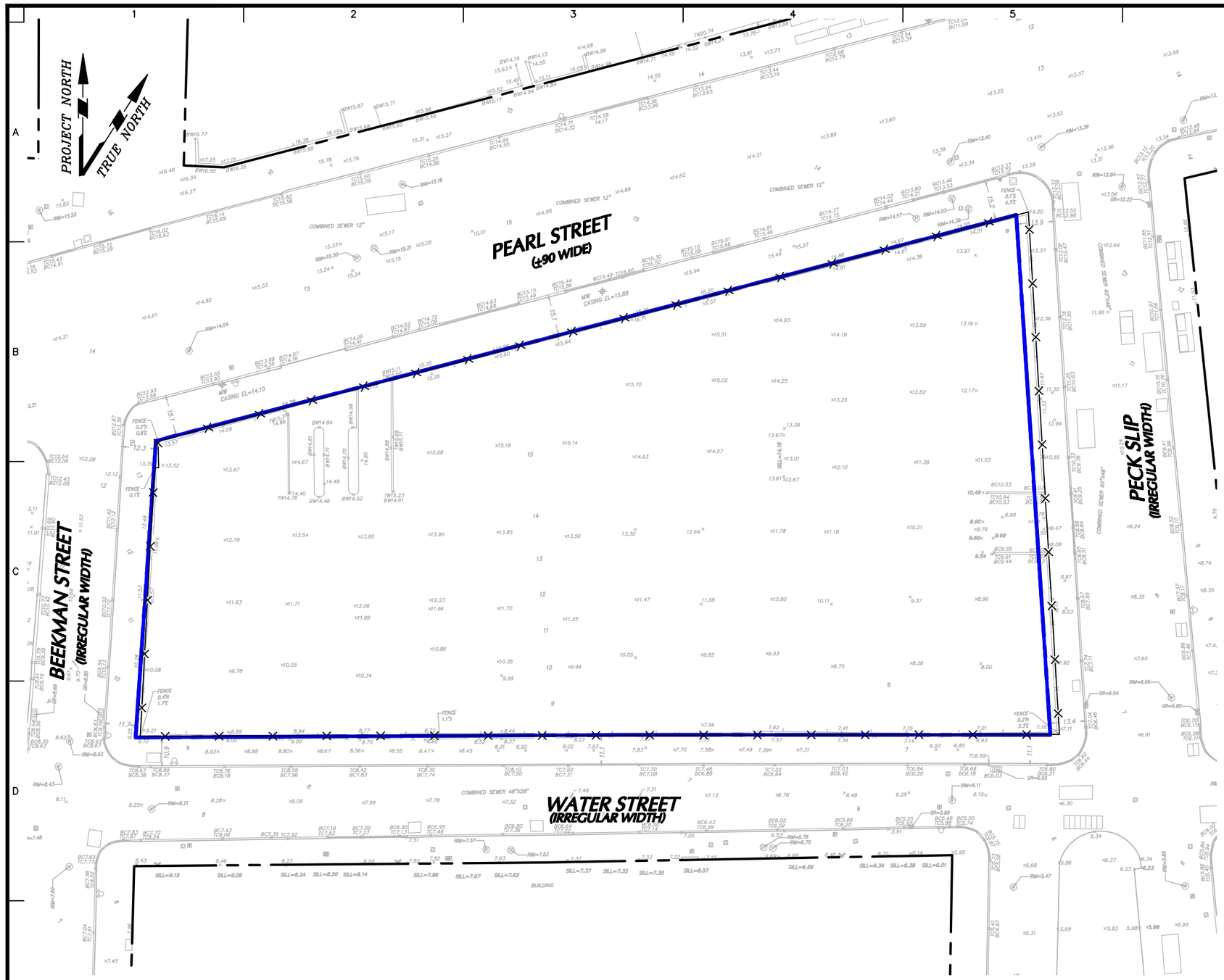
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001

T: 212.479.5400 F: 212.479.5444 www.langan.com

Project	Drawing Title	Project No.	Drawing No.
250 WATER STREET BLOCK No. 98, LOT No.1 NEW YORK NEW YORK	SITE LOCATION MAP	170381202 Date 12/23/2020 Drawn By JFY Checked By PM	1

© 2019 Langan

Filename: \\langan.com\data\NY\data2\170381202\Project Data\CAD\02\SheetFiles\Environmental\BCP RAWP\Figure 1 - Site Location Map.dwg Date: 2/5/2021 Time: 14:22 User: astappenbeck Style Table: Langan.stb Layout: ANSIA-BP



LEGEND

SITE BOUNDARY

APPROXIMATE LOCATION OF SITE FENCE

NOTES:

1. BASE MAP IS FROM THE SURVEY DRAWING ALTA/NSPS LAND TITLE SURVEY, COMPLETED BY LANGAN, DATED JUNE 07, 2018.
2. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

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

40 0 10 25 40

SCALE IN FEET

LANGAN

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

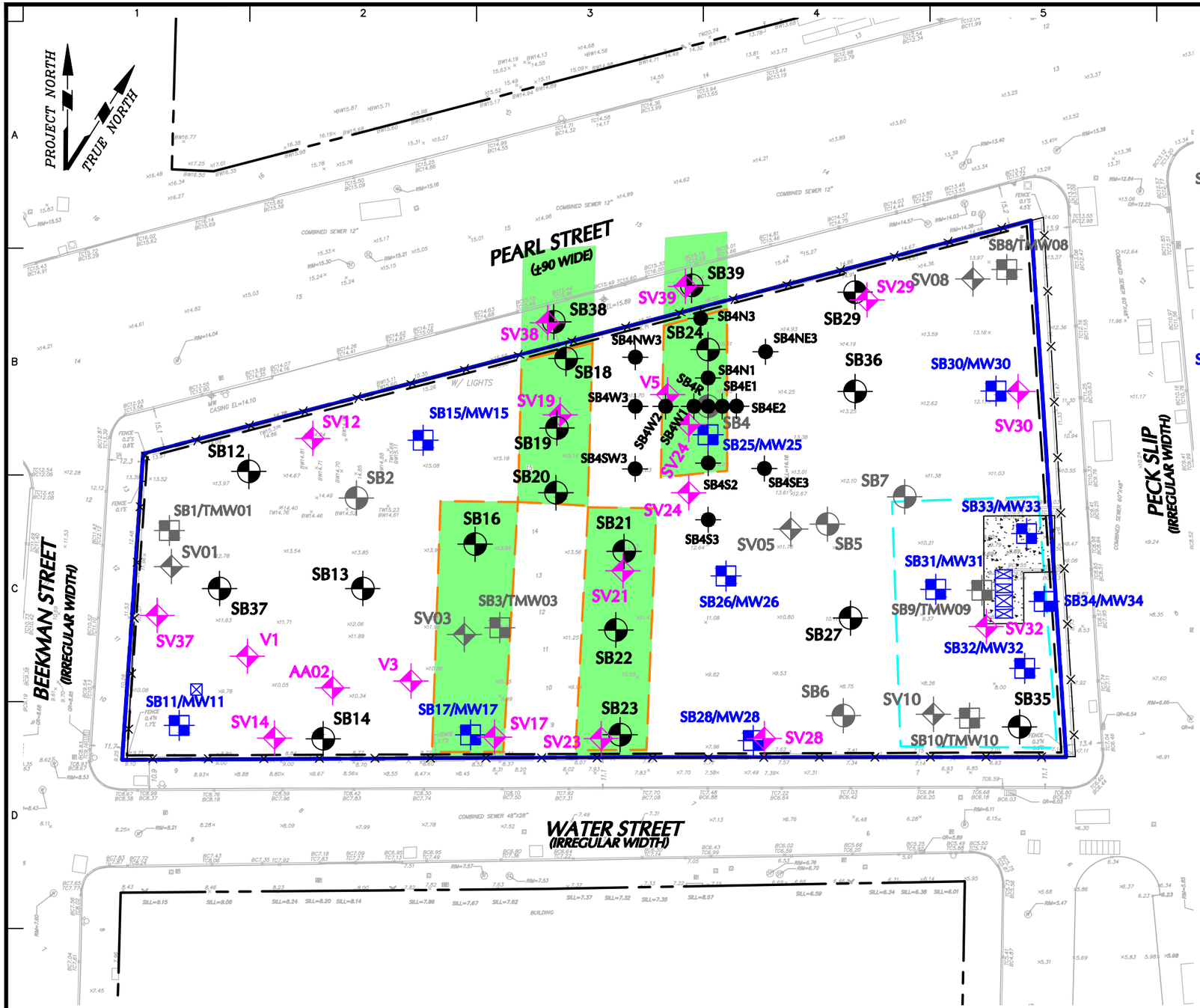
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001

T: 212.479.5400 F: 212.479.5444 www.langan.com

Project	250 WATER STREET BLOCK No. 98, LOT No. 1 CITY NEW YORK NEW YORK
Drawing Title	SITE PLAN
Project No.	170381202
Date	1/14/2021
Drawn By	JFY
Checked By	PM
Drawing No.	2

© 2019 Langan

Filename: \\langan.com\data\NY\data2\170381202\Project Data\CAD\02\SheetFiles\Environmental\BCP RAWP\Figure 2 - Site Plan.dwg Date: 2/5/2021 Time: 14:23 User: astappenbeck Style Table: Langan.stb Layout: ANSIB-BL



LEGEND

- SITE BOUNDARY (AOC 1)
- APPROXIMATE LOCATION OF SITE FENCE
- SB02 — PHASE II ESI SOIL BORING LOCATION
- SB01/TMW01 — PHASE II ESI SOIL BORING LOCATION WITH TEMPORARY MONITORING WELL
- SV01 — PHASE II ESI SOIL VAPOR LOCATION
- SB19 — SOIL BORING LOCATION
- SB4E1 — MERCURY DELINEATION SOIL BORING LOCATION
- SB11/MW11 — SOIL BORING AND MONITORING WELL LOCATION
- SV24 — SOIL VAPOR LOCATION
- APPROXIMATE UST LOCATION
- APPROXIMATE EXTENT OF HISTORICAL THERMOMETER FACTORY/WORKSHOPS

AOCS:

- AOC 1 - HISTORIC FILL MATERAL
- AOC 2 - PETROLEUM-LIKE IMPACTS AND OPEN SPILL (SPILL No. 1507371)
- AOC 3 - HISTORICAL THERMOMETER FACTORY/WORKSHOPS
- AOC 4 - HISTORICAL USE OF THE SITE AND SURROUNDING PROPERTIES

NOTES:

1. BASE MAP IS FROM THE SURVEY DRAWING ALTA/NSPS LAND TITLE SURVEY, COMPLETED BY LANGAN, DATED JUNE 07, 2018.
2. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. REMEDIAL INVESTIGATION AND PHASE II ESI BORING LOCATIONS WERE MEASURED OFF OF SURVEYED LOCATIONS USING A HANDHELD TAPE MEASURE AND ARE APPROXIMATE.
4. AOC = AREA OF CONCERN
5. UST = UNDERGROUND STORAGE TANK

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

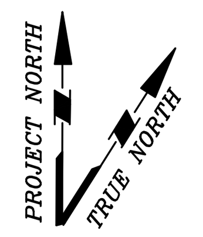
40 0 10 25 40
SCALE IN FEET

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project	250 WATER STREET BLOCK No. 98, LOT No. 1 CITY NEW YORK NEW YORK
Drawing Title	AREAS OF CONCERN AND SAMPLE LOCATION MAP
Project No.	170381202
Date	03/25/2021
Drawn By	JFY
Checked By	PM
Drawing No.	3

© 2019 Langan

Filename: \\langan.com\data\NY\data2\170381202\Project Data\CAD\02\Sheet Files\Environmental\BCP RAWP\Figure 3 - AOC and BLP.dwg Date: 3/25/2021 Time: 08:20 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL



Sample ID	SB20_0-2	SB20_10-12	SB20_20-22	SB20_30-32
Sample Date	7/30/2020	7/30/2020	7/30/2020	7/30/2020
Sample Depth (feet bgs)	0-2	10-12	20-22	30-32
VOCs (mg/kg)				
Acetone	ND	0.14	ND	0.011 J
SVOCs (mg/kg)				
Benzo(b)fluoranthene	1.1	ND	ND	ND
Indeno(1,2,3-cd)pyrene	0.51	ND	ND	ND
Pesticides (mg/kg)	NE	NE	NE	NA
Herbicides (mg/kg)	ND	ND	ND	NA
PCBs (mg/kg)	ND	NE	ND	NA
Inorganics (mg/kg)				
Chromium, Trivalent	64	11	8	6.5
Copper	60	15	6.8	6.9
Lead	130 J	3.6 J	2.3 J	2.5 J
Mercury	12	0.11	ND	ND
Nickel	180 J	17 J	15 J	13 J
Zinc	270 J-	650 J-	17 J-	15 J-
PFAS (ppb)				
Perfluorooctanesulfonic Acid	0.97	ND	ND	NA

Sample ID	SB19_0-2	SB19_6-8	SB19_18-20
Sample Date	7/29/2020	7/29/2020	7/29/2020
Sample Depth (feet bgs)	0-2	6-8	18-20
VOCs (mg/kg)			
Acetone	0.011 J	0.042	0.1
SVOCs (mg/kg)			
Benzo(a)anthracene	2.3 J-	ND	ND
Benzo(a)pyrene	2.1 J-	ND	ND
Benzo(b)fluoranthene	2.9 J-	ND	ND
Benzo(k)fluoranthene	0.98 J-	ND	ND
Chrysene	2.1 J-	0.0038 J-	ND
Dibenz(a,h)anthracene	0.39 J-	ND	ND
Indeno(1,2,3-cd)pyrene	1.4 J-	ND	ND
Pesticides (mg/kg)			
4,4'-DDT	0.0051 J-	ND	ND
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	NE	ND	ND
Inorganics (mg/kg)			
Copper	83	7.2	9.5
Lead	580	2.4	3.4
Mercury	4.1 J	0.12 J	0.047 J
Zinc	280	14	17
PFAS (ppb)			
Perfluorooctanesulfonic Acid	0.5 J	ND	ND
Perfluorooctanoic Acid	0.28 J	ND	ND

Sample ID	SB18_0-2	SB18_7-8	SB18_18-20
Sample Date	7/30/2020	7/30/2020	7/30/2020
Sample Depth (feet bgs)	0-2	7-8	18-20
VOCs (mg/kg)			
Acetone	0.015 J	0.14	0.051
SVOCs (mg/kg)	NE	NE	NE
Pesticides (mg/kg)	NE	ND	NE
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)			
Total PCBs	0.15	ND	ND
Inorganics (mg/kg)			
Copper	150	5.8	7.7
Lead	780 J	2.3 J	2.6 J
Mercury	8.8	ND	ND
Nickel	36 J	12 J	16 J
Zinc	160 J-	14 J-	19 J-
PFAS (ppb)			
Perfluorobutanesulfonic Acid	ND	ND	0.51 J
Perfluorooctanesulfonic Acid	0.4 J	ND	ND
Perfluorooctanoic Acid	0.23 J	ND	ND

Sample ID	SB38_0-2	SODUP02_080320	SB38_6-8	SB38_22-24
Sample Date	8/3/2020	8/3/2020	8/3/2020	8/3/2020
Sample Depth (feet bgs)	0-2	0-2	6-8	22-24
VOCs (mg/kg)	NE	NE	NE	NE
SVOCs (mg/kg)	NE	NE	NE	NE
Pesticides (mg/kg)	ND	ND	ND	ND
Herbicides (mg/kg)	ND	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND	ND
Inorganics (mg/kg)				
Arsenic	0.73 J	0.67 J	60 J	2.7 J
PFAS (ppb)				
Perfluorooctanesulfonic Acid	0.41 J	0.46 J	ND	ND

Sample ID	SB24_0-2	SB24_6-8	SB24_10-12
Sample Date	7/29/2020	7/29/2020	7/29/2020
Sample Depth (feet bgs)	0-2	6-8	10-12
VOCs (mg/kg)			
Acetone	0.15	0.018 J	0.099
SVOCs (mg/kg)	NE	NE	NE
Pesticides (mg/kg)			
4,4'-DDD	0.0051 JN	ND	ND
4,4'-DDE	0.015 JN	ND	ND
4,4'-DDT	0.093 J	ND	ND
Dieldrin	0.0062 JN	ND	ND
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)			
Total PCBs	1.6 J	ND	ND
Inorganics (mg/kg)			
Barium	560	5.6	40
Chromium, Hexavalent	1.5	0.57	1.1
Copper	66	37	9.3
Lead	270	29	2.1
Mercury	12 J	1.3 J	0.2 J
Nickel	24	32	46
Zinc	470	78	15
PFAS (ppb)			
Perfluorooctanesulfonic Acid	3.7	ND	ND
Perfluorooctanoic Acid	0.68	0.49 J	ND

Sample ID	SB39_0-2	SB39_8-10	SB39_18-20
Sample Date	8/3/2020	8/3/2020	8/3/2020
Sample Depth (feet bgs)	0-2	8-10	18-20
VOCs (mg/kg)			
Acetone	0.082 J	0.076 J	0.029 J
SVOCs (mg/kg)			
Benzo(a)anthracene	0.62 J	5.7 J	0.0089 J
Benzo(a)pyrene	0.67 J	4.1 J	0.0058 J
Benzo(b)fluoranthene	0.83 J	7.7 J	0.0077 J
Benzo(k)fluoranthene	0.33	1.8	0.0047 J
Chrysene	0.62 J	5.6 J	0.0084 J
Dibenz(a,h)anthracene	0.14	1.1	ND
Indeno(1,2,3-cd)pyrene	0.47	3.4	ND
Pesticides (mg/kg)	NE	ND	ND
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	NE	NE	ND
Inorganics (mg/kg)			
Chromium, Hexavalent	1.3	ND	ND
Copper	82 J	50 J	11 J
Lead	130 J	290 J	3.1 J
Mercury	5.3	42	ND
Nickel	19	49	38
Zinc	330 J	160 J	19 J
PFAS (ppb)			
Perfluorooctanesulfonic Acid	0.91	0.53 J	ND
Perfluorooctanoic Acid	0.29 J	ND	ND

Sample ID	SB25_0-2	SB25_6-8	SB25_28-30
Sample Date	7/28/2020	7/28/2020	7/28/2020
Sample Depth (feet bgs)	0-2	6-8	28-30
VOCs (mg/kg)			
Acetone	0.12	0.023 J	0.022
SVOCs (mg/kg)	NE	NE	NE
Pesticides (mg/kg)			
4,4'-DDE	0.025 J	ND	ND
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	NE	ND	ND
Inorganics (mg/kg)			
Lead	88	4.3	2.4
Mercury	5.3	1.6	ND
Nickel	33	19	24
PFAS (ppb)			
Perfluorooctanesulfonic Acid	1.2	ND	ND
Perfluorooctanoic Acid	0.51 J	0.86	ND

Sample ID	SB36_0-2	SB36_2-4	SB36_16-18	SB36_22-24
Sample Date	8/24/2020	8/17/2020	8/24/2020	8/24/2020
Sample Depth (feet bgs)	0-2	2-4	16-18	22-24
VOCs (mg/kg)				
1,2,4-Trimethylbenzene	0.0063 J	9.4	0.04 J	ND
Acetone	0.085 J	ND	ND	0.037 J
Benzene	0.0027 J	0.062 J	0.058 J	ND
Ethylbenzene	0.009	2.8	0.06 J	ND
Toluene	0.0028 J	2.9 J-	0.082 J	0.0008 J
Total Xylenes	0.0032 J	15	0.18 J	ND
SVOCs (mg/kg)				
Benzo(a)anthracene	3.3 J-	0.65 J-	0.027 J-	ND
Benzo(a)pyrene	2.9 J	0.55 J-	0.023 J	ND
Benzo(b)fluoranthene	3.4 J-	0.61 J-	0.026 J-	ND
Benzo(k)fluoranthene	1.1 J	0.3 J-	ND	ND
Chrysene	3.1 J	0.59 J-	0.037 J	ND
Dibenz(a,h)anthracene	0.42	ND	ND	ND
Indeno(1,2,3-cd)pyrene	1.6 J	0.36 J-	0.015 J	ND
Phenol	0.37 J-	1.5 J-	ND	ND
Pesticides (mg/kg)				
4,4'-DDD	ND	0.33 J	ND	ND
4,4'-DDT	ND	3.6	ND	ND
Aldrin	ND	0.24 J	ND	ND
Alpha BHC (Alpha Hexachlorocyclohexane)	ND	0.35 J	ND	ND
Alpha Chlordane	0.045 J	0.87 J	ND	ND
Dieldrin	ND	0.78 J	ND	ND
Herbicides (mg/kg)	ND	ND	ND	ND
PCBs (mg/kg)				
Total PCBs	2 J	46	ND	ND
Inorganics (mg/kg)				
Barium	610 J	700	20 J	23 J
Cadmium	1.4	7.3	ND	0.16
Chromium, Trivalent	54 J	100	7.2 J	12 J
Copper	140 J	290	8.5 J	8 J
Lead	880 J	830	5.6 J	2.7 J
Mercury	0.57	1.4	ND	ND
Nickel	24 J	74	15 J	24 J
Zinc	480 J	1,900	16 J	170 J
PFAS (ppb)				
N-ethyl perfluorooctane- sulfonamidoacetic Acid	ND	4.9	ND	ND
N-methyl perfluorooctane- sulfonamidoacetic Acid	ND	1 J	ND	ND
Perfluorodecanesulfonic Acid	ND	0.3 J	ND	ND
Perfluorohexanesulfonic Acid	ND	0.83	ND	ND
Perfluorohexanoic Acid	ND	0.28 J	ND	ND
Perfluorooctanesulfonic Acid	1.4	2.7	ND	ND
Perfluorooctanoic Acid	ND	0.32 J	ND	ND

Sample ID	SB30_0-2	SB30_16-18	SB30_30-32
Sample Date	8/20/2020	8/20/2020	8/20/2020
Sample Depth (feet bgs)	0-2	16-18	30-32
VOCs (mg/kg)			
Acetone	0.08	ND	0.06
SVOCs (mg/kg)			
Benzo(a)anthracene	1.7 J-	0.12	ND
Benzo(a)pyrene	1.9 J-	0.1	ND
Benzo(b)fluoranthene	2.2 J-	0.13	0.004 J
Benzo(k)fluoranthene	0.94 J-	0.054	ND
Chrysene	1.7 J-	0.14	0.005 J
Indeno(1,2,3-cd)pyrene	1.3 J-	0.058	ND
Pesticides (mg/kg)			
4,4'-DDD	0.0092 JN	ND	ND
4,4'-DDE	0.011 JN	ND	ND
4,4'-DDT	0.098	ND	ND
Dieldrin	0.023 JN	ND	ND
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)			
Total PCBs	1.5	ND	ND
Inorganics (mg/kg)			
Copper	120	10	8.3
Lead	210 J+	13 J+	2.2 J+
Mercury	0.49	0.052 J	ND
Zinc	480	20 J	14 J
PFAS (ppb)			
Perfluorodecanoic Acid	0.26 J	ND	ND
Perfluorohexanesulfonic Acid	0.29 J	ND	ND
Perfluorohexanoic Acid	0.26 J	ND	ND
Perfluorooctanesulfonic Acid	5.9	ND	ND
Perfluorooctanoic Acid	0.9	ND	ND
Perfluoropentanoic Acid	0.23 J	ND	ND

LEGEND

- SITE BOUNDARY
- APPROXIMATE LOCATION OF SITE FENCE
- 50-FOOT BY 50-FOOT GRID LINES
- SB02 — PHASE II ESI SOIL BORING LOCATION
- SB01/TMW01 — PHASE II ESI SOIL BORING LOCATION WITH TEMPORARY MONITORING WELL
- SB19 — SOIL BORING LOCATION
- SB4E1 — MERCURY DELINEATION SOIL BORING LOCATION
- SB11/MW11 — SOIL BORING AND MONITORING WELL LOCATION
- APPROXIMATE UST LOCATION
- APPROXIMATE EXTENT OF HISTORICAL THERMOMETER FACTORY/WORKSHOPS

Sample ID	SB15_0-2	SB15_8-10	SB15_14-16
Sample Date	8/19/2020	8/19/2020	8/19/2020
Sample Depth (feet bgs)	0-2	8-10	14-16
VOCs (mg/kg)			
Acetone	0.079 J	0.18 J	0.15 J
SVOCs (mg/kg)	NE	NE	ND
Pesticides (mg/kg)	NE	NE	ND
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND
Inorganics (mg/kg)			
Copper	36	860	11
Lead	120	1,100 B	3.7
Mercury	1.2	2.3	ND
Silver	0.55	2.1	ND
Zinc	160	910	32 J
PFAS (ppb)			
Perfluorooctanesulfonic Acid	0.68	1.4	ND

Sample ID	SB29_0-2	SB29_2-4	SB29_7-9	SB29_13-15
Sample Date	8/17/2020	8/17/2020	8/17/2020	8/17/2020
Sample Depth (feet bgs)	0-2	2-4	7-9	13-15
VOCs (mg/kg)				
Acetone	0.024	ND	0.013 J	0.076
SVOCs (mg/kg)				
Benzo(a)anthracene	0.38	8.4 J-	1.3 J-	0.4
Benzo(a)pyrene	0.41	7.1 J-	1.3 J-	0.39
Benzo(b)fluoranthene	0.47	8.5 J-	1.5 J-	0.48
Benzo(k)fluoranthene	0.19	2.9 J-	0.69 J-	0.2
Chrysene	0.35	7.3 J-	1.1 J-	0.35
Dibenz(a,h)anthracene	ND	1 J-	0.28 J-	0.065 J
Indeno(1,2,3-cd)pyrene	0.28	4 J-	0.91 J-	0.3
Phenol	ND	0.81 J-	ND	ND
Pesticides (mg/kg)				
4,4'-DDD	0.018 J+	ND	NA	ND
4,4'-DDE	0.013 J+	ND	NA	ND
4,4'-DDT	0.017 J+	0.56	NA	0.23
Alpha Chlordane	0.04 J+	0.14 J	NA	0.061 J
Dieldrin	0.038 J+	ND	NA	ND
Herbicides (mg/kg)	ND	ND	NA	ND
PCBs (mg/kg)				
Total PCBs	0.22 J	7.9	NA	1.1 J
Inorganics (mg/kg)				
Arsenic	4.6	22	7	4.7
Barium	92	440	230	98
Cadmium	0.26	3.5	2.5	1.2
Chromium, Trivalent	20	45	NA	23
Copper	38	500	190	76
Lead	81	500	390	150
Mercury	0.059 J	0.73	0.37	0.36
Nickel	22	44	40	26
Zinc	100 J	1,100	2,600 J	430 J
PFAS (ppb)				
N-methyl perfluorooctane- sulfonamidoacetic Acid	ND	0.6 J	NA	ND
Perfluorohexanoic Acid	ND	0.31 J	NA	ND
Perfluorooctanesulfonic Acid	0.59	0.7	NA	3.7
Perfluorooctanoic Acid	ND	ND	NA	1.1

Sample ID	SB04_3-4	SB04_13-14
Sample Date	10/3/2015	10/3/2015
Sample Depth (feet bgs)	3-4	13-14
VOCs (mg/kg)	ND	ND
SVOCs (mg/kg)	NE	ND
PCBs (mg/kg)	ND	ND
Inorganics (mg/kg)		
Copper	83	20
Lead	340	ND
Mercury	63	120
Nickel	27	34
Silver	4.2	0.52 J

Sample ID	SB12_1-3	SB12_6-8	SB12_14-16
Sample Date	8/20/2020	8/20/2020	8/20/2020
Sample Depth (feet bgs)	1-3	6-8	14-16
VOCs (mg/kg)	NE	ND	ND
SVOCs (mg/kg)			
Benzo(a)anthracene	5.5	0.33	ND
Benzo(a)pyrene	5.6	0.39	ND
Benzo(b)fluoranthene	6.6	0.46	ND
Benzo(k)fluoranthene	2.1	0.19	ND
Chrysene	5.1	0.32	ND
Dibenz(a,h)anthracene	0.83	0.084	ND
Indeno(1,2,3-cd)pyrene	2.9	0.27	ND
Pesticides (mg/kg)			
4,4'-DDT	0.0059 J	ND	ND
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	NE	ND	ND
Inorganics (mg/kg)			
Chromium, Hexavalent	1.5	ND	ND
Copper	84	78	11
Lead	270 J+	48 J+	6 J+
Mercury	1.6	0.64	ND
Silver	6	1.1	ND
Zinc	160	43 J	17 J
PFAS (ppb)			
Perfluorooctanesulfonic Acid	0.61 J	ND	ND
Perfluorooctanoic Acid	0.22 J	ND	ND

Sample ID	SB02_12-13
Sample Date	10/3/2015
Sample Depth (feet bgs)	12 to 13
VOCs (mg/kg)	
Total VOCs	ND
SVOCs (mg/kg)	
Total SVOCs	ND
PCBs (mg/kg)	
Total PCBs	ND
Total Metals (mg/kg)	
Total Metals	NE

Sample ID	SB8_2-3	SB8_19-20	SB8_27-28
Sample Date	10/3/2015	10/3/2015	10/3/2015
Sample Depth (feet bgs)	2-3	19-20	27-28
VOCs (mg/kg)			
Total Xylenes	0.66	ND	ND
SVOCs (mg/kg)			
Benzo(a)anthracene	6.6	ND	ND
Benzo(a)pyrene	5	ND	ND
Benzo(b)fluoranthene	7.5	ND	ND
Benzo(k)fluoranthene	2.6	ND	ND
Chrysene	6	ND	ND
Dibenz(a,h)anthracene	0.88	ND	ND
Indeno(1,2,3-cd)pyrene	3.3	ND	ND
PCBs (mg/kg)			
Total PCBs	2.44 J	ND	ND
Inorganics (mg/kg)			
Copper	53	7.6	6.4
Lead	270	4.4 J	ND
Mercury	0.47	0.04 J	0.03 J
Zinc	340	14	12

Sample ID	SB7_13-14	SB7_18-19
Sample Date	10/3/2015	10/3/2015
Sample Depth (feet bgs)	13 to 14	18 to 19
VOCs (mg/kg)		
Total VOCs	NE	NE
SVOCs (mg/kg)		
Total SVOCs	ND	ND
PCBs (mg/kg)		
Total PCBs	ND	ND
Total Metals (mg/kg)		
Arsenic, Total	NE	NE

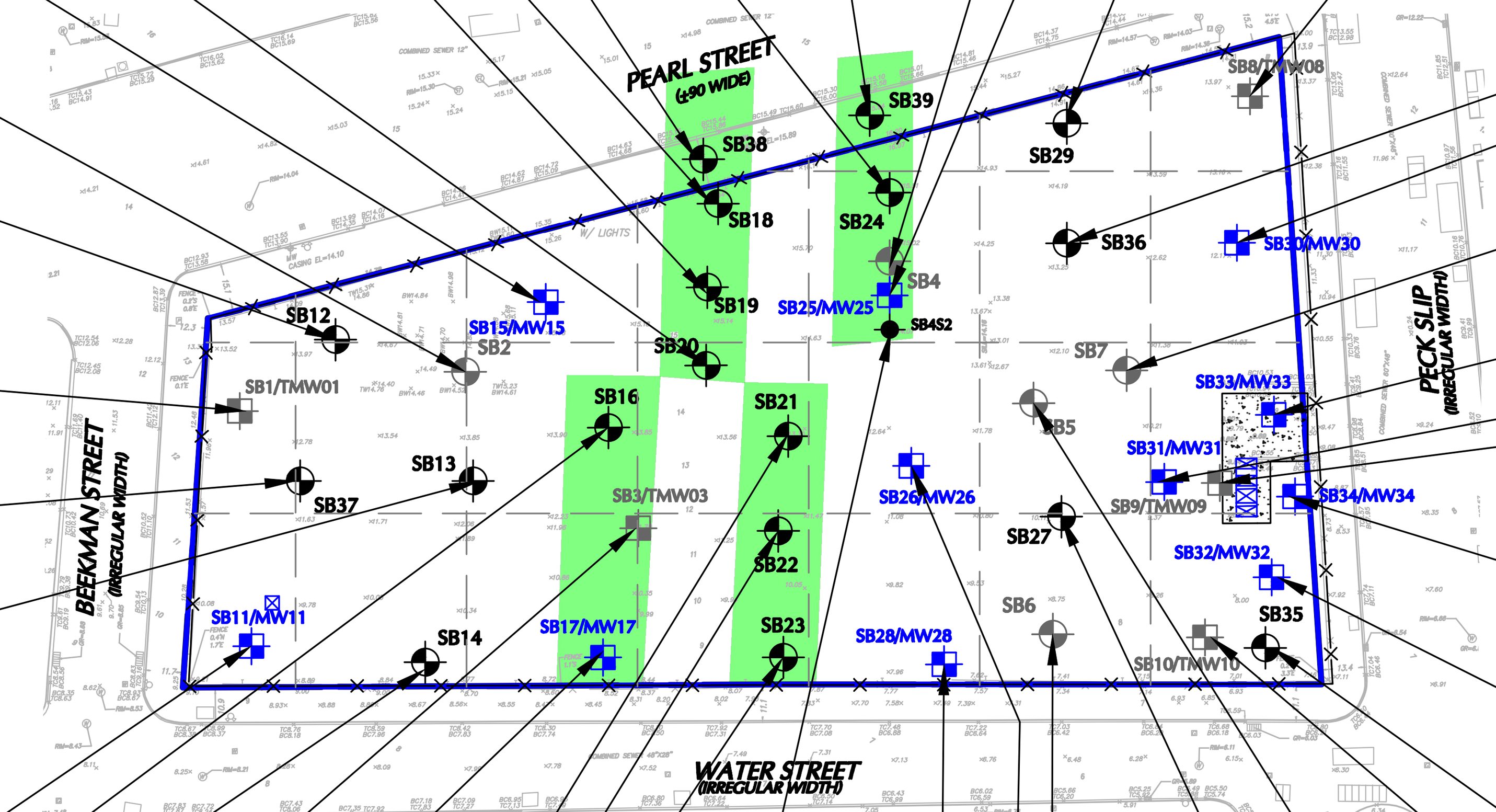
Sample ID	SB33_0-2	SB33_11-13	SB33_18-20
Sample Date	8/21/2020	8/21/2020	8/21/2020
Sample Depth (feet bgs)	0-2	11-13	18-20
VOCs (mg/kg)			
1,2,4-Trimethylbenzene	ND	6.7	ND
Acetone	0.029 J+	ND	0.068
n-Propylbenzene	ND	4	0.0005 J
Total Xylenes	ND	1.1	ND
SVOCs (mg/kg)			
Benzo(a)anthracene	1.8 J-	0.15 J-	0.26 J-
Benzo(a)pyrene	1.5 J	0.14 J	0.23 J
Benzo(b)fluoranthene	1.9 J-	0.21 J-	0.29 J-
Benzo(k)fluoranthene	0.94 J	0.072 J	0.11 J
Chrysene	1.6 J-	0.15 J-	0.25 J-
Indeno(1,2,3-cd)pyrene	1 J	0.11 J	0.15 J
Pesticides (mg/kg)			
4,4'-DDT	0.0045 J	ND	ND
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	NE	ND	ND
Inorganics (mg/kg)			
Copper	120	17	10
Lead	830	37	4.7
Mercury	1.1	0.13	ND
Zinc	330 J	43 J	25 J
PFAS (ppb)			
Perfluorohexanesulfonic Acid	ND	0.3 NJ	ND
Perfluorohexanoic Acid	ND	0.28 J	ND
Perfluorononanoic Acid	ND	0.69	ND
Perfluorooctanesulfonic Acid	0.85	ND	ND
Perfluorooctanoic Acid	0.44 J	ND	ND
Perfluoroundecanoic Acid	ND	ND	0.95

Sample ID	SB01_7-8	SB01_11-12
Sample Date	10/3/2015	10/3/2015
Sample Depth (feet bgs)	7-8	11-12
VOCs (mg/kg)	ND	ND
SVOCs (mg/kg)	NE	NE
PCBs (mg/kg)		
Total PCBs	4.57	0.0683
Inorganics (mg/kg)		
Arsenic	10	27
Barium	420	88
Copper	240	82
Lead	1,400	150
Mercury	0.76	0.24
Selenium	ND	9.8
Zinc	400	58

Sample ID	SB37_2-4	SB37_6-8	SB37_12-14
Sample Date	8/20/2020	8/20/2020	8/20/2020
Sample Depth (feet bgs)	2-4	6-8	12-14
VOCs (mg/kg)	ND	NE	NE
SVOCs (mg/kg)			
Benzo(b)fluoranthene	1.2 J-	1 J-	0.0098 J
Indeno(1,2,3-cd)pyrene	0.59 J-	0.57 J-	ND
Phenol	0.63 J-	ND	ND
Pesticides (mg/kg)			
4,4'-DDD	0.022 J	ND	ND
4,4'-DDE	0.01 JN	0.0079 JN	ND
4,4'-DDT	0.21	0.15	ND
Dieldrin	0.015 JN	0.021 JN	ND
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)			
Total PCBs	2.7	2	0.015 J
Inorganics (mg/kg)			
Arsenic	14	7	0.89 J
Barium	620 J	390 J	27 J
Copper	110	56	6
Lead	2,100 J+	2,100 J+	9.8 J+
Mercury	0.74	0.55	ND
Zinc	570	280	45 J
PFAS (ppb)			
Perfluorooctanesulfonic Acid	0.79 J	0.82 J	ND
Perfluorooctanoic Acid	1.1	0.51 J	ND

Sample ID	SB31_0-2	SB31_18-20	SB31_30-32
Sample Date	8/24/2020	8/24/2020	8/24/2020
Sample Depth (feet bgs)	0-2	18-20	30-32
VOCs (mg/kg)			
1,2,4-Trimethylbenzene	ND	62	0.6
1,3,5-Trimethylbenzene (Mesitylene)	ND	16	0.18 J
Benzene	ND	0.68	ND
Ethylbenzene	ND	14	0.11 J
n-Propylbenzene	ND	7.1	0.074 J
Toluene	ND	9.9	0.058 J
Total Xylenes	ND	98	0.66
SVOCs (mg/kg)			
Benzo(a)anthracene	2.8 J-	0.29 J-	0.032 J-
Benzo(a)pyrene	2.5 J	0.2 J	0.02 J
Benzo(b)fluoranthene	2.8 J-	0.25 J-	0.024 J-
Benzo(k)fluoranthene	1.4 J	0.088 J	0.0075 J
Chrysene	2.8 J	0.28 J	0.026 J
Dibenz(a,h)anthracene	0.36	0.03	ND
Indeno(1,2,3-cd)pyrene	1.5 J	0.11 J	0.01 J
Pesticides (mg/kg)	NE	ND	NE
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND
Inorganics (mg/kg)			
Barium	75 J	26 J	380 J
Lead	58 J	16 J	120 J
Mercury	1.7	0.22	ND
PFAS (ppb)			
Perfluorooctanesulfonic Acid	0.41 J	0.57 J	ND

Sample ID	SB9_7-8	SB9_13-14	SB9_19-20
Sample Date	10/3/2015	10/3/2015	10/3/2015
Sample Depth (feet bgs)	7-8	13-14	19-20
VOCs (mg/kg)			
1,2,4-Trimethylbenzene	30	1,200	0.03
1,3,5-Trimethylbenzene (Mesitylene)	6.1	330	0.01
Benzene	0.31	14	0 J
Ethylbenzene	7.8	250	0
Naphthalene	80	450	0.02
n-Butylbenzene	1.2	63	0
n-Propylbenzene	4.6	140	0
Toluene	6.8	230	0 J
Total Xylenes	45	1,800	0.01
SVOCs (mg/kg)			
3 & 4 Methylphenol (m&p Cresol)	6.8	0.42	ND
Dibenzofuran	20	1.4	0.1 J
Naphthalene	94	12	1.3
Phenol	6.5	0.35	ND
PCBs (mg/kg)	ND	ND	ND
Inorganics (mg/kg)			
Mercury	0.56	6	0.09



Analyte	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Restricted Use Restricted-Residential SCOs
VOCs (mg/kg)		
1,2,4-Trimethylbenzene	3.6	52
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52
Acetone	0.05	100
Benzene	0.06	4.8
Ethylbenzene	1	41
n-Butylbenzene	12	100
n-Propylbenzene	3.9	100
Toluene	0.7	100
Total Xylenes	0.26	100
SVOCs (mg/kg)		
3 & 4 Methylphenol (m&p Cresol)	0.33	100
Benzo(a)anthracene	1	1
Benzo(a)pyrene	1	1
Benzo(b)fluoranthene	1	1
Benzo(k)fluoranthene	0.8	3.9
Chrysene	1	3.9
Dibenz(a,h)anthracene	0.33	0.33
Dibenzofuran	7	59
Indeno(1,2,3-cd)pyrene	0.5	0.5
Naphthalene	12	100
Phenol	0.33	100
Pesticides (mg/kg)		
4,4'-DDD	0.0033	13
4,4'-DDE	0.0033	8.9
4,4'-DDT	0.0033	7.9
Aldrin	0.005	0.097
Alpha BHC (Alpha Hexachlorocyclohexane)	0.02	0.48
Alpha Chlordane	0.094	4.2
Dieldrin	0.005	0.2
Gamma Bhc (Lindane)	0.1	1.3
PCBs (mg/kg)		
Total PCBs	0.1	1
Inorganics (mg/kg)		
Arsenic	13	16
Barium	350	400
Cadmium	2.5	4.3
Chromium, Hexavalent	1	110
Chromium, Trivalent	30	180
Copper	50	270
Lead	63	400
Mercury	0.18	0.81
Nickel	30	310
Selenium	3.9	180
Silver	2	180
Zinc	109	10,000
PFAS (ppb)		
Perfluorooctanesulfonic Acid	0.88	44
Perfluorooctanoic Acid	0.66	33

Sample ID	SB13_0-2	SB13_4-6	SB13_12-14
Sample Date	8/18/2020	8/18/2020	8/18/2020
Sample Depth (feet bgs)	0-2	4-6	12-14
VOCs (mg/kg)			
Acetone	0.056 J	ND	0.08 J
SVOCs (mg/kg)			
Benzo(a)anthracene	6.3 J	3.1 J	ND
Benzo(a)pyrene	4.9 J	2.6 J	ND
Benzo(b)fluoranthene	5.2 J	3.1 J	ND
Benzo(k)fluoranthene	2.2 J	1.1 J	ND
Chrysene	5.5 J	2.9 J	ND
Dibenz(a,h)anthracene	0.73 J	0.49 J	ND
Indeno(1,2,3-cd)pyrene	2.7	1.6	ND
Pesticides (mg/kg)			
4,4'-DDD	0.04 J	0.0053 J	ND
4,4'-DDE	0.021 J	0.0035 J	ND
4,4'-DDT	0.023 J	ND	ND
Dieldrin	0.0022 J	0.0094 J	0.0006 J
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	NE	NE	ND
Inorganics (mg/kg)			
Barium	500 J	200 J	24 J
Lead	610 J	1,400 J	11 J
Mercury	0.61	0.65	ND
Nickel	24 J	51 J	21 J
Zinc	650	310	19 J
PFAS (ppb)			
Perfluorooctanesulfonic Acid	0.73 J	0.37 J	ND
Perfluorooctanoic Acid	0.26 J	0.36 J	ND

Sample ID	SB11_0-2	SB11_6-8	SB11_18-20	SODUP04_081920
Sample Date	8/19/2020	8/19/2020	8/19/2020	8/19/2020
Sample Depth (feet bgs)	0-2	6-8	18-20	18-20
VOCs (mg/kg)				
Acetone	0.015 J	0.038 J	0.0053 J	0.14 J
SVOCs (mg/kg)	NE	NE	NE	NE
Pesticides (mg/kg)	NE	ND	NE	ND
Herbicides (mg/kg)	ND	ND	ND	ND
PCBs (mg/kg)	ND	NE	ND	ND
Inorganics (mg/kg)				
Lead	14	180 B	3.1	3.6
Mercury	ND	0.37	ND	ND
Zinc	36 J	110	12 J	13 J
PFAS (ppb)				
Perfluoroheptanoic acid	0.45 J	ND	ND	ND
Perfluorohexanoic Acid	0.2 J	ND	ND	ND
Perfluorooctanesulfonic Acid	0.64	ND	ND	ND
Perfluorooctanoic Acid	0.46 J	ND	ND	ND

Sample ID	SB34_4-6	SB34_10-12	SB34_12-14	SB34_18-20
Sample Date	8/25/2020	8/25/2020	8/25/2020	8/25/2020
Sample Depth (feet bgs)	4-6	10-12	12-14	18-20
VOCs (mg/kg)				
Acetone	0.084	0.052 J+	0.35 J+	0.055 J+
SVOCs (mg/kg)				
Indeno(1,2,3-cd)pyrene	0.54 J-	0.012 J	ND	ND
Pesticides (mg/kg)	NE	ND	NE	NA
Herbicides (mg/kg)	ND	ND	ND	NA
PCBs (mg/kg)	NE	ND	ND	NA
Inorganics (mg/kg)				
Arsenic	14	1.6	0.68 J	7
Chromium, Hexavalent	16	0.93	ND	ND
Chromium, Trivalent	99	29	7.3	30
Mercury	2.5 J	0.1 J	ND	ND
Nickel	8.6	21	11	77
Zinc	110 J	50	13 J	68
PFAS (ppb)				
Perfluorooctanesulfonic Acid	0.73	ND	ND	NA

Location	SB4S2	SB4S2
Sample ID	SB4S2_18-19	SB4S2_22-23
Sample Date	7/29/2020	7/29/2020
Sample Depth (feet bgs)	18-19	22-23
VOCs (mg/kg)		
Acetone	0.028	0.085
SVOCs (mg/kg)	NE	NE

Sample ID	SB16_0-2	SB16_6-8	SB16_10-12
Sample Date	8/18/2020	8/18/2020	8/18/2020
Sample Depth (feet bgs)	0-2	6-8	10-12
VOCs (mg/kg)			
Acetone	0.08 J	0.067 J	0.034 J
SVOCs (mg/kg)			
Benzo(a)anthracene	3 J	1.5 J	4 J
Benzo(a)pyrene	3 J	1.4 J	3.6 J
Benzo(b)fluoranthene	3.6 J	1.7 J	3.6 J
Benzo(k)fluoranthene	1.3 J	0.57 J	1.8 J
Chrysene	3.1 J	1.5 J	3.8 J
Dibenz(a,h)anthracene	0.45 J	0.25 J	0.6 J
Indeno(1,2,3-cd)pyrene	1.9	1	2.5
Pesticides (mg/kg)			
4,4'-DDE	0.0071 J	ND	ND
4,4'-DDT	0.017 J	ND	ND
Dieldrin	ND	0.0045 J-	0.0073 J
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	NE	ND	ND
Inorganics (mg/kg)			
Copper	57 J	16 J	27 J
Lead	730 J	96 J	170 J
Mercury	1.3	0.42	1.3
Zinc	180	480	230
PFAS (ppb)			
Perfluorooctanesulfonic Acid	ND	ND	0.23 J
Perfluorooctanoic Acid	ND	ND	0.52 J
Perfluoropentanoic Acid	ND	ND	0.29 J

Sample ID	SB28_0-2	SB28_4-6	SB28_12-14
Sample Date	8/18/2020	8/18/2020	8/18/2020
Sample Depth (feet bgs)	0-2	4-6	12-14
VOCs (mg/kg)	NE	NE	NE
SVOCs (mg/kg)			
Benzo(a)anthracene	5.8 J	0.13 J	ND
Benzo(a)pyrene	4.5 J	0.099 J	ND
Benzo(b)fluoranthene	5.4 J	0.11 J	ND
Benzo(k)fluoranthene	2.3 J	0.065 J	ND
Chrysene	5.7 J	0.13 J	ND
Dibenz(a,h)anthracene	0.73 J	0.019 J	ND
Indeno(1,2,3-cd)pyrene	2.9	0.079	ND
Pesticides (mg/kg)	NE	ND	ND
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	NE	ND	ND
Inorganics (mg/kg)			
Arsenic	6.3 J	41 J	2 J
Barium	150 J	360 J	25 J
Cadmium	0.69 J	6 J	ND
Chromium, Hexavalent	ND	6.9	ND
Chromium, Trivalent	15 J+	350 J+	12 J+
Copper	90 J	480 J	11 J
Lead	390 J	20,000 J	3.6 J
Mercury	1.8	2.6	ND
Nickel	14 J	66 J	32 J
Silver	2.6	29	ND
Zinc	250	1,400 J	17 J
PFAS (ppb)			
Perfluorooctanesulfonic Acid	0.28 J	0.75 J	ND

Sample ID	SB6_2-3	SB6_6.5-7.5
Sample Date	10/3/2015	10/3/2015
Sample Depth (feet bgs)	2-3	6.5-7.5
VOCs (mg/kg)	ND	ND
SVOCs (mg/kg)		
Benzo(b)fluoranthene	1.3	0.16
Chrysene	1.1	0.11 J
Indeno(1,2,3-cd)pyrene	0.72	0.13 J
PCBs (mg/kg)	NE	ND
Inorganics (mg/kg)		
Arsenic	16	24
Barium	890	130
Copper	150	1,400
Lead	680	1,200
Mercury	1.3	1.7
Silver	2.2	4
Zinc	460	2,200

Sample ID	SB5_3-4	SB5_9-10
Sample Date	10/3/2015	10/3/2015
Sample Depth (feet bgs)	3-4	9-10
VOCs (mg/kg)	NE	NE
SVOCs (mg/kg)		
Benzo(a)anthracene	12	0.09 J
Benzo(a)pyrene	10	0.096 J
Benzo(b)fluoranthene	14	0.13
Benzo(k)fluoranthene	4.9	0.046 J
Chrysene	11	0.092 J
Dibenz(a,h)anthracene	1.8	ND
Indeno(1,2,3-cd)pyrene	7.3	0.068 J
PCBs (mg/kg)	ND	ND
Inorganics (mg/kg)		
Arsenic	42	4.8
Barium	800	38
Copper	170	98
Lead	970	130
Mercury	2	0.1
Zinc	1,000	290

Sample ID	SB32_0-2	SB32_14-16	SB32_26-28
Sample Date	8/21/2020	8/21/2020	8/21/2020
Sample Depth (feet bgs)	0-2	14-16	26-28
VOCs (mg/kg)			
1,2,4-Trimethylbenzene	ND	5.1	ND
Benzene	ND	0.2 J	ND
SVOCs (mg/kg)	NE	NE	NE
Pesticides (mg/kg)	NE	NE	NE
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	NE	ND	ND
Inorganics (mg/kg)			
Copper	71	9.1	6.6
Lead	290	42	2.3
Mercury	0.86	0.07	ND
Silver	2.9	ND	ND
Zinc	200 J	38 J	13 J
PFAS (ppb)			
Perfluorooctanesulfonic Acid	1.1	ND	ND
Perfluorooctanoic Acid	0.26 J	ND	ND

Sample ID	SB14_0-2	SB14_8-10	SB14_18-20
Sample Date	8/19/2020	8/19/2020	8/19/2020
Sample Depth (feet bgs)	0-2	8-10	18-20
VOCs (mg/kg)			
Acetone	0.25 J	0.051 J	0.16 J
SVOCs (mg/kg)			
Indeno(1,2,3-cd)pyrene	0.57	ND	ND
Pesticides (mg/kg)	NE	ND	NE
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	NE	ND	ND
Inorganics (mg/kg)			
Lead	390 B	3	3.3
Mercury	0.33	ND	ND
Zinc	310	16 J	15 J
PFAS (ppb)			
Perfluorooctanesulfonic Acid	0.29 J	ND	ND
Perfluorooctanoic Acid	0.24 J	ND	ND

Sample ID	SB26_0-2	SB26_4-6	SB26_6-8	SB26_13-15	SODUP05_08242020
Sample Date	8/17/2020	8/17/2020	8/24/2020	8/24/2020	8/24/2020
Sample Depth (feet bgs)	0-2	4-6	6-8	13-15	13-15
VOCs (mg/kg)	NE	NA	NE	NE	NE
SVOCs (mg/kg)					
Benzo(a)anthracene	1.5 J-	NA	1.9 J-	ND	ND
Benzo(a)pyrene	1.5 J-	NA	1.8 J-	ND	ND
Benzo(b)fluoranthene	2 J-	NA	2.2 J-	ND	ND
Chrysene	1.3 J-	NA	2 J	0.004 J	0.0097 J
Dibenz(a,h)anthracene	0.35 J-	NA	0.31	ND	ND
Indeno(1,2,3-cd)pyrene	1 J-	NA	1.2 J-	ND	ND
Pesticides (mg/kg)					
4,4'-DDD	0.0065 J+	NA	ND	ND	ND
4,4'-DDT	ND	NA	0.0063 J	ND	ND
Herbicides (mg/kg)	ND	NA	ND	ND	ND
PCBs (mg/kg)	NE	NA	NE	ND	ND
Inorganics (mg/kg)					
Cadmium	0.84	NA	4.1	ND	ND
Chromium, Trivalent	32	NA	39 J	9.1 J	11 J
Copper	120	NA	930 J	12 J	12 J
Lead	440	NA	1,100 J	4.1 J	3.1 J
Mercury	2.7	11	2.7	ND	ND
Nickel	25	NA	39 J	27 J	38 J
Silver	1.5	NA	34	ND	ND
Zinc	330 J	NA	710 J	29 J	20 J
PFAS (ppb)					
Perfluorooctanesulfonic Acid	0.99	NA	ND	ND	ND
Perfluorooctanoic Acid	ND	NA	0.4 J	ND	ND

Sample ID	SB27_0-2	SB27_10-12	SB27_18-20	SB27_20-22
Sample Date	8/20/2020	8/20/2020	8/20/2020	8/20/2020
Sample Depth (feet bgs)	0-2	10-12	18-20	20-22
VOCs (mg/kg)				
Acetone	0.032	0.082	0.031	0.039
SVOCs (mg/kg)				
Benzo(a)anthracene	2.5	ND	ND	ND
Benzo(a)pyrene	3.3	ND	ND	0.0042 J
Benzo(b)fluoranthene	3.8	0.0039 J	0.0051 J	ND
Benzo(k)fluoranthene	1.6	ND	ND	ND
Chrysene	2.3	ND	ND	0.0047 J
Dibenz(a,h)anthracene	0.58	ND	ND	ND
Indeno(1,2,3-cd)pyrene	2.1	ND	ND	ND
Pesticides (mg/kg)	NE	ND	NE	NA
Herbicides (mg/kg)	ND	ND	ND	NA
PCBs (mg/kg)	NE	ND	ND	NA
Inorganics (mg/kg)				
Copper	60	19	12	300
Lead	160 J+	8 J+	2.9 J+	2.7 J+
Mercury	0.76	0.057 J	ND	ND
Nickel	NE	40 J	81 J	24 J
Zinc	220	150	18 J	84
PFAS (ppb)				
Perfluorodecanoic Acid	0.3 J	ND	ND	NA
Perfluorooctanesulfonic Acid	0.8	0.27 J	ND	NA

Sample ID	SB3_13.5-14.5	SB3_19-20
Sample Date	10/3/2015	10/3/2015
Sample Depth (feet bgs)	13.5-14.5	19-20
VOCs (mg/kg)		
Acetone	1.9 J	0.0057 J
SVOCs (mg/kg)	NE	ND
PCBs (mg/kg)	ND	ND
Inorganics (mg/kg)	NE	NE

Sample ID	SB22_0-2	SB22_4-6	SB22_8-10
Sample Date	8/18/2020	8/18/2020	8/18/2020
Sample Depth (feet bgs)	0-2	4-6	8-10
VOCs (mg/kg)			
Acetone	0.033 J	0.53 J	0.071 J
SVOCs (mg/kg)			
Benzo(a)anthracene	8.8 J	11 J	3.5 J
Benzo(a)pyrene	8.3 J	8.3 J	2.8 J
Benzo(b)fluoranthene	8.2 J	9.8 J	3 J
Benzo(k)fluoranthene	4 J	4.2 J	1.2 J
Chrysene	9 J	11 J	3.1 J
Dibenz(a,h)anthracene	1.4 J	1.4 J	0.44 J
Indeno(1,2,3-cd)pyrene	5	5.1	1.8
Pesticides (mg/kg)	NE	NE	NE
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	ND	NE	NE
Inorganics (mg/kg)			
Barium	150 J	380 J	370 J
Copper	90 J	250 J	210 J
Lead	300 J	790 J	1,300 J
Mercury	13	1	0.84
Silver	1.1	2.3	0.91
Zinc	230	490	330
PFAS (ppb)			
Perfluorooctanesulfonic Acid	0.85 J	0.36 J	0.54 J
Perfluorooctanoic Acid	ND	ND	0.71
Perfluoropentanoic Acid	ND	ND	0.22 J

Sample ID	SB10_7-8	SB10_10-11	DUP01_100315
Sample Date	10/3/2015	10/3/2015	10/3/2015
Sample Depth (feet bgs)	7-8	10-11	10-11
VOCs (mg/kg)	NE	NE	NE
SVOCs (mg/kg)	ND	NE	ND
PCBs (mg/kg)	ND	ND	ND
Inorganics (mg/kg)			
Nickel	76	25	31

Sample ID	SB35_0-2	SB35_8-10	SB35_26-28
Sample Date	8/25/2020	8/25/2020	8/25/2020
Sample Depth (feet bgs)	0-2	8-10	26-28
VOCs (mg/kg)			
Acetone	0.13	0.1	0.012 J+
SVOCs (mg/kg)	NE	NE	ND
Pesticides (mg/kg)			
4,4'-DDD	ND	0.017 J	ND
4,4'-DDE	ND	0.0046 J+	ND
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	NE	NE	ND
Inorganics (mg/kg)			
Arsenic	7.4	5.8	59
Barium	300	390	640
Chromium, Trivalent	19	49	550
Copper	84	77	180
Lead	410	430	2.5 J
Mercury	0.76	0.47 J	ND
Nickel	24	37	36
Silver	2.2	2.4	1.1
Zinc	520 J	430 J	11 J
PFAS (ppb)			
Perfluorooctanesulfonic Acid	1.9	0.3 J	ND

Sample ID	SB21_0-2	SB21_6-8	SB21_9-11	SODUP03_081820
Sample Date	8/18/2020	8/18/2020	8/18/2020	8/18/2020
Sample Depth (feet bgs)	0-2	6-8	9-11	9-11
VOCs (mg/kg)	NE	ND	ND	NE
SVOCs (mg/kg)				
Benzo(a)anthracene	5.1 J	0.19 J	3.8 J	13 J
Benzo(a)pyrene	4.5 J	0.18 J	4 J	11 J
Benzo(b)fluoranthene	4.6 J	0.24 J	4.1 J	12 J
Benzo(k)fluoranthene	2.2 J	0.071 J	1.6 J	5.2 J
Chrysene	4.7 J	0.21 J	3.9 J	13 J
Dibenz(a,h)anthracene	0.7 J	0.038 J	0.88 J	1.8 J
Indeno(1,2,3-cd)pyrene	2.7	0.14 J-	3.7	6.3
Pesticides (mg/kg)				
4,4'-DDE	ND	ND	0.0036 J	0.0032 J
Dieldrin	0.0076 J	ND	ND	0.006 J
Herbicides (mg/kg)	ND	ND	ND	ND
PCBs (mg/kg)	NE	NE	NE	NE
Inorganics (mg/kg)				
Barium	310 J	110 J	440 J	410 J
Copper	110 J	260 J	68 J	92 J
Lead	75 J	39 J	980 J	380 J
Mercury	3.2	0.82	5.7	9.1
Nickel	23 J	35 J	19 J	20 J
Zinc	380	160	410	310
PFAS (ppb)				
Perfluorooctanesulfonic Acid	0.69 J	ND	ND	1.2 J
Perfluoropentanoic Acid	0.32 J	0.29 J	ND	ND

Sample ID	SB23_0-2	SB23_9-11	SB23_26-28	SODUP01_073120
Sample Date	7/31/2020	7/31/2020	7/31/2020	7/31/2020
Sample Depth (feet bgs)	0-2	9-11	26-28	26-28
VOCs (mg/kg)				
Acetone	ND	0.19 J	ND	0.025 J
SVOCs (mg/kg)				
Benzo(a)anthracene	2.3	0.048 J-	ND	ND
Benzo(a)pyrene	2	0.047 J-	ND	ND
Benzo(b)fluoranthene	2.8	0.059 J-	ND	ND
Chrysene	2.1 J	0.044 J	0.0051 J	ND
Dibenz(a,h)anthracene	0.36	ND	ND	ND
Indeno(1,2,3-cd)pyrene	1.3	0.029 J-	ND	ND
Pesticides (mg/kg)				
4,4'-DDT	ND	ND	ND	0.036 R
Gamma Bhc (Lindane)	0.11	ND	ND	ND
Herbicides (mg/kg)	ND	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND	ND
Inorganics (mg/kg)				
Copper	150	7.5	8.8	7.7
Lead	420 J-	20 J-	3 J-	2.7 J-
Mercury	1.7	0.71	ND	ND
Zinc	250 J	16 J	17 J	16 J
PFAS (ppb)				
Perfluoroheptanoic acid	0.53 J	ND	ND	ND
Perfluorohexanoic Acid	0.79	ND	ND	ND
Perfluorooctanesulfonic Acid	1.7	ND	ND	ND
Perfluorooctanoic Acid	2.8	ND	ND	ND
Perfluoropentanoic Acid	0.46 J	ND	ND	ND

Sample ID	SB17_0-2	SB17_14-16	SB17_30-32
Sample Date	7/31/2020	7/31/2020	7/31/2020
Sample Depth (feet bgs)	0-2	14-16	30-32
VOCs (mg/kg)			
Acetone	0.085 J	ND	0.045 J
SVOCs (mg/kg)	NE	NE	NE
Pesticides (mg/kg)	ND	ND	ND
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND
Inorganics (mg/kg)			
Chromium, Hexavalent	3.5	ND	ND
Lead	110 J-	6.2 J-	3.6 J-
Mercury	0.2	0.037 J	ND
PFAS (ppb)			
Perfluorooctanesulfonic Acid	0.65	ND	ND

NOTES:

1. BASE MAP IS FROM THE SURVEY DRAWING ALTA/NSPS LAND TITLE SURVEY, COMPLETED BY LANGAN, DATED JUNE 07, 2018.
2. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. 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 (UU) SOIL CLEANUP OBJECTIVES (SCOs) AND RESTRICTED USE RESTRICTED-RESIDENTIAL (RURR) SCOs.
4. ONLY COMPOUNDS DETECTED AT CONCENTRATIONS ABOVE UU SCOs ARE SHOWN.
5. CONCENTRAIONS ABOVE UU SCOs ARE BOLD.
6. CONCENTRATIONS ABOVE RURR SCOs ARE BOLD AND SHADED.
7. BGS = BELOW GRADE SURFACE
8. VOC = VOLATILE ORGANIC COMPOUND
9. SVOC = SEMIVOLATILE ORGANIC COMPOUND
10. PCB = POLYCHLORINATED BIPHENYL
11. mg/kg = MILLIGRAM PER KILOGRAM
12. ppb = PART PER BILLION
13. ND = NOT DETECTED
14. NE = NO EXCEEDANCE
15. NA = NOT ANALYZED
16. J = THE ANALYTE WAS DETECTED ABOVE THE METHOD DETECTION LIMIT BUT BELOW THE REPORTING LIMIT; THEREFORE, THE RESULT IS AN ESTIMATE
17. J+ = THE REPORTED VALUE MAY BE BIASED HIGH. THE ACTUAL VALUE IS EXPECTED TO BE LESS THAN THE REPORTED VALUE
18. J- = THE REPORTED VALUE MAY BE BIASED LOW. THE ACTUAL VALUE IS EXPECTED TO BE GREATER THAN THE REPORTED VALUE
19. JN = THE ANALYSIS INDICATES THE PRESENCE OF AN ANALYTE THAT HAS BEEN "TENTATIVELY IDENTIFIED" AND THE ASSOCIATED NUMERICAL VALUES REPRESENTS ITS APPROXIMATE CONCENTRATION
20. B = THE ANALYTE WAS FOUND IN THE ASSOCIATED ANALYSIS BATCH BLANK
21. R = THE SAMPLE RESULT IS UNUSABLE DUE TO THE QUALITY OF THE DATA GENERATED BECAUSE CERTAIN CRITERIA WAS NOT MET. THE ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE.

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

50 0 25 50
SCALE: 1 INCH = 50 FEET

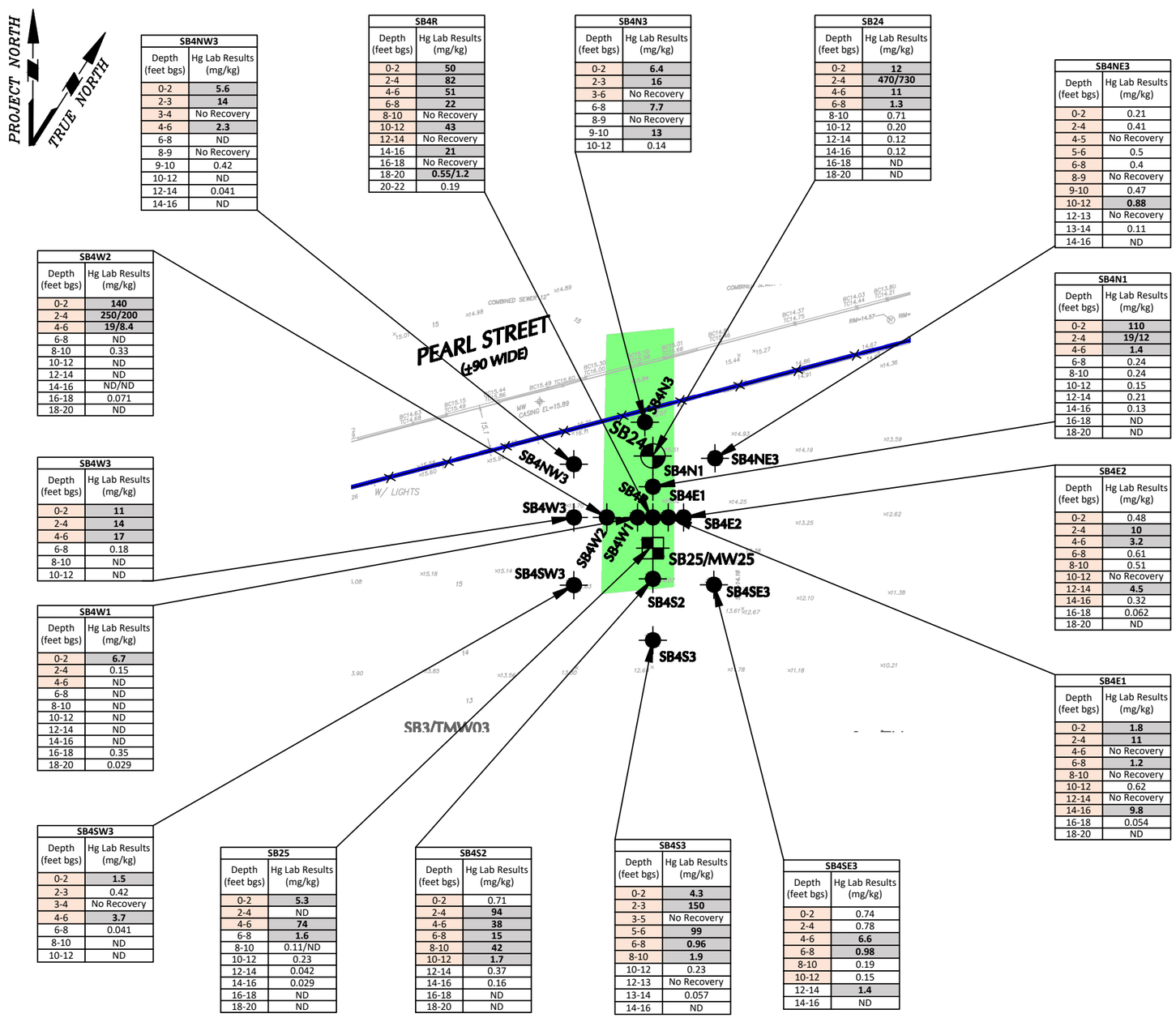
LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
300 Kimball Drive
Parsippany, NJ 07054
T: 973.560.4900 F: 973.560.4901 www.langan.com
NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project
250 WATER STREET
BLOCK No. 98, LOT No. 1
NEW YORK CITY NEW YORK

Drawing Title
SOIL SAMPLE ANALYTICAL RESULTS MAP

Project No. 170381202
Date 1/21/2021
Drawn By JFY
Checked By PM
Drawing No. 4A

LANGAN
© 2020 Langan



SB4NW3	
Depth (feet bgs)	Hg Lab Results (mg/kg)
0-2	**5.6**
2-3	**14**
3-4	No Recovery
4-6	**2.3**
6-8	ND
8-9	No Recovery
9-10	0.42
10-12	ND
12-14	0.041
14-16	ND

SB4R	
Depth (feet bgs)	Hg Lab Results (mg/kg)
0-2	**50**
2-4	**82**
4-6	**51**
6-8	**22**
8-10	No Recovery
10-12	**43**
12-14	No Recovery
14-16	**21**
16-18	No Recovery
18-20	**0.55/1.2**
20-22	0.19

SB4N3	
Depth (feet bgs)	Hg Lab Results (mg/kg)
0-2	**6.4**
2-3	**16**
3-6	No Recovery
6-8	**7.7**
8-9	No Recovery
9-10	**13**
10-12	0.14

SB24	
Depth (feet bgs)	Hg Lab Results (mg/kg)
0-2	**12**
2-4	**470/730**
4-6	**11**
6-8	**1.3**
8-10	0.71
10-12	0.20
12-14	0.12
14-16	0.12
16-18	ND
18-20	ND

SB4NE3	
Depth (feet bgs)	Hg Lab Results (mg/kg)
0-2	0.21
2-4	0.41
4-5	No Recovery
5-6	0.5
6-8	0.4
8-9	No Recovery
9-10	0.47
10-12	**0.88**
12-13	No Recovery
13-14	0.11
14-16	ND

SB4W2	
Depth (feet bgs)	Hg Lab Results (mg/kg)
0-2	**140**
2-4	**250/200**
4-6	**19/8.4**
6-8	ND
8-10	0.33
10-12	ND
12-14	ND
14-16	ND/ND
16-18	0.071
18-20	ND

SB4N1	
Depth (feet bgs)	Hg Lab Results (mg/kg)
0-2	**110**
2-4	**19/12**
4-6	**1.4**
6-8	0.24
8-10	0.24
10-12	0.15
12-14	0.21
14-16	0.13
16-18	ND
18-20	ND

SB4W3	
Depth (feet bgs)	Hg Lab Results (mg/kg)
0-2	**11**
2-4	**14**
4-6	**17**
6-8	0.18
8-10	ND
10-12	ND

SB4E2	
Depth (feet bgs)	Hg Lab Results (mg/kg)
0-2	0.48
2-4	**10**
4-6	**3.2**
6-8	0.61
8-10	0.51
10-12	No Recovery
12-14	**4.5**
14-16	0.32
16-18	0.062
18-20	ND

SB4W1	
Depth (feet bgs)	Hg Lab Results (mg/kg)
0-2	**6.7**
2-4	0.15
4-6	ND
6-8	ND
8-10	ND
10-12	ND
12-14	ND
14-16	ND
16-18	0.35
18-20	0.029

SB4E1	
Depth (feet bgs)	Hg Lab Results (mg/kg)
0-2	**1.8**
2-4	**11**
4-6	No Recovery
6-8	**1.2**
8-10	No Recovery
10-12	0.62
12-14	No Recovery
14-16	**9.8**
16-18	0.054
18-20	ND

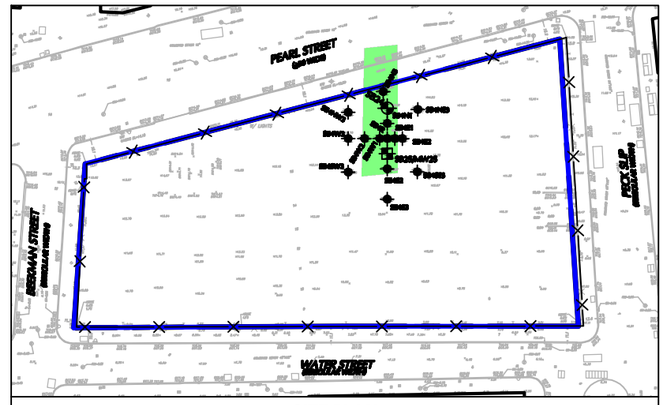
SB4SW3	
Depth (feet bgs)	Hg Lab Results (mg/kg)
0-2	**1.5**
2-3	0.42
3-4	No Recovery
4-6	**3.7**
6-8	0.041
8-10	ND
10-12	ND

SB25	
Depth (feet bgs)	Hg Lab Results (mg/kg)
0-2	**5.3**
2-4	ND
4-6	**74**
6-8	**1.6**
8-10	0.11/ND
10-12	0.23
12-14	0.042
14-16	0.029
16-18	ND
18-20	ND

SB4S2	
Depth (feet bgs)	Hg Lab Results (mg/kg)
0-2	0.71
2-4	**94**
4-6	**38**
6-8	**15**
8-10	**42**
10-12	**1.7**
12-14	0.37
14-16	0.16
16-18	ND
18-20	ND

SB4S3	
Depth (feet bgs)	Hg Lab Results (mg/kg)
0-2	**4.3**
2-3	**150**
3-5	No Recovery
5-6	**99**
6-8	**0.96**
8-10	**1.9**
10-12	0.23
12-13	No Recovery
13-14	0.057
14-16	ND

SB4SE3	
Depth (feet bgs)	Hg Lab Results (mg/kg)
0-2	0.74
2-4	0.78
4-6	**6.6**
6-8	**0.98**
8-10	0.19
10-12	0.15
12-14	**1.4**
14-16	ND



SITE PLAN
(1"=100')

LEGEND

- SITE BOUNDARY (AOC 1)
- APPROXIMATE LOCATION OF SITE FENCE
- SB19 — SOIL BORING LOCATION
- SB4E1 — MERCURY DELINEATION SOIL BORING LOCATION
- SB25/MW25 — SOIL BORING AND MONITORING WELL LOCATION
- APPROXIMATE EXTENT OF HISTORICAL THERMOMETER FACTORY

NOTES:

1. BASE MAP IS FROM THE SURVEY DRAWING ALTA/NSPS LAND TITLE SURVEY, COMPLETED BY LANGAN, DATED JUNE 07, 2018.
2. 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 RESTRICTED USE RESTRICTED-RESIDENTIAL (RURR) SOIL CLEANUP OBJECTIVES (SCOs).
3. CONCENTRATIONS ABOVE RURR SCOs ARE BOLD AND SHADED.
4. Hg = MERCURY
5. bgs = BELOW GRADE SURFACE
6. mg/kg = MILLIGRAM PER KILOGRAM
7. ND = NOT DETECTED
8. TAN SHADED DEPTH INTERVALS WERE IDENTIFIED AS HISTORIC FILL

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

40 0 10 25 40
SCALE IN FEET

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project
250 WATER STREET
BLOCK No. 98, LOT No. 1
CITY
NEW YORK NEW YORK

Drawing Title
MERCURY DELINEATION SOIL SAMPLE ANALYTICAL RESULTS MAP

Project No. 170381202
Date 1/14/2021
Drawn By JFY
Checked By PM

Drawing No. **4B**

© 2019 Langan

Filename: \\langan.com\data\NY\data2\170381202\Project Data\CAD\02\SheetFiles\Environmental\BCP RAWP\Figure 4B - Mercury Delineation.dwg Date: 2/5/2021 Time: 15:25 User: astappenbeck Style Table: Langan.stb Layout: ANSIB-BL

Sample ID	MW15_090120
Sample Date	9/1/2020
VOCs (µg/L)	NE
SVOCs (µg/L)	NE
Pesticides (µg/L)	NE
Herbicides (µg/L)	ND
PCBs (µg/L)	ND
Inorganics (µg/L)	
Antimony	5.79 J
Antimony (Dissolved)	7.03 J
Magnesium	84,600
Magnesium (Dissolved)	86,700
Sodium	212,000
Sodium (Dissolved)	213,000
PFAS (ng/L)	
Perfluorobutanesulfonic Acid	55.7
Perfluorobutanoic acid	12.5
Perfluorodecanoic Acid	1.91
Perfluoroheptanoic acid	18.4
Perfluorohexanesulfonic Acid	3.15
Perfluorohexanoic Acid	17.4
Perfluorononanoic Acid	2.28
Perfluorooctanesulfonic Acid	24.3
Perfluorooctanoic Acid	45.8
Perfluoropentanoic Acid	21.9
Total PFOA and PFOS	70.1

Sample ID	MW25_090120
Sample Date	9/1/2020
VOCs (µg/L)	NE
SVOCs (µg/L)	NE
Pesticides (µg/L)	ND
Herbicides (µg/L)	ND
PCBs (µg/L)	ND
Inorganics (µg/L)	
Antimony (Dissolved)	3.48 J
Sodium	96,900
Sodium (Dissolved)	97,500
PFAS (ng/L)	
Perfluorobutanesulfonic Acid	5.67
Perfluorobutanoic acid	8.27
Perfluorodecanoic Acid	4.49
Perfluoroheptanesulfonic Acid	1.3 J
Perfluoroheptanoic acid	17.1
Perfluorohexanesulfonic Acid	11.7
Perfluorohexanoic Acid	14.4
Perfluorononanoic Acid	4.96
Perfluorooctanesulfonic Acid	52.8
Perfluorooctanoic Acid	103
Perfluoropentanoic Acid	14.3
Total PFOA and PFOS	156

Sample ID	MW30_090220	GWDUP01_090220
Sample Date	9/2/2020	9/2/2020
VOCs (µg/L)		
1,2,4,5-Tetramethylbenzene	17	18
Benzene	10	9.4
Ethylbenzene	7.3	7.9
Isopropylbenzene (Cumene)	63	68
M,P-Xylene	16	17
n-Butylbenzene	6.4	7.2
n-Propylbenzene	65	72
Sec-Butylbenzene	10	11
Toluene	5.5	5.4
Total Xylenes	20	21
SVOCs (µg/L)		
Benzo(a)anthracene	0.16 JN	ND
Benzo(a)pyrene	0.17 J+	0.07 J
Benzo(b)fluoranthene	0.19 JN	0.09 J
Benzo(k)fluoranthene	0.08 J+	ND
Chrysene	0.14 J+	ND
Indeno(1,2,3-cd)pyrene	0.15 JN	0.06 JN
Pesticides (µg/L)	ND	ND
Herbicides (µg/L)	ND	ND
PCBs (µg/L)		
Total PCBs	0.977 J-	0.082 J-
Inorganics (µg/L)		
Iron	1,310 J	878 J
Sodium	144,000 J	144,000 J
Sodium (Dissolved)	146,000 J	139,000 J
PFAS (ng/L)		
N-ethyl perfluorooctane- sulfonamidoacetic Acid	5.4	5.43
N-methyl perfluorooctane- sulfonamidoacetic Acid	1.59 J	1.23 J
Perfluorobutanesulfonic Acid	7.98 J	8.9 J
Perfluorobutanoic acid	17.7 J	20.3 J
Perfluorodecanoic Acid	3.75	3.88
Perfluoroheptanesulfonic Acid	1.41 J	1.33 J
Perfluoroheptanoic acid	24.4	25.2
Perfluorohexanesulfonic Acid	24	25.3
Perfluorohexanoic Acid	24.5	26
Perfluorononanoic Acid	4.7 J+	5.08 J+
Perfluorooctanesulfonamide	45.2 J-	60.2 J-
Perfluorooctanesulfonic Acid	121	126
Perfluorooctanoic Acid	94.5 J	93.6 J
Perfluoropentanoic Acid	21.2	21.3
Sodium 1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	ND	1.2 J+
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	ND	2.6 J+
Total PFOA and PFOS	216	220

Sample ID	TMW08_100315
Sample Date	10/3/2015
VOCs (µg/L)	
1,2,4,5-Tetramethylbenzene	6.8
n-Butylbenzene	11
sec-Butylbenzene	13
SVOCs (µg/L)	
Total SVOCs	NE
PCBs, Total	ND
Dissolved Metals (µg/L)	
Sodium, Dissolved	87,800
Total Metals (µg/L)	
Iron, Total	815
Sodium, Total	83,600

Sample ID	MW33_090220
Sample Date	9/2/2020
VOCs (µg/L)	
1,2,4,5-Tetramethylbenzene	39
Benzene	1.4
Isopropylbenzene (Cumene)	45
n-Butylbenzene	6.7
n-Propylbenzene	92
Sec-Butylbenzene	6.9
SVOCs (µg/L)	
Benzo(a)anthracene	0.04 JN
Benzo(b)fluoranthene	0.02 JN
Chrysene	0.04 J
Pesticides (µg/L)	ND
Herbicides (µg/L)	ND
PCBs (µg/L)	NE
Inorganics (µg/L)	
Antimony (Dissolved)	3.01 J
Iron	1,320 J
Iron (Dissolved)	1,270 J
Sodium	411,000 J
Sodium (Dissolved)	393,000 J
PFAS (ng/L)	
Perfluorobutanesulfonic Acid	9.96
Perfluorobutanoic acid	16.9
Perfluorodecanoic Acid	0.944 J
Perfluoroheptanesulfonic Acid	0.763 J
Perfluoroheptanoic acid	5.92
Perfluorohexanesulfonic Acid	3.71
Perfluorohexanoic Acid	9.16
Perfluorononanoic Acid	10.3 J+
Perfluorooctanesulfonic Acid	36.9
Perfluorooctanoic Acid	61.6
Perfluoropentanoic Acid	10.7
Perfluoroundecanoic Acid	4.92 J+
Total PFOA and PFOS	98.5

Sample ID	MW31_090220
Sample Date	9/2/2020
VOCs (µg/L)	
1,2,4,5-Tetramethylbenzene	35
1,2,4-Trimethylbenzene	550
1,3,5-Trimethylbenzene (Mesitylene)	140
Benzene	53
Ethylbenzene	390
Isopropylbenzene (Cumene)	34
M,P-Xylene	1,300
n-Butylbenzene	6.6 J
n-Propylbenzene	74
o-Xylene (1,2-Dimethylbenzene)	390
Sec-Butylbenzene	5.8 J
Toluene	290
Total Xylenes	1,700
SVOCs (µg/L)	
2,4-Dimethylphenol	4.9 J-
Biphenyl (Diphenyl)	7.9
Naphthalene	210
Phenol	2.5 J-
Pesticides (µg/L)	ND
Herbicides (µg/L)	ND
PCBs (µg/L)	ND
Inorganics (µg/L)	
Iron	308 J
Magnesium	52,800 J
Magnesium (Dissolved)	52,100 J
Manganese	539.5
Manganese (Dissolved)	542.3
Sodium	336,000 J
Sodium (Dissolved)	331,000 J
PFAS (ng/L)	
N-ethyl perfluorooctane- sulfonamidoacetic Acid	2.08
N-methyl perfluorooctane- sulfonamidoacetic Acid	1.22 J
Perfluorobutanesulfonic Acid	12.3 J
Perfluorobutanoic acid	24 J
Perfluorodecanoic Acid	1.44 J
Perfluoroheptanesulfonic Acid	0.787 J
Perfluoroheptanoic acid	18.3
Perfluorohexanesulfonic Acid	25.9
Perfluorohexanoic Acid	19.5
Perfluorononanoic Acid	5.2 J+
Perfluorooctanesulfonamide	1.46 J
Perfluorooctanesulfonic Acid	37.4 J
Perfluorooctanoic Acid	78.4 J
Perfluoropentanoic Acid	20.4
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	2.09 J+
Total PFOA and PFOS	116

Sample ID	TMW01_100315
Sample Date	10/3/2015
VOCs (µg/L)	
Total VOCs	ND
SVOCs (µg/L)	
Total SVOCs	NE
PCBs (µg/L)	
PCBs, Total	ND
Dissolved Metals (µg/L)	
Magnesium, Dissolved	103,000
Sodium, Dissolved	881,000
Total Metals (µg/L)	
Iron, Total	359
Magnesium, Total	101,000
Sodium, Total	882,000

Sample ID	TMW03_100315
Sample Date	10/3/2015
VOCs (µg/L)	
1,2,4,5-Tetramethylbenzene	10
SVOCs (µg/L)	
Total SVOCs	NE
PCBs (µg/L)	
PCBs, Total	ND
Dissolved Metals (µg/L)	
Barium, Dissolved	1,014
Iron, Dissolved	1,080
Magnesium, Dissolved	128,000
Manganese, Dissolved	2,762
Sodium, Dissolved	930,000
Total Metals (µg/L)	
Iron, Total	2,500
Lead, Total	25.8
Magnesium, Total	128,000
Manganese, Total	2,850
Sodium, Total	966,000

Sample ID	MW11_090120
Sample Date	9/1/2020
VOCs (µg/L)	NE
SVOCs (µg/L)	
Benzo(b)fluoranthene	0.01 JN
Pesticides (µg/L)	ND
Herbicides (µg/L)	ND
PCBs (µg/L)	ND
Inorganics (µg/L)	
Iron	452
Manganese	306.7
Manganese (Dissolved)	307.9
Sodium	35,900
Sodium (Dissolved)	35,200
PFAS (ng/L)	
Perfluorobutanesulfonic Acid	10.7
Perfluorobutanoic acid	6.2
Perfluorodecanoic Acid	2.51
Perfluoroheptanoic acid	3.15
Perfluorohexanesulfonic Acid	1.1 J
Perfluorohexanoic Acid	4.35
Perfluorononanoic Acid	2.14
Perfluorooctanesulfonic Acid	23.1
Perfluoropentanoic Acid	7
Total PFOA and PFOS	29.3

Sample ID	MW17_090120
Sample Date	9/1/2020
VOCs (µg/L)	NE
SVOCs (µg/L)	
Benzo(a)anthracene	0.03 JN
Chrysene	0.02 JN
Pesticides (µg/L)	ND
Herbicides (µg/L)	ND
PCBs (µg/L)	ND
Inorganics (µg/L)	
Iron	1,340
Iron (Dissolved)	1,240
Manganese	629.6
Manganese (Dissolved)	645.3
Sodium	150,000
Sodium (Dissolved)	145,000
PFAS (ng/L)	
Perfluorobutanesulfonic Acid	10.1
Perfluorobutanoic acid	9.93
Perfluorodecanoic Acid	2.47
Perfluoroheptanoic acid	5.46
Perfluorohexanesulfonic Acid	0.954 J
Perfluorohexanoic Acid	13.5
Perfluorononanoic Acid	2.65
Perfluorooctanesulfonic Acid	22.8
Perfluoropentanoic Acid	27.2
Total PFOA and PFOS	32.1

Sample ID	MW26_090220
Sample Date	9/2/2020
VOCs (µg/L)	NE
SVOCs (µg/L)	NE
Pesticides (µg/L)	ND
Herbicides (µg/L)	ND
PCBs (µg/L)	
Total PCBs	0.139 J-
Inorganics (µg/L)	
Antimony	4.09 J
Antimony (Dissolved)	3.62 J
Iron	1,470 J
Iron (Dissolved)	1,340 J
Magnesium	37,300 J
Magnesium (Dissolved)	35,700 J
Sodium	211,000 J
Sodium (Dissolved)	201,000 J
PFAS (ng/L)	
Perfluorobutanesulfonic Acid	9.23 J
Perfluorobutanoic acid	10.8 J
Perfluorodecanoic Acid	2.02
Perfluoroheptanoic acid	6.83 J
Perfluorohexanesulfonic Acid	10.6
Perfluorohexanoic Acid	5.49
Perfluorononanoic Acid	1.96 J+
Perfluorooctanesulfonic Acid	27.7
Perfluorooctanoic Acid	46
Perfluoropentanoic Acid	7.21
Total PFOA and PFOS	73.7

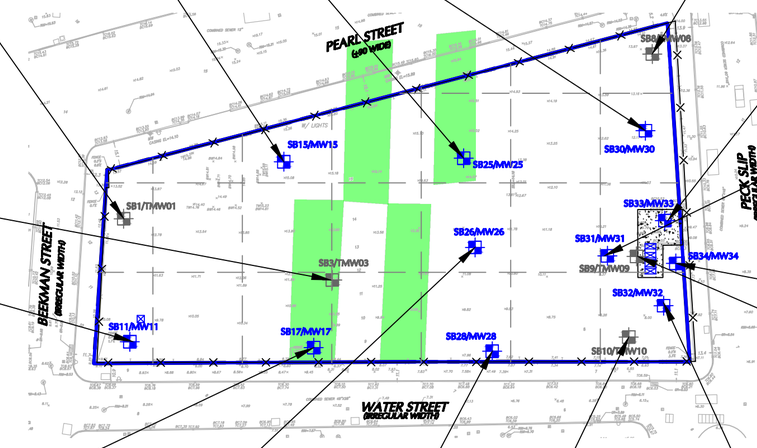
Sample ID	MW28_090120
Sample Date	9/1/2020
VOCs (µg/L)	NE
SVOCs (µg/L)	
Benzo(a)anthracene	0.04 J
Benzo(a)pyrene	0.03 J
Benzo(b)fluoranthene	0.04 J
Benzo(k)fluoranthene	0.02 J
Chrysene	0.03 J
Indeno(1,2,3-cd)pyrene	0.03 JN
Pesticides (µg/L)	ND
Herbicides (µg/L)	ND
PCBs (µg/L)	ND
Inorganics (µg/L)	
Antimony	40.08
Antimony (Dissolved)	28.62
Arsenic	116
Arsenic (Dissolved)	118.4
Iron	8,100
Iron (Dissolved)	8,010
Lead	66.74
Manganese	861.6
Manganese (Dissolved)	851
Sodium	301,000
Sodium (Dissolved)	299,000
PFAS (ng/L)	
Perfluorobutanesulfonic Acid	8.29
Perfluorobutanoic acid	11.3
Perfluoroheptanoic acid	13.4
Perfluorohexanesulfonic Acid	1.19 J
Perfluorohexanoic Acid	32.2
Perfluorononanoic Acid	3.71
Perfluorooctanesulfonic Acid	17.5
Perfluorooctanoic Acid	18
Perfluoropentanoic Acid	38.1
Total PFOA and PFOS	35.5

Sample ID	TMW10_100315	DUP02_100315
Sample Date	10/3/2015	10/3/2015
VOCs (µg/L)		
1,2,4,5-Tetramethylbenzene	10	10
n-Propylbenzene	7.8	7.9
SVOCs (µg/L)		
Total SVOCs	NE	NE
PCBs (µg/L)		
PCBs, Total	ND	ND
Dissolved Metals (µg/L)		
Iron, Dissolved	349	336
Magnesium, Dissolved	50,700	54,800
Manganese, Dissolved	292.4	315.8
Sodium, Dissolved	494,000	536,000
Total Metals (µg/L)		
Iron, Total	668	906
Magnesium, Total	40,700	44,000
Sodium, Total	460,000	460,000

Sample ID	MW32_090220
Sample Date	9/2/2020
VOCs (µg/L)	
1,2,4,5-Tetramethylbenzene	18
1,2,4-Trimethylbenzene	22
Benzene	8.6
Ethylbenzene	5.7
Isopropylbenzene (Cumene)	28
n-Propylbenzene	23
SVOCs (µg/L)	NE
Pesticides (µg/L)	ND
Herbicides (µg/L)	ND
PCBs (µg/L)	NE
Inorganics (µg/L)	
Iron	2,100 J
Iron (Dissolved)	1,810 J
Magnesium	42,000 J
Magnesium (Dissolved)	39,600 J
Manganese	654.6
Manganese (Dissolved)	644
Sodium	511,000 J
Sodium (Dissolved)	505,000 J
PFAS (ng/L)	
N-ethyl perfluorooctane- sulfonamidoacetic Acid	1.52 J
Perfluorobutanesulfonic Acid	7.53
Perfluorobutanoic acid	16
Perfluorodecanoic Acid	1.66 J
Perfluorododecanoic Acid	0.452 J
Perfluoroheptanoic acid	8.57
Perfluorohexanesulfonic Acid	6.5
Perfluorohexanoic Acid	11.3
Perfluorononanoic Acid	68.4 J+
Perfluorooctanesulfonamide	5.66 J-
Perfluorooctanesulfonic Acid	33.3
Perfluorooctanoic Acid	46.3
Perfluoropentanoic Acid	14.4
Perfluoroundecanoic Acid	5.34 J+
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	1.69 J+
Total PFOA and PFOS	79.6

Sample ID	MW34_090220
Sample Date	9/2/2020
VOCs (µg/L)	
1,2,4,5-Tetramethylbenzene	11
Isopropylbenzene (Cumene)	53
n-Propylbenzene	53
Sec-Butylbenzene	9.9
SVOCs (µg/L)	NE
Pesticides (µg/L)	ND
Herbicides (µg/L)	ND
PCBs (µg/L)	
Total PCBs	0.098 J-
Inorganics (µg/L)	
Iron	1,490 J
Iron (Dissolved)	1,020
Sodium	235,000 J
Sodium (Dissolved)	232,000
PFAS (ng/L)	
N-ethyl perfluorooctane- sulfonamidoacetic Acid	3.62
Perfluorobutanesulfonic Acid	4.97
Perfluorobutanoic acid	9.76
Perfluorodecanoic Acid	1.67 J
Perfluoroheptanoic acid	4.48
Perfluorohexanesulfonic Acid	2.69
Perfluorohexanoic Acid	8.04
Perfluorononanoic Acid	2.01 J+
Perfluorooctanesulfonamide	1.25 J-
Perfluorooctanesulfonic Acid	23.4
Perfluorooctanoic Acid	21.5
Perfluoropentanoic Acid	10.3
Sodium 1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	8.74 J+
Total PFOA and PFOS	44.9

Sample ID	TMW09_100315
Sample Date	10/3/2015
VOCs (µg/L)	
1,2,4,5-Tetramethylbenzene	550
1,2,4-Trimethylbenzene	6,100
1,3,5-Trimethylbenzene	1,800
Benzene	330
Ethylbenzene	1,800
Isopropylbenzene	240 J
n-Butylbenzene	240 J
n-Propylbenzene	760
o-Xylene	3,400
p-Isopropyltoluene	83 J
p/m-Xylene	8,400
sec-Butylbenzene	86 J
Toluene	2,700
SVOCs (µg/L)	
Biphenyl	28
Phenol	44
Acenaphthene	53
Benzo(a)anthracene	4.6 J
Benzo(a)pyrene	2.2 J
Benzo(b)fluoranthene	2.8 J
Chrysene	3.7 J
Naphthalene	540
Phenanthrene	77
PCBs (µg/L)	
PCBs, Total	ND
Dissolved Metals (µg/L)	
Antimony, Dissolved	6.1
Iron, Dissolved	697
Magnesium, Dissolved	90,800
Manganese, Dissolved	478.7
Sodium, Dissolved	1,660,000
Total Metals (µg/L)	
Antimony, Total	5.1
Barium, Total	1,136
Chromium, Total	98.1
Copper, Total	227
Iron, Total	41,500
Lead, Total	725.5
Magnesium, Total	111,000
Manganese, Total	1,820
Nickel, Total	112.2
Sodium, Total	1,480,000



LEGEND

- SITE BOUNDARY
- APPROXIMATE LOCATION OF SITE FENCE
- 50-FOOT BY 50-FOOT GRID LINES
- SB01/TMW01 — PHASE II ESI SOIL BORING LOCATION WITH TEMPORARY MONITORING WELL
- SB11/MW11 — SOIL BORING AND MONITORING WELL LOCATION
- APPROXIMATE UST LOCATION
- APPROXIMATE EXTENT OF HISTORICAL THERMOMETER FACTORY/WORKSHOPS

Analyte	NYSDEC SGVs	NYSDEC January 2020 Guidance Values
VOCs (µg/L)		
1,2,4,5-Tetramethylbenzene	5	~
1,2,4-Trimethylbenzene	5	~
1,3,5-Trimethylbenzene (Mesitylene)	5	~
Benzene	1	~
Ethylbenzene	5	~
Isopropylbenzene (Cumene)	5	~
M,P-Xylene	5	~
n-Butylbenzene	5	~
n-Propylbenzene	5	~
o-Xylene (1,2-Dimethylbenzene)	5	~
Sec-Butylbenzene	5	~
Toluene	5	~
Total Xylenes	5	~
SVOCs (µg/L)		
2,4-Dimethylphenol	1	~
Benzo(a)anthracene	0.002	~
Benzo(a)pyrene	0	~
Benzo(b)fluoranthene	0.002	~
Benzo(k)fluoranthene	0.002	~
Biphenyl (Diphenyl)	5	~
Chrysene	0.002	~
Indeno(1,2,3-cd)pyrene	0.002	~
Naphthalene	10	~
Phenol	1	~
PCBs (µg/L)		
Total PCBs	0.09	~
Inorganics (µg/L)		
Antimony	3	~
Arsenic	25	~
Iron	300	~
Lead	25	~
Magnesium	35,000	~
Manganese	300	~
Sodium	20,000	~
PFAS (ng/L)		
Perfluorooctanesulfonic Acid	~	10
Perfluorooctanoic Acid	~	10

NOTES:

1. BASE MAP IS FROM THE SURVEY DRAWING ALTA/NSPS LAND TITLE SURVEY, COMPLETED BY LANGAN, DATED JUNE 07, 2018.
2. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. GROUNDWATER SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) TECHNICAL AND OPERATIONAL GUIDANCE SERIES (TOGS) 1.1.1 AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES (SGVs) FOR DRINKING WATER (CLASS GA) AND TO THE NYSDEC PER- AND POLYFLUOROALKYL SUBSTANCE (PFAS) SCREENING LEVELS , JANUARY 2021.
4. ONLY DETECTED COMPOUNDS ARE SHOWN.
5. SGV EXCEEDANCES ARE HIGHLIGHTED AND IN BOLD.
6. PFAS SCREENING LEVELS EXCEEDANCES ARE IN RED
7. TOTAL AND DISSOLVED MERCURY WAS NOT DETECTED IN THE SEPTEMBER 2020 GROUNDWATER SAMPLES.
8. µg/L = MICROGRAM PER LITER
9. ng/L = NANOGRAM PER LITER
10. VOC = VOLATILE ORGANIC COMPOUND
11. SVOC = SEMIVOLATILE ORGANIC COMPOUND
12. PCB = POLYCHLORINATED BIPHENYL
13. ND = NOT DETECTED
14. NE = NO EXCEEDANCE
15. J = THE ANALYTE WAS DETECTED ABOVE THE METHOD DETECTION LIMIT BUT BELOW THE REPORTING LIMIT; THEREFORE, THE RESULT IS AN ESTIMATE
16. J+ = THE REPORTED VALUE MAY BE BIASED HIGH. THE ACTUAL VALUE IS EXPECTED TO BE LESS THAN THE REPORTED VALUE
17. J- = THE REPORTED VALUE MAY BE BIASED LOW. THE ACTUAL VALUE IS EXPECTED TO BE GREATER THAN THE REPORTED VALUE
18. JN = THE ANALYSIS INDICATES THE PRESENCE OF AN ANALYTE THAT HAS BEEN "TENTATIVELY IDENTIFIED" AND THE ASSOCIATED NUMERICAL VALUES REPRESENTS ITS APPROXIMATE CONCENTRATION
19. UST = UNDERGROUND STORAGE TANK

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

60 0 20 40 60
SCALE: 1 INCH = 60 FEET

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
250 WATER STREET
BLOCK No. 98, LOT No. 1
NEW YORK NEW YORK

Drawing Title
GROUNDWATER SAMPLE ANALYTICAL RESULTS MAP

Project No. 170381202
Date 1/14/2021
Drawn By JFY
Checked By PM

Drawing No. 5

© 2020 Langan

Filename: \\langan.com\data\NY\data2\170381202\Project Data\CAD\02\SheetFiles\Environmental\BCP RAWP\Figure 5 - Groundwater Analytical Results Map.dwg Date: 3/5/2021 Time: 08:27 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL (2)

PROJECT NORTH
TRUE NORTH

Sample ID	SV12_070920
Sample Date	7/9/2020
Sample Type	SV
VOCs (µg/m³)	
1,1,1-Trichloroethane	1.51
1,2,4-Trimethylbenzene	14.8
1,3,5-Trimethylbenzene (Mesitylene)	4.62
1,3-Butadiene	1.16
2-Hexanone	68.4 J
4-Ethyltoluene	1.79
Acetone	234
Benzene	9.78
Carbon Disulfide	21.1
Chloroform	4.45 J
Cyclohexane	41.3
Dichlorodifluoromethane	56.9
Ethanol	61.8
Ethylbenzene	4
Isopropanol	2.21
M,P-Xylene	12.9
Methyl Ethyl Ketone (2-Butanone)	187
Methyl Isobutyl Ketone	6.56
n-Heptane	74.6
n-Hexane	21.1
o-Xylene (1,2-Dimethylbenzene)	7.17
Styrene	0.949
Tert-Butyl Alcohol	14.6
Tetrachloroethene (PCE)	42.6 J
Toluene	26.5
Total Xylenes	20.1
Trichlorofluoromethane	7.02 J
Total BTEX	60.4
Total VOCs	929
Other (µg/m³)	ND
Mercury	0.00073 U

Sample ID	SV01_100315
Sample Date	10/3/2015
Sample Type	SV
1,2,4-Trimethylbenzene	10.7
1,3,5-Trimethylbenzene	3.22
2,2,4-Trimethylpentane	2.38
2-Butanone	6.05
4-Ethyltoluene	4.57
Acetone	22.3
Benzene	1.42
Carbon disulfide	1.77
Chloroform	2.47
Cyclohexane	0.709
Ethylbenzene	38.4
Heptane	34.7
n-Hexane	92
o-Xylene	11.2
p/m-Xylene	28.7
Styrene	16
tert-Butyl Alcohol	10.6
Tetrachloroethene	3.36
Tetrahydrofuran	1.57
Toluene	16.6
Total BTEX	96.32
Total VOCs	318.58

Sample ID	SV19_070920
Sample Date	7/9/2020
Sample Type	SV
VOCs (µg/m³)	
1,2,4-Trimethylbenzene	4.71
1,3,5-Trimethylbenzene (Mesitylene)	1.17
2-Hexanone	45.5 J
Acetone	65.6
Benzene	1.48
Carbon Disulfide	2.34
Chloroform	1.13 J
Dichlorodifluoromethane	7.37
Ethanol	14.9
Ethylbenzene	1.78
M,P-Xylene	9.08
Methyl Ethyl Ketone (2-Butanone)	125
n-Heptane	1.64
n-Hexane	1.26
o-Xylene (1,2-Dimethylbenzene)	5.21
Tert-Butyl Alcohol	7.34
Tetrachloroethene (PCE)	57.6 J
Toluene	6.41
Total Xylenes	14.3
Trichloroethene (TCE)	1.27
Trichlorofluoromethane	24.8 J
Total BTEX	24
Total VOCs	386
General Chemistry (µg/m³)	
Mercury	0.00086 U

Sample ID	SV38_080320
Sample Date	8/3/2020
Sample Type	SV
VOCs (µg/m³)	
Ethanol	171
Acetone	245
Trichlorofluoromethane	17.3
2-Butanone	3420
n-Hexane	104
Benzene	20.7
Cyclohexane	17
Xylenes, Total	277
2,2,4-Trimethylpentane	110
Heptane	48.4
Toluene	274
2-Hexanone	400
Tetrachloroethene	283
Ethylbenzene	62.1
p/m-Xylene	199
o-Xylene	78.2
1,3,5-Trimethylbenzene	19.2
1,2,4-Trimethylbenzene	66.9
General Chemistry (µg/m³)	
Mercury	0.271 J+

Sample ID	SV39_080320
Sample Date	8/3/2020
Sample Type	SV
VOCs (µg/m³)	
Chloromethane	8.49
Acetone	333
Trichlorofluoromethane	86.5
Carbon disulfide	60.1
2-Butanone	3750
n-Hexane	92.7
Benzene	20.3
Cyclohexane	17
Xylenes, Total	277
2,2,4-Trimethylpentane	84.1
Heptane	53.3
Toluene	221
2-Hexanone	590
Tetrachloroethene	300
Ethylbenzene	60.8
p/m-Xylene	197
o-Xylene	79.5
1,3,5-Trimethylbenzene	20.5
1,2,4-Trimethylbenzene	32.9
General Chemistry (µg/m³)	
Mercury	0.222 J+

Sample ID	SV24_070920
Sample Date	7/9/2020
Sample Type	SV
VOCs (µg/m³)	
1,2,4-Trimethylbenzene	4.15
1,3,5-Trimethylbenzene (Mesitylene)	1.19
2-Hexanone	12.3 J
Acetone	197
Benzene	1.77
Carbon Disulfide	3.27
Chloroform	7.42 J
Dichlorodifluoromethane	5.79
Ethanol	19.2
Ethylbenzene	50
Isopropanol	1.3
M,P-Xylene	245
Methyl Ethyl Ketone (2-Butanone)	39.5
n-Heptane	2.53
n-Hexane	1.35
o-Xylene (1,2-Dimethylbenzene)	66.9
Tert-Butyl Alcohol	8.09
Tetrachloroethene (PCE)	**437 J**
Toluene	8.89
Total Xylenes	312
Trichloroethene (TCE)	5.43
Trichlorofluoromethane	25.2 J
Total BTEX	373
Total VOCs	1,140
General Chemistry (µg/m³)	
Mercury	0.00084 U

Sample ID	SV08_100315
Sample Date	10/3/2015
Sample Type	SV
1,1,1-Trichloroethane	1.49
1,1,2-Trichloro-1,2,2-Trifluoroethane	1.66
1,2,4-Trimethylbenzene	11.4
1,3,5-Trimethylbenzene	3.81
1,3-Butadiene	1.99
2-Butanone	32.4
4-Ethyltoluene	5.26
Acetone	98.6
Benzene	11.4
Carbon disulfide	77.2
Chloroform	19.2
Cyclohexane	11.4
Dichlorodifluoromethane	5.44
Ethyl Alcohol	9.72
Ethylbenzene	63.9
Heptane	147
Iso-Propyl Alcohol	5.83
n-Hexane	327
o-Xylene	18
p/m-Xylene	45.2
Styrene	24.6
tert-Butyl Alcohol	19.9
Tetrachloroethene	30
Tetrahydrofuran	3.8
Toluene	36.3
Trichloroethene	2.1
Trichlorofluoromethane	179
Total BTEX	174.8
Total VOCs	1193.6

Sample ID	SV29_070920
Sample Date	7/9/2020
Sample Type	SV
VOCs (µg/m³)	
1,2,4-Trimethylbenzene	27.9
1,3,5-Trimethylbenzene (Mesitylene)	11.2
1,3-Butadiene	4.54
2,2,4-Trimethylpentane	96.2 J
2-Hexanone	126 J
4-Ethyltoluene	7.47
Acetone	570
Benzene	125
Carbon Disulfide	214
Chloroethane	1.72
Chloroform	3.37 J
Chloromethane	1.64
Cyclohexane	89.5
Dichlorodifluoromethane	8.9
Ethanol	97.6
Ethylbenzene	28.6
Isopropanol	11.7
M,P-Xylene	80.4
Methyl Ethyl Ketone (2-Butanone)	507
Methyl Isobutyl Ketone	9.47
n-Heptane	179
n-Hexane	211
o-Xylene (1,2-Dimethylbenzene)	25.6
Tert-Butyl Alcohol	36.7
Tetrachloroethene (PCE)	**110 J**
Tetrahydrofuran	30.4
Toluene	129
Total Xylenes	106
Trichloroethene (TCE)	**13.2**
Trichlorofluoromethane	151 J
Total BTEX	389
Total VOCs	2,910
General Chemistry (µg/m³)	
Mercury	0.00079 U

Sample ID	SV30_070920
Sample Date	7/9/2020
Sample Type	SV
VOCs (µg/m³)	
1,2,4-Trimethylbenzene	7.13
1,3-Butadiene	1.7
Acetone	333
Benzene	54.9
Carbon Disulfide	26.4
Chloroform	4.17 J
Cyclohexane	816
Dichlorodifluoromethane	8.7
Ethanol	78.2
Ethylbenzene	7.51
Isopropanol	7.18
M,P-Xylene	19
Methyl Ethyl Ketone (2-Butanone)	204
n-Heptane	520
n-Hexane	571
o-Xylene (1,2-Dimethylbenzene)	7.91
Tert-Butyl Alcohol	13.4
Tetrachloroethene (PCE)	10 J
Toluene	36.6
Total Xylenes	26.9
Trichlorofluoromethane	214 J
Total BTEX	126
Total VOCs	2,940
General Chemistry (µg/m³)	
Mercury	0.00096 U

Sample ID	V5_070920
Sample Date	7/9/2020
Sample Type	SV
VOCs (µg/m³)	NA
General Chemistry (µg/m³)	
Mercury	0.00065 U

Sample ID	V3_070920
Sample Date	7/9/2020
Sample Type	SV
VOCs (µg/m³)	NA
General Chemistry (µg/m³)	
Mercury	0.00094 U

Sample ID	V1_070920
Sample Date	7/9/2020
Sample Type	SV
VOCs (µg/m³)	NA
General Chemistry (µg/m³)	
Mercury	0.00082 U

Sample ID	SV05_100315
Sample Date	10/3/2015
Sample Type	SV
1,2,4-Trimethylbenzene	13.4
1,3-Butadiene	20.5
2,2,4-Trimethylpentane	111
2-Butanone	25.1
Cyclohexane	23
Dichlorodifluoromethane	40.4
Ethyl Alcohol	53.3
Ethylbenzene	49.5
Heptane	114
n-Hexane	217
o-Xylene	26.1
p/m-Xylene	67.3
Styrene	16
tert-Butyl Alcohol	17.8
Tetrachloroethene	82.7
Toluene	46.4
Trichlorofluoromethane	4180
Total BTEX	189.3
Total VOCs	5352.8

Sample ID	AA02_070920
Sample Date	7/9/2020
Sample Type	AA
VOCs (µg/m³)	
2,2,4-Trimethylpentane	2.43 J
Acetone	8.12
Benzene	1.32
Chloromethane	1.1
Dichlorodifluoromethane	2.26
Ethanol	13.9
Isopropanol	1.24
M,P-Xylene	2.24
n-Hexane	1.06
o-Xylene (1,2-Dimethylbenzene)	0.886
Toluene	2.39
Total Xylenes	3.13
Trichlorofluoromethane	1.45 J
Total BTEX	6.84
Total VOCs	38.4
General Chemistry (µg/m³)	
Mercury	0.00082 U

Sample ID	SV32_070920
Sample Date	7/9/2020
Sample Type	SV
2,2,4-Trimethylpentane	4,100 J
Benzene	649
Carbon Disulfide	114
Cyclohexane	3,070
Ethylbenzene	414
M,P-Xylene	1,790
n-Heptane	12,100
n-Hexane	13,900
o-Xylene (1,2-Dimethylbenzene)	656
Toluene	2,520
Total Xylenes	2,450
Total BTEX	6,030
Total VOCs	39,300
General Chemistry (µg/m³)	
Mercury	0.00096 U

Sample ID	SV28_070920
Sample Date	7/9/2020
Sample Type	SV
VOCs (µg/m³)	
1,2,4-Trimethylbenzene	5.11
1,3,5-Trimethylbenzene (Mesitylene)	1.88
2-Hexanone	26.6 J
Acetone	340
Benzene	2.57
Carbon Disulfide	2.91
Chloroform	10.4 J
Cis-1,2-Dichloroethene	3.14
Cyclohexane	1.37
Dichlorodifluoromethane	3.44
Ethanol	33.4
Ethylbenzene	1.96
Isopropanol	2.93
M,P-Xylene	8.99
Methyl Ethyl Ketone (2-Butanone)	97.6
n-Heptane	6.23
n-Hexane	8.32
o-Xylene (1,2-Dimethylbenzene)	4.95
Tert-Butyl Alcohol	13.3
Tetrachloroethene (PCE)	**827 J**
Toluene	6.1
Total Xylenes	13.9
Trichloroethene (TCE)	**27.3**
Trichlorofluoromethane	4.1 J
Total BTEX	24.5
Total VOCs	1,440
General Chemistry (µg/m³)	
Mercury	0.00089 U

Sample ID	SV10_100315
Sample Date	10/3/2015
Sample Type	SV
1,2,4-Trimethylbenzene	11.1
1,3,5-Trimethylbenzene	4.37
1,3-Butadiene	0.788
2,2,4-Trimethylpentane	257
2-Butanone	6.02
4-Ethyltoluene	4.54
Benzene	26.1
Carbon disulfide	15.5
Chloroform	4.22
Cyclohexane	158
Ethyl Alcohol	20.2
Ethylbenzene	40.9
Heptane	71.3
n-Hexane	244
o-Xylene	16.7
p/m-Xylene	37
Styrene	13.8
Tetrachloroethene	7.12
Toluene	36.5
Trichloroethene	1.09
Trichlorofluoromethane	224
Total BTEX	157.2
Total VOCs	979.51

Sample ID	SV37_070920
Sample Date	7/9/2020
Sample Type	SV
VOCs (µg/m³)	
1,2,4-Trimethylbenzene	4.12
1,3,5-Trimethylbenzene (Mesitylene)	1.14
2-Hexanone	34.5 J
Acetone	442
Benzene	1.88
Carbon Disulfide	7.22
Chloroform	6.45 J
Cyclohexane	1.77
Dichlorodifluoromethane	271
Ethanol	45.6
Ethylbenzene	2.26
Isopropanol	3.61
M,P-Xylene	9.64
Methyl Ethyl Ketone (2-Butanone)	117
n-Heptane	35.7
n-Hexane	200
o-Xylene (1,2-Dimethylbenzene)	4.25
Tetrachloroethene (PCE)	6.39 J
Tetrahydrofuran	1.52
Toluene	6.44
Total Xylenes	13.9
Trichloroethene (TCE)	1.1
Trichlorofluoromethane	1.42 J
Total BTEX	24.5
Total VOCs	1,210
General Chemistry (µg/m³)	
Mercury	0.00075 U

Sample ID	SV14_070920
Sample Date	7/9/2020
Sample Type	SV
VOCs (µg/m³)	
1,2,4-Trimethylbenzene	3.76
1,3,5-Trimethylbenzene (Mesitylene)	1.04
1,3-Butadiene	0.542
2-Hexanone	12 J
Acetone	283
Benzene	1.08
Carbon Disulfide	2.75
Chloroform	7.62 J
Dichlorodifluoromethane	19.1
Ethanol	27.1
Ethylbenzene	1.39
Isopropanol	1.89
M,P-Xylene	6.08
Methyl Ethyl Ketone (2-Butanone)	42.5
Methyl Isobutyl Ketone	2.28
n-Heptane	5.45
n-Hexane	10.1
o-Xylene (1,2-Dimethylbenzene)	2.92
Tert-Butyl Alcohol	9.4
Tetrachloroethene (PCE)	7.73 J
Tetrahydrofuran	2.51
Toluene	4.64
Total Xylenes	8.99
Trichlorofluoromethane	4.66 J
Total BTEX	16.1
Total VOCs	460
General Chemistry (µg/m³)	
Mercury	0.00096 U

Sample ID	SV03_100315
Sample Date	10/3/2015
Sample Type	SV
1,2,4-Trimethylbenzene	10
1,3,5-Trimethylbenzene	3.19
1,3-Butadiene	2.81
2,2,4-Trimethylpentane	3.13
2-Butanone	7.08
4-Ethyltoluene	3.89
Acetone	39.2
Benzene	3.61
Carbon disulfide	4.33
Chloroform	7.76
Cyclohexane	1.89
Ethylbenzene	34.8
Heptane	27.8
n-Hexane	47.2
o-Xylene	11.6
p/m-Xylene	28.9
Styrene	14.6
tert-Butyl Alcohol	8.73
Tetrachloroethene	60.2
Tetrahydrofuran	1.73
Toluene	18.7
Trichloroethene	**7.47**
Trichlorofluoromethane	2.05
Total BTEX	97.61
Total VOCs	360.82

Sample ID	SV17_070920	DUP01_070920
Sample Date	7/9/2020	7/9/2020
Sample Type	SV	SV
VOCs (µg/m³)		
1,2,4-Trimethylbenzene	4.01	2.73
1,3,5-Trimethylbenzene (Mesitylene)	1.23 J	ND
2,2,4-Trimethylpentane	194 J	124 J
2-Hexanone	17 J	23.2 J
Acetone	184	215
Benzene	1.35	1.39
Carbon Disulfide	1.68	1.64
Chloroform	28.9 J	18.4 J
Chloromethane	ND	0.454
Cyclohexane	1.92	1.34
Dichlorodifluoromethane	13.2	10.6
Ethanol	20.3	31.1
Ethylbenzene	1.55	1.26
Isopropanol	1.61	3.42
M,P-Xylene	8.04	5.95
Methyl Ethyl Ketone (2-Butanone)	50.7	58.1
Methyl Isobutyl Ketone	ND	2.75
Methylene Chloride	3.34	3.05
n-Heptane	18.2	16.6
n-Hexane	54.3	45.5
o-Xylene (1,2-Dimethylbenzene)	3.94	2.76
Tert-Butyl Alcohol	8.43	9.82
Tetrachloroethene (PCE)	60.1 J	38 J
Toluene	5.05	4.48
Total Xylenes	12	8.69
Trichlorofluoromethane	8.77 J	6.69 J
Total BTEX	20	15.8
Total VOCs	692	628
General Chemistry		
Mercury (µg/m³)	0.00085 U	0.871 U

Sample ID	SV23_070920
Sample Date	7/9/2020
Sample Type	SV
VOCs (µg/m³)	
1,2,4-Trimethylbenzene	4.12
2-Hexanone	20.4 J
Acetone	245
Benzene	1.18
Carbon Disulfide	2.39
Chloroform	4.24 J
Dichlorodifluoromethane	8.8
Ethanol	27.5
Ethylbenzene	1.55
Isopropanol	2.95
M,P-Xylene	7.38
Methyl Ethyl Ketone (2-Butanone)	64.3
n-Heptane	6.8
n-Hexane	14.4
o-Xylene (1,2-Dimethylbenzene)	3.71
Tert-Butyl Alcohol	9.22
Tetrachloroethene (PCE)	**333 J**
Toluene	5.46
Total Xylenes	11.1
Trichloroethene (TCE)	2.95
Trichlorofluoromethane	8.15 J
Total BTEX	19.3
Total VOCs	774
General Chemistry (µg/m³)	
Mercury	0.00078 U

Sample ID	SV21_070920
Sample Date	7/9/2020
Sample Type	SV
VOCs (µg/m³)	
1,2,4-Trimethylbenzene	5.85
1,3,5-Trimethylbenzene (Mesitylene)	2.24
2,2,4-Trimethylpentane	2.5 J
2-Hexanone	25.9 J
Acetone	242
Benzene	3.11
Carbon Disulfide	15.5
Chloroform	7.08 J
Chloromethane	0.446
Cyclohexane	1.73
Dichlorodifluoromethane	16.6
Ethanol	16.6
Ethylbenzene	2.87
Isopropanol	2.44
M,P-Xylene	11.9
Methyl Ethyl Ketone (2-Butanone)	82
Methyl Isobutyl Ketone	2.79
n-Heptane	11.5
n-Hexane	15.8
o-Xylene (1,2-Dimethylbenzene)	6.91
Styrene	1.19
Tert-Butyl Alcohol	11.8
Tetrachloroethene (PCE)	**263 J**
Toluene	10.3
Total Xylenes	18.8
Trichloroethene (TCE)	**12.3**
Trichlorofluoromethane	11.5 J
Total BTEX	35.1
Total VOCs	786
General Chemistry (µg/m³)	
Mercury	0.00102 U

LEGEND

- SITE BOUNDARY
- APPROXIMATE LOCATION OF SITE FENCE
- 50-FOOT BY 50-FOOT GRID LINES
- SV01 — PHASE II ESI SOIL VAPOR SAMPLE LOCATION
- SV24 — RI SOIL VAPOR/AMBIENT AIR SAMPLE LOCATION
- V1 — RI SOIL VAPOR SAMPLE LOCATION (VOID SPACE)
- APPROXIMATE UST LOCATION

Analyte	NYSDOH Decision Matrices Minimum Concentrations
VOCs (µg/m³)	
1,1,1-Trichloroethane	100
1,1,2-Trichloro-1,2,2-Trifluoroethane	~
1,2,4-Trimethylbenzene	~
1,3,5-Trimethylbenzene (Mesitylene)	~
1,3-Butadiene	~
2,2,4-Trimethylpentane	~
2-Hexanone	~
4-Ethyltoluene	~
Acetone	~
Benzene	~
Carbon Disulfide	~
Chloroethane	~
Chloroform	~
Chloromethane	~
Cis-1,2-Dichloroethene	6
Cyclohexane	~
Dichlorodifluoromethane	~
Ethanol	~
Ethylbenzene	~
Isopropanol	~
M,P-Xylene	~
Methyl Ethyl Ketone (2-Butanone)	~
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	~
Methylene Chloride	100
n-Heptane	~
n-Hexane	~
o-Xylene (1,2-Dimethylbenzene)	~
Styrene	~
Tert-Butyl Alcohol	~
Tetrachloroethene (PCE)	100
Tetrahydrofuran	~
Toluene	~
Total Xylenes	~
Trichloroethene (TCE)	6
Trichlorofluoromethane	~
General Chemistry (µg/m³)	
Mercury	~

NOTES:

1. BASE MAP IS FROM THE SURVEY DRAWING ALTA/NSPS LAND TITLE SURVEY, COMPLETED BY LANGAN, DATED JUNE 07, 2018.
2. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. PHASE II ENVIRONMENTAL SITE INVESTIGATION (ESI) AND REMEDIAL INVESTIGATION (RI) SAMPLING LOCATIONS WERE MEASURED OFF OF SURVEYED LOCATIONS USING A HANDHELD TAPE MEASURE AND ARE APPROXIMATE.
4. SOIL VAPOR 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).
5. AMBIENT AIR SAMPLE ANALYTICAL RESULTS ARE SHOWN FOR REFERENCE ONLY.
6. ONLY DETECTED COMPOUNDS, WITH THE EXCEPTION OF MERCURY, ARE SHOWN IN THE FIGURE.
7. DETECTED ANALYTICAL RESULTS ABOVE THE MINIMUM SOIL VAPOR CONCENTRATIONS RECOMMENDING MITIGATION ARE SHADED AND BOLDED.
8. SAMPLE DUP01_070920 IS A DUPLICATE OF PARENT SAMPLE SV17_070920.
9. ~ = REGULATORY LIMIT FOR THIS ANALYTE DOES NOT EXIST
10. µg/m³= MICROGRAMS PER CUBIC METER
11. J = THE ANALYTE WAS DETECTED ABOVE THE METHOD DETECTION LIMIT BUT BELOW THE REPORTING LIMIT; THEREFORE, THE RESULT IS AN ESTIMATE
12. J+ = THE REPORTED VALUE MAY BE BIASED HIGH. THE ACTUAL VALUE IS EXPECTED TO BE LESS THEN THE REPORTED VALUE
13. NA = NOT ANALYZED
14. UST = UNDERGROUND STORAGE TANK

60 0 20 40 60

SCALE: 1 INCH = 60 FEET

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

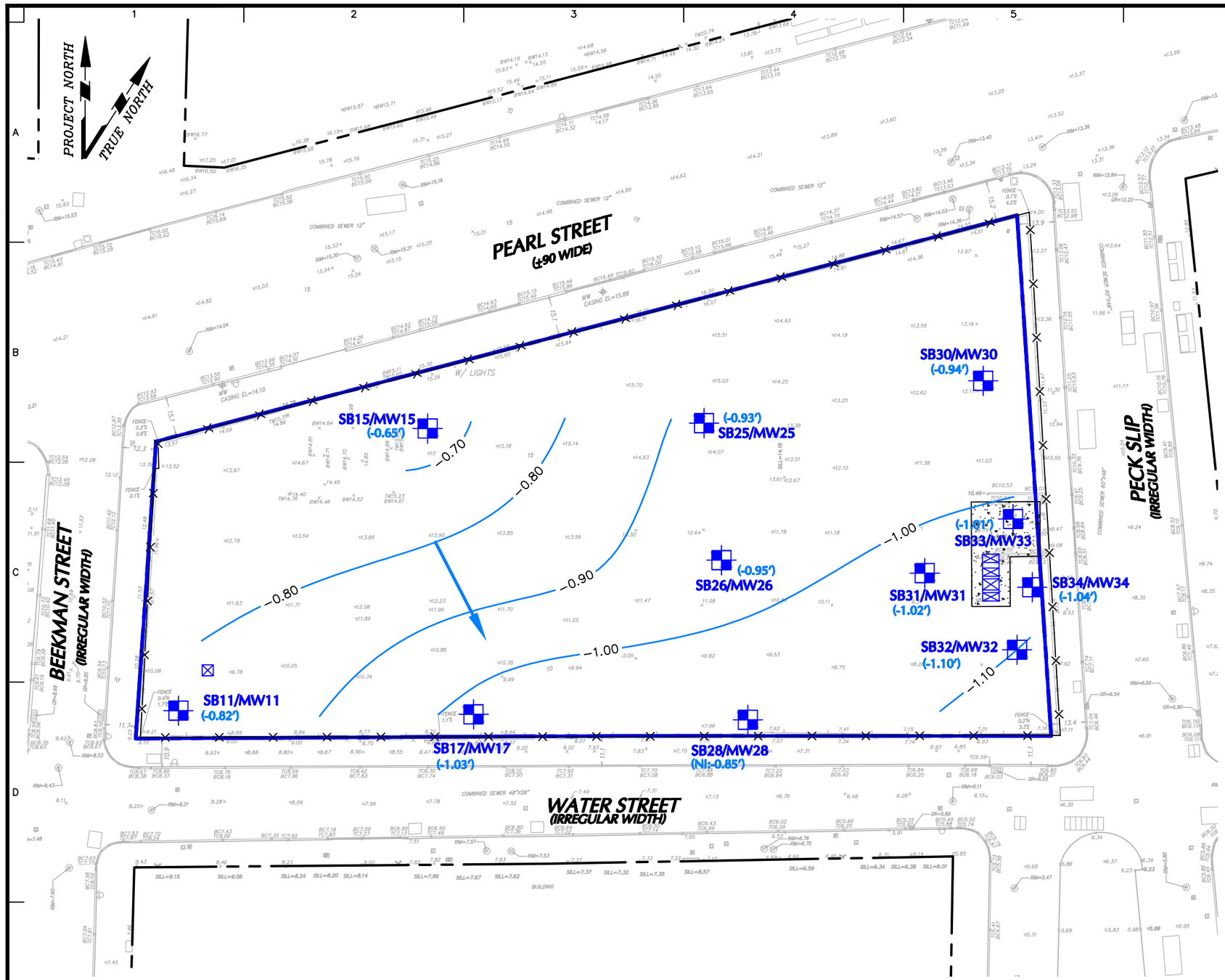
Project: 250 WATER STREET
BLOCK No. 98, LOT No. 1
CITY NEW YORK NEW YORK

Drawing Title: SOIL VAPOR SAMPLE ANALYTICAL RESULTS MAP

Project No. 170381202
Date 1/14/2021
Drawn By JFY
Checked By PM
Drawing No. 6

© 2019 Langan

Filename: \\langan.com\data\NY\data2\170381202\Project Data\CAD\02\SheetFiles\Environmental\BCP RAWP\Figure 6 - Soil Vapor Analytical Results Map.dwg Date: 3/5/2021 Time: 08:29 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL



LEGEND

- SITE BOUNDARY
- APPROXIMATE LOCATION OF SITE FENCE
- SB11/MW11 (-0.82') — SOIL BORING AND MONITORING WELL LOCATION (GROUNDWATER ELEVATION)
- —0.90— GROUNDWATER CONTOUR ELEVATION

NOTES:

1. BASE MAP IS FROM THE SURVEY DRAWING ALTA/NSPS LAND TITLE SURVEY, COMPLETED BY LANGAN, DATED JUNE 07, 2018.
2. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. MONITORING WELL TOP OF CASING ELEVATIONS WERE SURVEYED BY LANGAN ON SEPTEMBER 23, 2020.
4. GROUNDWATER ELEVATIONS ARE BASED ON A SYNOPTIC ROUND OF GROUNDWATER GAUGING ON OCTOBER 10, 2020.
5. GROUNDWATER CONTOURS INTERVAL IS 0.1 FOOT
6. THE GROUNDWATER ELEVATION AT MONITORING WELL MW28 WAS NOT INCLUDED BECAUSE OF GROUNDWATER MOUNDING CAUSED BY A SUBSURFACE UTILITY OR CONDITION .
7. NI = NOT INCLUDED

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

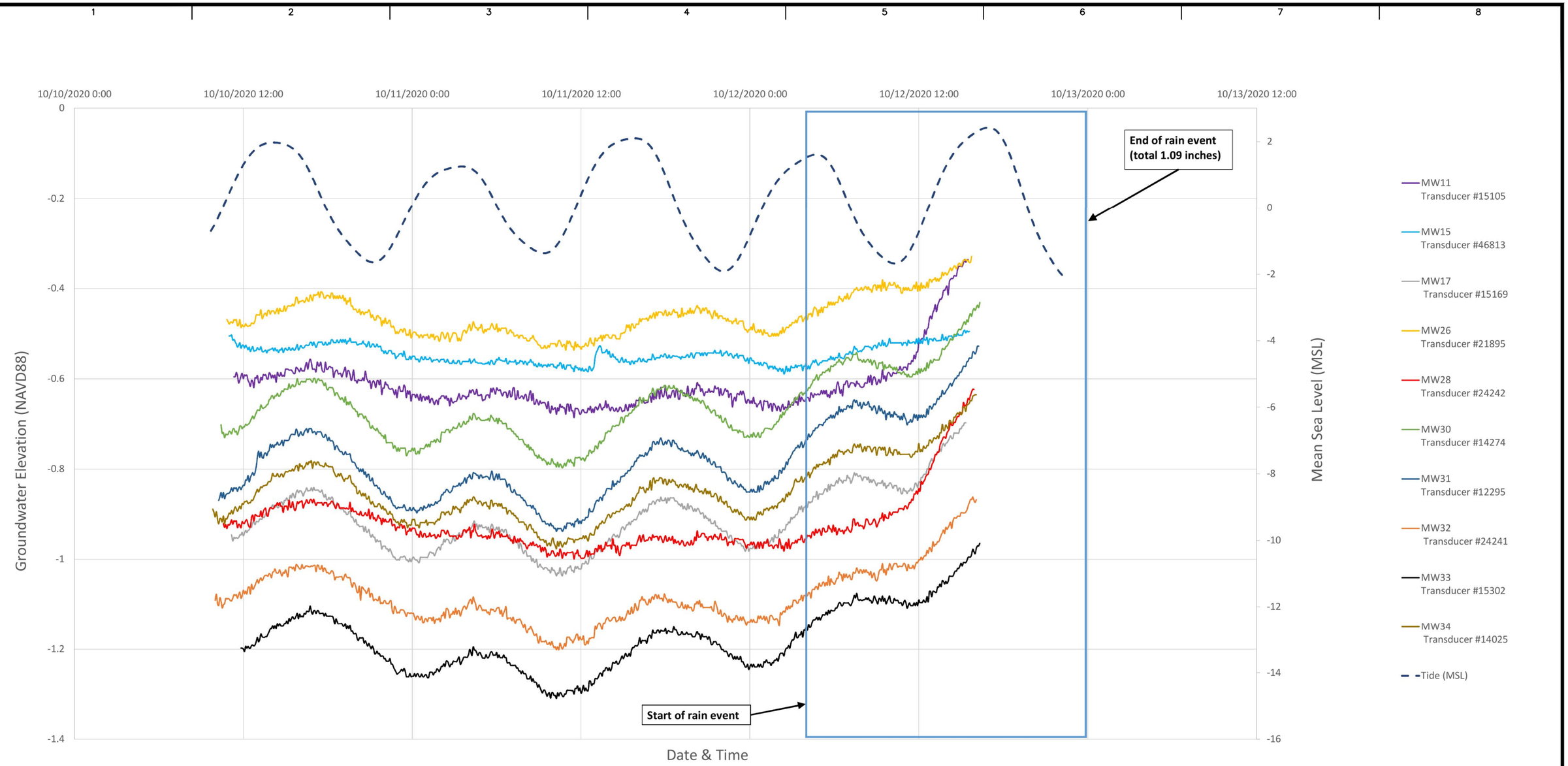
40 0 10 25 40
SCALE IN FEET

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project	250 WATER STREET BLOCK No. 98, LOT No. 1 CITY NEW YORK NEW YORK
Drawing Title	GROUNDWATER ELEVATION CONTOUR MAP
Project No.	170381202
Date	1/14/2021
Drawn By	JFY
Checked By	PM
Drawing No.	7A

© 2019 Langan

Filename: \\langan.com\data\NY\data2\170381202\Project Data\CAD\02\SheetFiles\Environmental\BCP RAWP\Figure 7 - Groundwater Elevation Contour Map.dwg Date: 2/5/2021 Time: 15:46 User: astappenbeck Style Table: Langan.stb Layout: ANSIB-BL



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

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project
250 WATER STREET
BLOCK No. 98, LOT No. 1
CITY
NEW YORK NEW YORK

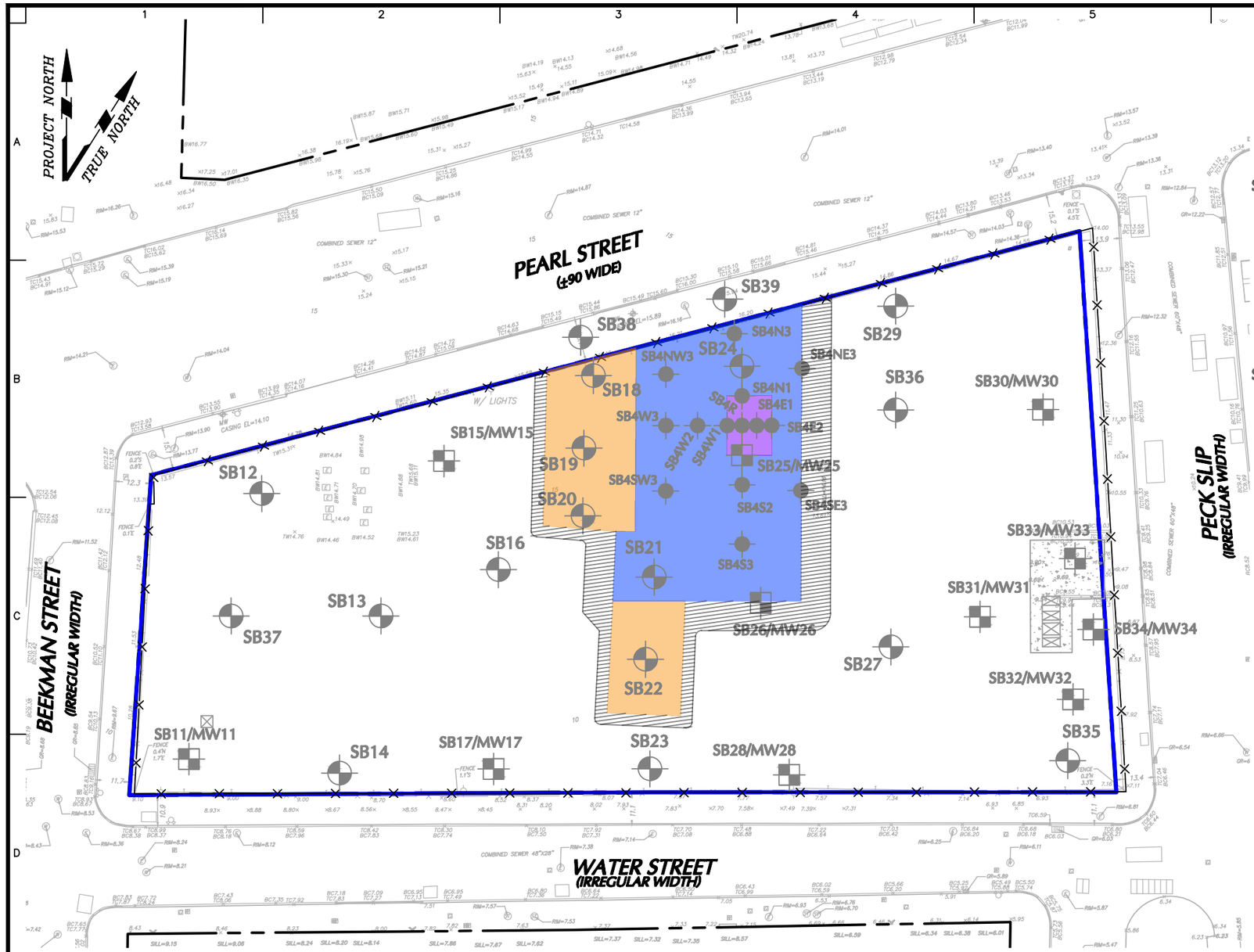
Drawing Title
GROUNDWATER ELEVATION OVER TIME

Project No.	170381202
Date	1/14/2021
Drawn By	JFY
Checked By	PM

Drawing No. **7B**

© 2019 Langan

Filename: \\langan.com\data\NY\data2\170381202\Project Data\CAD\02\SheetFiles\Environmental\BCP RAWP\Figure 7 - Groundwater Elevation Contour Map.dwg Date: 2/5/2021 Time: 15:48 User: astappenbeck Style Table: Langan.stb Layout: ANSIB-BL (2)



LEGEND

- SITE BOUNDARY (AOC 1)
- APPROXIMATE LOCATION OF SITE FENCE
- SB02 — PHASE II ESI SOIL BORING LOCATION
- SB01/TMW01 — PHASE II ESI SOIL BORING LOCATION WITH TEMPORARY MONITORING WELL
- SV01 — PHASE II ESI SOIL VAPOR LOCATION
- SB19 — SOIL BORING LOCATION
- SB4E1 — MERCURY DELINEATION SOIL BORING LOCATION
- SB11/MW11 — SOIL BORING AND MONITORING WELL LOCATION
- APPROXIMATE UST LOCATION
- APPROXIMATE REMEDIAL EXCAVATION TO 4 FEET BGS
- APPROXIMATE REMEDIAL EXCAVATION FROM 8 TO 10 FEET BGS
- APPROXIMATE REMEDIAL EXCAVATION TO 16 FEET BGS
- APPROXIMATE EXTENT OF EXCAVATION FOR SUPPORT OF EXCAVATION (1:1 SLOPING)

NOTES:

1. BASE MAP IS FROM THE SURVEY DRAWING ALTA/NSPS LAND TITLE SURVEY, COMPLETED BY LANGAN, DATED JUNE 07, 2018.
2. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. REMEDIAL INVESTIGATION AND PHASE II ESI BORING LOCATIONS WERE MEASURED OFF OF SURVEYED LOCATIONS USING A HANDHELD TAPE MEASURE AND ARE APPROXIMATE.
4. BGS = BELOW GRADE SURFACE
5. REMEDIAL EXCAVATION EXTENTS ARE SUBJECT TO CHANGE BASED ON ENDPOINT SAMPLE RESULTS.

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

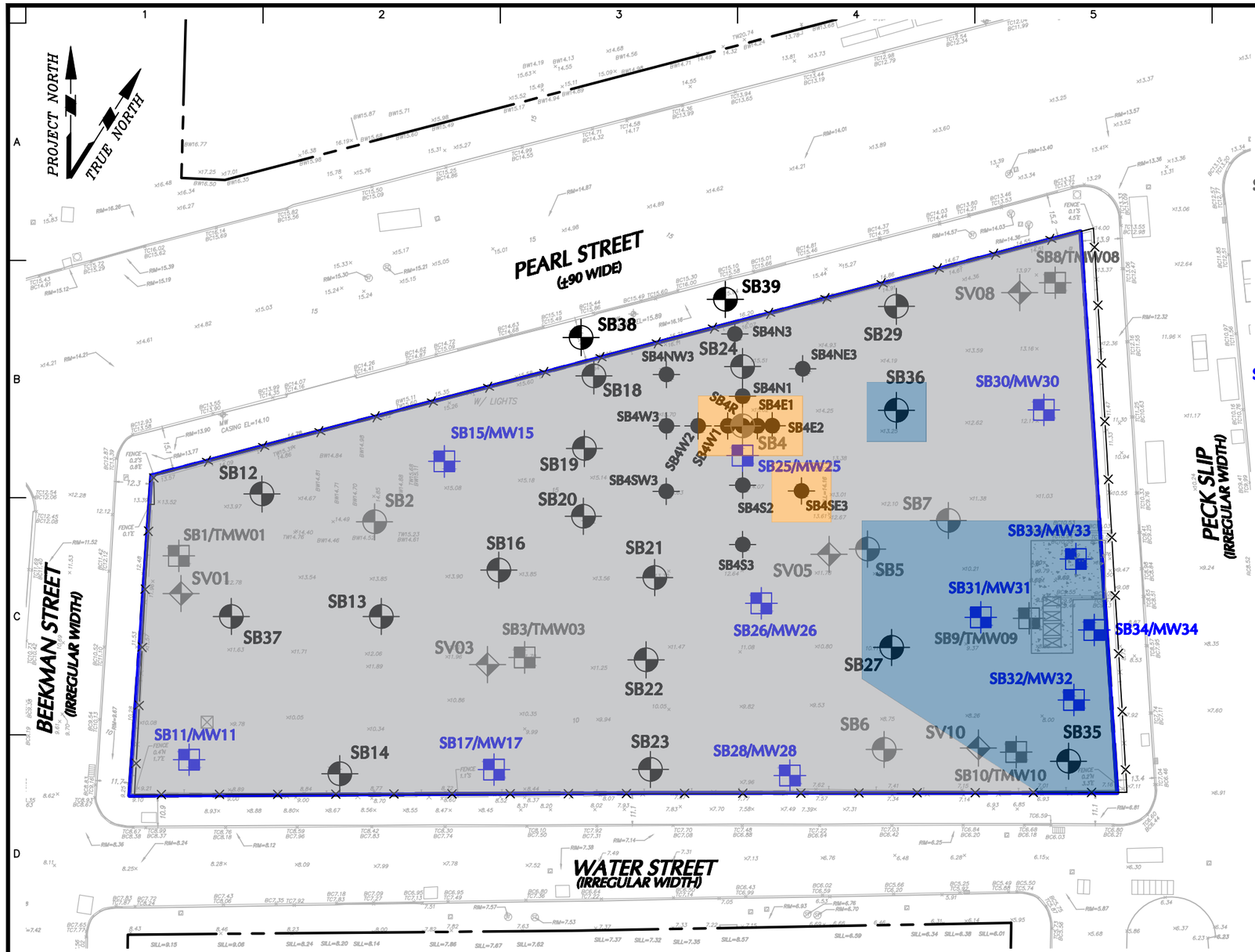
40 0 10 25 40
SCALE IN FEET

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project	250 WATER STREET BLOCK No. 98, LOT No. 1 CITY NEW YORK NEW YORK
Drawing Title	MERCURY IMPACTED SOIL HOTSPOT REMOVL
Project No.	170381202
Date	3/5/2021
Drawn By	JFY
Checked By	PM
Drawing No.	8

© 2019 Langan

Filename: \\langan.com\data\NY\data2\170381202\Project Data\CAD\02\SheetFiles\Environmental\BCP RAWP\Figure 8 - Hg Hotspot.dwg Date: 5/4/2021 Time: 17:36 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL



LEGEND

- SITE BOUNDARY (AOC 1)
- APPROXIMATE LOCATION OF SITE FENCE
- SB02 — PHASE II ESI SOIL BORING LOCATION
- SB01/TMW01 — PHASE II ESI SOIL BORING LOCATION WITH TEMPORARY MONITORING WELL
- SV01 — PHASE II ESI SOIL VAPOR LOCATION
- SB19 — SOIL BORING LOCATION
- SB4E1 — MERCURY DELINEATION SOIL BORING LOCATION
- SB11/MW11 — SOIL BORING AND MONITORING WELL LOCATION
- APPROXIMATE UST LOCATION
- APPROXIMATE REMEDIAL EXCAVATION FROM ABOUT 8 TO 16 FEET BGS
- APPROXIMATE REMEDIAL EXCAVATION FROM ABOUT 16 TO 22 FEET BGS
- APPROXIMATE REMEDIAL EXCAVATION FROM ABOUT 24 TO 34 FEET BGS

NOTES:

1. BASE MAP IS FROM THE SURVEY DRAWING ALTA/NSPS LAND TITLE SURVEY, COMPLETED BY LANGAN, DATED JUNE 07, 2018.
2. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. REMEDIAL INVESTIGATION AND PHASE II ESI BORING LOCATIONS WERE MEASURED OFF OF SURVEYED LOCATIONS USING A HANDHELD TAPE MEASURE AND ARE APPROXIMATE.
4. BGS = BELOW GRADE SURFACE
5. REMEDIAL EXCAVATION EXTENTS ARE SUBJECT TO CHANGE BASED ON ENDPOINT SAMPLE RESULTS.

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

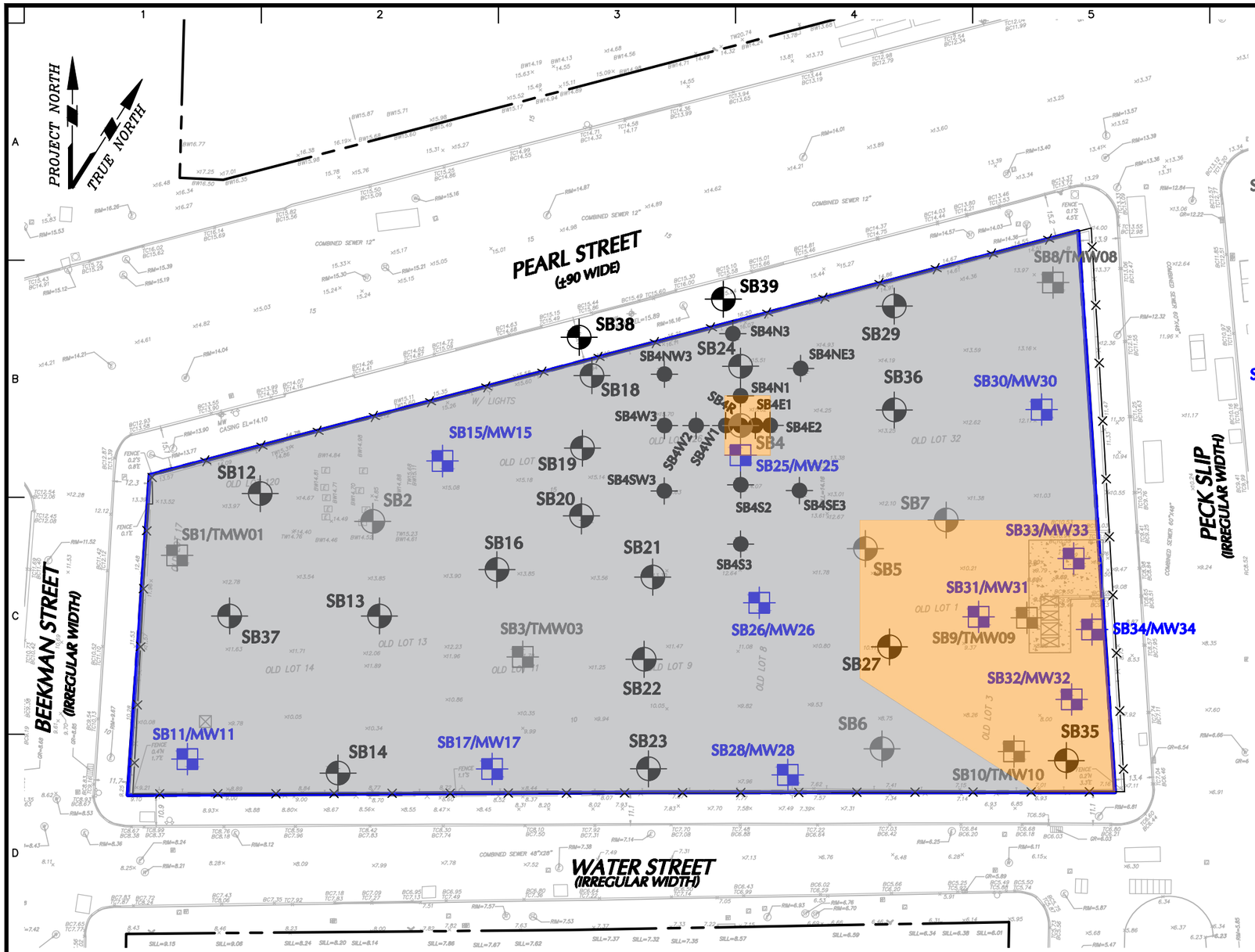
40 0 10 25 40
SCALE IN FEET

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project	250 WATER STREET BLOCK No. 98, LOT No. 1 CITY NEW YORK NEW YORK
Drawing Title	TRACK 1 CLEANUP PLAN
Project No.	170381202
Date	03/25/2021
Drawn By	JFY
Checked By	PM
Drawing No.	9

© 2019 Langan

Filename: \\langan.com\data\NY\data2\170381202\Project Data\CAD\02\SheetFiles\Environmental\BCP RAWP\Figure 9 - Track 1 Excavation Depths.dwg Date: 3/25/2021 Time: 09:15 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL



LEGEND

- SITE BOUNDARY (AOC 1)
- APPROXIMATE LOCATION OF SITE FENCE
- SB02 — PHASE II ESI SOIL BORING LOCATION
- SB01/TMW01 — PHASE II ESI SOIL BORING LOCATION WITH TEMPORARY MONITORING WELL
- SV01 — PHASE II ESI SOIL VAPOR LOCATION
- SB19 — SOIL BORING LOCATION
- SB4E1 — MERCURY DELINEATION SOIL BORING LOCATION
- SB11/MW11 — SOIL BORING AND MONITORING WELL LOCATION
- APPROXIMATE UST LOCATION
- APPROXIMATE REMEDIAL EXCAVATION TO ABOUT 15 FEET BGS
- APPROXIMATE REMEDIAL EXCAVATION FROM ABOUT 16 TO 18 FEET BGS

NOTES:

1. BASE MAP IS FROM THE SURVEY DRAWING ALTA/NSPS LAND TITLE SURVEY, COMPLETED BY LANGAN, DATED JUNE 07, 2018.
2. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. REMEDIAL INVESTIGATION AND PHASE II ESI BORING LOCATIONS WERE MEASURED OFF OF SURVEYED LOCATIONS USING A HANDHELD TAPE MEASURE AND ARE APPROXIMATE.
4. BGS = BELOW GRADE SURFACE
5. REMEDIAL EXCAVATION EXTENTS ARE SUBJECT TO CHANGE BASED ON ENDPOINT SAMPLE RESULTS.

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

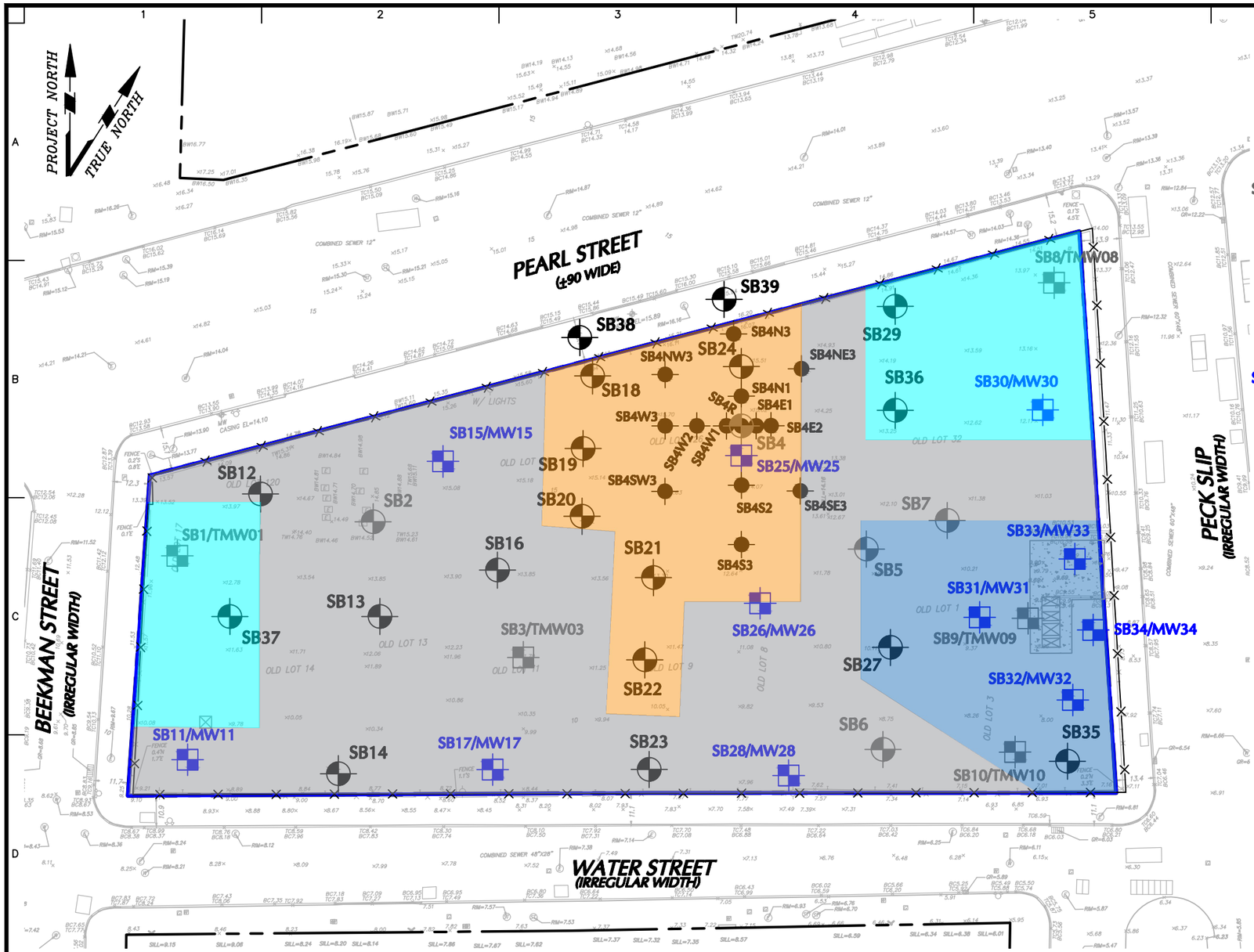
40 0 10 25 40
SCALE IN FEET

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project	250 WATER STREET BLOCK No. 98, LOT No. 1 CITY NEW YORK NEW YORK
Drawing Title	TRACK 2 CLEANUP PLAN
Project No.	170381202
Date	12/23/2020
Drawn By	JFY
Checked By	PM
Drawing No.	10

© 2019 Langan

Filename: \\langan.com\data\NY\data2\170381202\Project Data\CAD\02\SheetFiles\Environmental\BCP RAWP\Figure 10 - Track 2 Excavation Depths.dwg Date: 3/25/2021 Time: 08:55 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL



LEGEND

- SITE BOUNDARY (AOC 1)
- APPROXIMATE LOCATION OF SITE FENCE
- SB02 — PHASE II ESI SOIL BORING LOCATION
- SB01/TMW01 — PHASE II ESI SOIL BORING LOCATION WITH TEMPORARY MONITORING WELL
- SV01 — PHASE II ESI SOIL VAPOR LOCATION
- SB19 — SOIL BORING LOCATION
- SB4E1 — MERCURY DELINEATION SOIL BORING LOCATION
- SB11/MW11 — SOIL BORING AND MONITORING WELL LOCATION
- APPROXIMATE UST LOCATION
- APPROXIMATE EXTENT OF REMEDIAL EXCAVATION TO INSTALL COVER SYSTEM (ABOUT 2 FEET BGS)
- APPROXIMATE EXTENT OF REMEDIAL EXCAVATION TO REMOVE PETROLEUM IMPACTED MATERIAL (ABOUT 18 FEET BGS)
- APPROXIMATE EXTENT OF REMEDIAL EXCAVATION TO REMOVE PCB IMPACTED MATERIAL (ABOUT 10 FEET BGS)
- APPROXIMATE EXTENT OF REMEDIAL EXCAVATION TO REMOVE MERCURY IMPACTED MATERIAL (ABOUT 4 TO 16 FEET BGS)

NOTES:

1. BASE MAP IS FROM THE SURVEY DRAWING ALTA/NSPS LAND TITLE SURVEY, COMPLETED BY LANGAN, DATED JUNE 07, 2018.
2. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. REMEDIAL INVESTIGATION AND PHASE II ESI BORING LOCATIONS WERE MEASURED OFF OF SURVEYED LOCATIONS USING A HANDHELD TAPE MEASURE AND ARE APPROXIMATE.
4. BGS = BELOW GRADE SURFACE
5. REMEDIAL EXCAVATION AREA EXTENTS ARE SUBJECT TO CHANGE BASED ON ENDPOINT SAMPLE RESULTS.

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

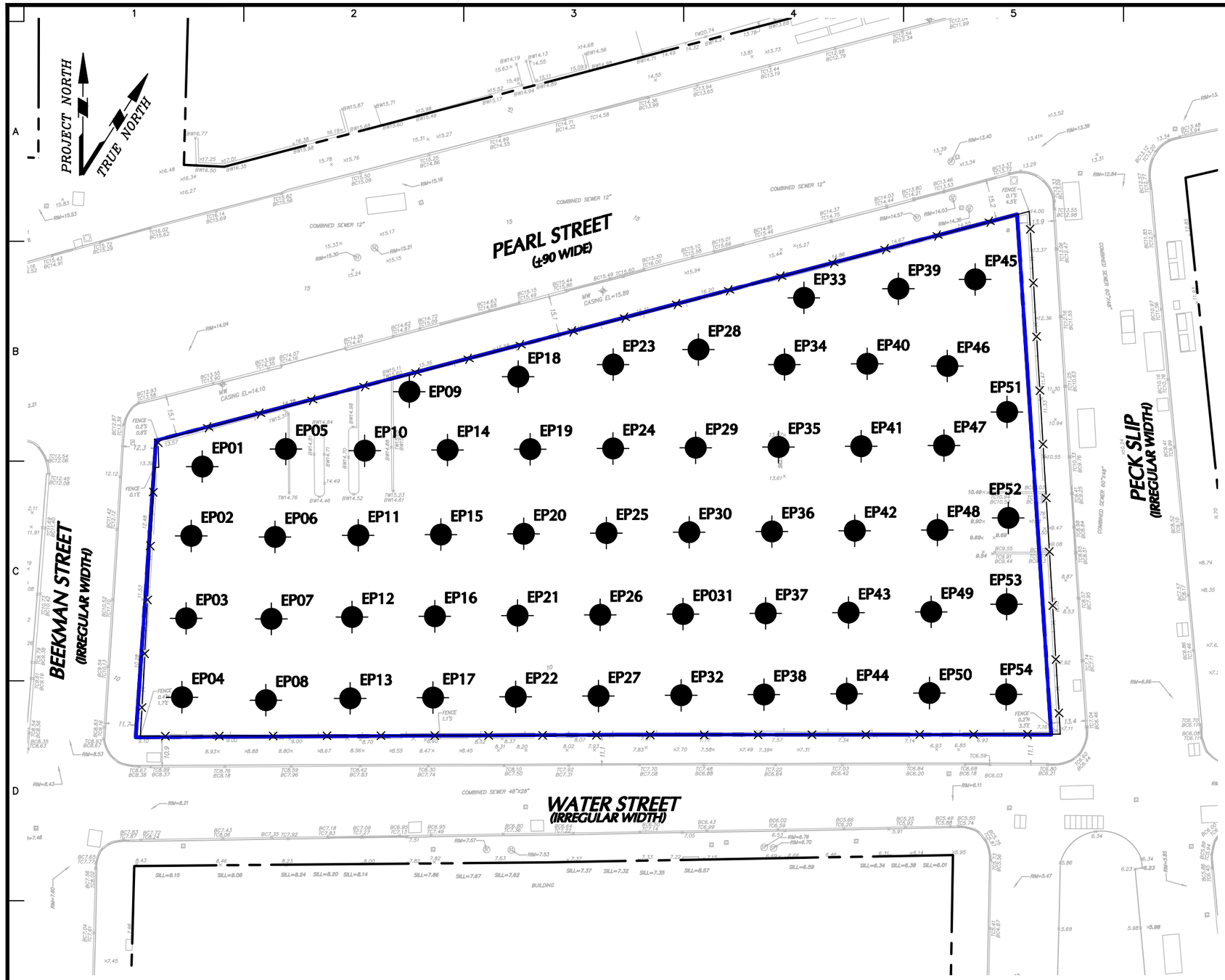
40 0 10 25 40
SCALE IN FEET

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project	Drawing Title	Project No.	Drawing No.
250 WATER STREET BLOCK No. 98, LOT No. 1 CITY NEW YORK NEW YORK	TRACK 4 CLEANUP PLAN	170381202 Date 12/23/2020 Drawn By JFY Checked By PM	11

© 2019 Langan

Filename: \\langan.com\data\NY\data2\170381202\Project Data\CAD\02\SheetFiles\Environmental\BCP RAWP\Figure 11 - Track 4 Excavation Depths.dwg Date: 3/25/2021 Time: 09:07 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL



LEGEND

- SITE BOUNDARY
- APPROXIMATE LOCATION OF SITE FENCE
- EP01 PROPOSED CONFIRMATION SAMPLE LOCATION

NOTES:

1. BASE MAP IS FROM THE SURVEY DRAWING ALTA/NSPS LAND TITLE SURVEY, COMPLETED BY LANGAN, DATED JUNE 07, 2018.
2. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

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

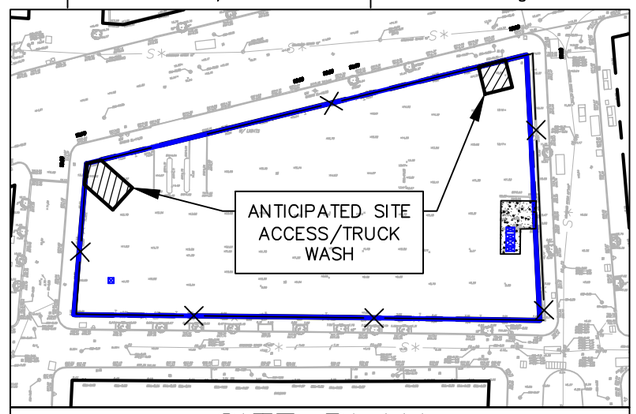
40 0 10 25 40
SCALE IN FEET

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project	250 WATER STREET BLOCK No. 98, LOT No. 1 CITY NEW YORK NEW YORK
Drawing Title	PROPOSED CONFIRMATION SAMPLE LOCATION PLAN
Project No.	170381202
Date	1/14/2021
Drawn By	JFY
Checked By	PM
Drawing No.	12

© 2019 Langan

Filename: \\langan.com\data\NY\data2\170381202\Project Data\CAD\02\SheetFiles\Environmental\BCP RAWP\Figure 12 - Endpoint Location Map.dwg Date: 3/5/2021 Time: 15:02 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL



SITE PLAN
(N.T.S)

LEGEND:

- APPROXIMATE SITE BOUNDARY
- TRUCK ROUTE
- LOCAL TRUCK ROUTE
- THROUGH TRUCK ROUTE
- THROUGH TRUCK ROUTE ON EXPRESSWAY
- THROUGH TRUCK ROUTE ON TUNNEL

NOTES:

1. BASEMAP IS REFERENCED FROM THE NEW YORK CITY DEPARTMENT OF TRANSPORTATION 2015 TRUCK ROUTE MAP, ACCESSED ON JANUARY 19, 2021.
2. LOCATION OF SITE ACCESS/TRUCK WASHING STATIONS ARE SUBJECT TO CHANGE, PENDING CONSTRUCTION LOGISTICS.
3. FIGURE IS NOT TO SCALE.

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

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project	250 WATER STREET BLOCK No. 98, LOT No. 1 CITY NEW YORK COUNTY NEW YORK
Drawing Title	TRUCK ROUTE MAP
Project No.	170381202
Date	01/22/2021
Drawn By	AS
Checked By	PM
Drawing No.	13

© 2019 Langan

Filename: \\langan.com\data\NY\data2\170381202\Project Data\CAD\02\SheetFiles\Environmental\BCP RAWP\Figure 13 - Truck Route Map.dwg Date: 11/4/2021 Time: 15:07 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL

Tables

Table 1
Track 2 Soil Cleanup Objectives
Remedial Action Work Plan

250 Water Street
New York, New York
BCP Site No.: C321127
Langan Project No.: 170381202

VOCs (mg/kg)	
1,1,1-Trichloroethane	100
1,1-Dichloroethane	26
1,1-Dichloroethene	100
1,2,4-Trimethylbenzene	52
1,2-Dichlorobenzene	100
1,2-Dichloroethane	3.1
1,3,5- Trimethylbenzene	52
1,3-Dichlorobenzene	49
1,4-Dichlorobenzene	13
1,4-Dioxane	13
Acetone	100
Benzene	4.8
Butylbenzene	100
Carbon tetrachloride	2.4
Chlorobenzene	100
Chloroform	49
cis-1,2-Dichloroethene	100
Ethylbenzene	41
Hexachlorobenzene	1.2
Methyl ethyl ketone	100
Methyl tert-butyl ether	100
Methylene chloride	100
n-Propylbenzene	100
sec-Butylbenzene	100
tert-Butylbenzene	100
Tetrachloroethene	19
Toluene	100
trans-1,2-Dichloroethene	100
Trichloroethene	21
Vinyl chloride	0.9
Xylene (mixed)	100
Metals (mg/kg)	
Arsenic	16
Barium	400
Beryllium	72
Cadmium	4.3
Chromium, hexavalent	110
Chromium, trivalent	180
Copper	270
Lead	400
Manganese	2000
Nickel	310
Selenium	180
Silver	180
Total Cyanide	27
Total Mercury	0.81
Zinc	10000

SVOCs (mg/kg)	
Acenaphthene	100
Acenapthylene	100
Anthracene	100
Benz(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1
Benzo(g,h,i)perylene	100
Benzo(k)fluoranthene	3.9
Chrysene	3.9
Dibenz(a,h)anthracene	0.33
Fluoranthene	100
Fluorene	100
Indeno(1,2,3-cd)pyrene	0.5
m-Cresol	100
Naphthalene	100
o-Cresol	100
p-Cresol	100
Pentachlorophenol	6.7
Phenanthrene	100
Phenol	100
Pyrene	100
PCBs/Pesticides (mg/kg)	
2,4,5-TP Acid (Silvex)	100
4,4'- DDD	13
4,4'-DDE	8.9
4,4'-DDT	7.9
Aldrin	0.097
alpha-BHC	0.48
beta-BHC	0.36
Chlordane (alpha)	4.2
delta-BHC	100
Dibenzofuran	59
Dieldrin	0.2
Endosulfan I	24
Endosulfan II	24
Endosulfan sulfate	24
Endrin	11
Heptachlor	2.1
Lindane	1.3
Polychlorinated biphenyls	1

Notes:

1. The above criteria are the Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 375 Restricted Use Restricted-Residential SCOs. (i.e., the Track 2 soil cleanup objectives)
2. SCO: Soil Cleanup Objective
3. SVOC: semivolatile organic compound
4. VOC: volatile organic compound
5. PCB: polychlorinated biphenyl
6. mg/kg: milligram per kilogram

Table 2
Track 1 Remedial Cost Estimate
Remedial Action Work Plan

250 Water Street
New York, New York
BCP Site No.: C321127
Langan Project No.: 170381202

Item No.	Item	Quantity	Unit	Unit Cost	Estimated Cost
CONTRACTOR FEES					
1	Remediation Facilities, Mobilization, Demobilization, and Site Maintenance - Remediation and decontamination facilities, site fencing, trailer, truck cleaning facilities, etc.		Lump Sum		$ 150,000.00
2	Management and Handling of Excavated Materials (Contaminated and Hazardous Materials)	28,300	Cubic Yard	$ 37.50	$ 1,061,250.00
3	Perimeter Support of Excavation (SOE) - Secant pile wall	19,000	Square Foot	$ 350.00	$ 6,650,000.00
4	Off-Site Transport and Disposal of Soil - Includes transport vehicles and disposal of material at a permitted facility to achieve a Track 1 cleanup.		Lump Sum		$ 4,700,000.00
5	Underground Storage Tank Removal - Registration, cleaning, removal and disposal of UST.	5	Each	$ 10,000.00	$ 50,000.00
6	Dewatering and Groundwater Treatment		Lump Sum		$ 2,400,000.00
7	Dust, Odor, and Vapor Control	14	Months	$ 10,000.00	$ 140,000.00
8	Backfill - Import and placement of clean fill. An additional 30% of material is included to account for compaction.	3,770	Cubic Yard	$ 55.00	$ 207,350.00
				Contractor Fee Subtotal	*$ 15,358,600.00*
				10% Contingency of Contractor Fee Subtotal	*$ 1,535,860.00*
ENGINEERING FEES					
9	BCP Consulting, Reporting, and Engineering Services		Lump Sum		$ 1,830,000.00
10	Confirmation Sampling - To confirm removal of material above Track 1 SCOs	57	Samples	$ 1,200.00	$ 68,400.00
				Engineering Fee Subtotal	*$ 1,898,400.00*
				10% Contingency of Engineering Fee Subtotal	*$ 189,840.00*
				Estimated Absolute Costs	**$ 19,000,000**

Table 2
Track 1 Remedial Cost Estimate
Remedial Action Work Plan

250 Water Street
New York, New York
BCP Site No.: C321127
Langan Project No.: 170381202

General Assumptions and Conditions:

- The density used for conversion from cubic yards (CY) to tons is 1.5 tons/CY.
- Costs provided are estimates.
- 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. This cost estimate is expected to be within -30% to +50% of the actual cost. Utilization of this cost 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.
- Assumes duration of remediation oversight will be 16 months.

Contractor Cost Assumptions

1 Includes mobilization and demobilization of equipment and materials necessary to excavate, transport, and dispose of the targeted soil per the Remedial Action Work Plan. Also includes labor and any project-related permit or regulation fees.

2 Management and handling of contaminated and potentially hazardous material assumes 25 percent increase in labor costs for OSHA trained labor. Baseline labor fees assumes $30 per cubic yard. Soil handling includes excavation for off-site disposal.

3 Perimeter support assumes that secant pile walls will be necessary along the Site extents. Square footage based on depth of remedial cut. Remedial excavations along Site boundaries cannot be sloped and thus require excavation support.

4 The estimated volumes for the differing types of materials are based on the sampling results of the Phase II and Remedial Investigation completed by Langan.

5 We assume that up to five USTs will be decommissioned. The estimated number of USTs is based on the results of the geophysical survey performed as part of the remedial investigation.

6 This estimate assumes dewatering with pre-treatment will be necessary to achieve development depth. Pre-treatment can include the following: (1) settling tank for the removal of large solids and free product, (2) granular activated carbon (GAC) filters for removal of dissolved organic compounds, (3) oil-water separator tank if free product is encountered, (4) ion exchange chambers, and (5) flocculation tanks.

7 Dust, odor and vapor control will be required throughout the duration of soil excavation. This cost estimate includes incremental costs associated with equipment and material necessary to monitor and mitigate vapor/odor emission.

9 Estimate includes, but is not limited to, fees for the RI, Remedial Investigation Report (RIR), and preparation of a Remedial Action Work Plan (RAWP), Final Engineering Report (FER) and data validation; implementation of a CAMP as required by the NYSDEC; the presence of an on-site field personnel throughout remediation; remediation health and safety including purchase and maintenance of appropriate personal protective equipment (PPE); periodic office reporting to the regulatory agency and attendance of at least two site meetings per month. Remediation Engineer will field contractor questions related to remediation during the bidding process and support the current site owner, as necessary, during the bid leveling process. Includes submittal review, responses to Requests for Information (RFI), and coordination with development team and the architect.

10 Confirmation soil sample collection will be completed from the excavation base at a frequency of one sample per 900 square feet incuding QAQC.

Table 3
Track 2 Remedial Cost Estimate
Remedial Action Work Plan

250 Water Street
New York, New York
BCP Site No.: C321127
Langan Project No.: 170381202

Item No.	Item	Quantity	Unit	Unit Cost	Estimated Cost
CONTRACTOR FEES					
1	Remediation Facilities, Mobilization, Demobilization, and Site Maintenance - Remediation and decontamination facilities, site fencing, trailer, truck cleaning facilities, etc.		Lump Sum		$ 150,000.00
2	Management and Handling of Excavated Materials (Contaminated and Hazardous Materials)	21,700	Cubic Yard	$ 37.50	$ 813,750.00
3	Perimeter Support of Excavation (SOE) - Soldier Piles and Lagging	15,000	Square Foot	$ 200.00	$ 3,000,000.00
4	Off-Site Transport and Disposal of Soil - Includes transport vehicles and disposal of material at a permitted facility to achiev a Track 2 Cleanup.		Lump Sum		$ 2,200,000.00
5	Underground Storage Tank Removal - Registration, cleaning, removal and disposal of UST.	5	Each	$ 10,000.00	$ 50,000.00
6	Dewatering and Groundwater Treatment		Lump Sum		$ 1,500,000.00
7	Dust, Odor, and Vapor Control	10	Months	$ 10,000.00	$ 100,000.00
8	Backfill - Import and placement of clean fill. An additional 30% of material is included to account for compaction.	650	Cubic Yard	$ 55.00	$ 35,750.00
9	Vapor Barrier/Waterproofing Membrane - Materials and labor to install a vapor barrier/waterproofing membrane along the base and sidewalls of all development excavations.	80,000	Square Foot	$ 13.00	$ 1,040,000.00
				Contractor Fee Subtotal	*$ 8,889,500.00*
				10% Contingency of Contractor Fee Subtotal	*$ 888,950.00*
ENGINEERING FEES					
10	BCP Consulting, Reporting, and Engineering Services		Lump Sum		$ 1,650,000.00
11	Endpoint/Sidewall Sampling - To document residual site conditions following source material removal.	57	Samples	$ 1,200.00	$ 68,400.00
12	Institutional and Engineering Control Certification - Accounts for fees associated with annual on-site inspections and preparation and submission of annual Periodic Review Reports for five years.	5	Per Year	$ 5,000.00	$ 25,000.00
				Engineering Fee Subtotal	*$ 1,743,400.00*
				10% Contingency of Engineering Fee Subtotal	*$ 174,340.00*
				Estimated Absolute Costs	**$ 11,700,000**

Table 3
Track 2 Remedial Cost Estimate
Remedial Action Work Plan

250 Water Street
New York, New York
BCP Site No.: C321127
Langan Project No.: 170381202

General Assumptions and Conditions:

- The density used for conversion from cubic yards (CY) to tons is 1.5 tons/CY.
- Costs provided are estimates.
- 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. This cost estimate is expected to be within -30% to +50% of the actual cost. Utilization of this cost 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.
- Assumes duration of remediation oversight will be 10 months.

Contractor Cost Assumptions

1 Includes mobilization and demobilization of equipment and materials necessary to excavate, transport, and dispose of the targeted soil per the Remedial Action Work Plan. Also includes labor and any project-related permit or regulation fees.

2 Management and handling of contaminated and potentially hazardous material assumes 25 percent increase in labor costs for OSHA trained labor. Baseline labor fees assumes $30 per cubic yard. Soil handling includes excavation for off-site disposal.

3 Perimeter support assumes that soldier pile and lagging will be necessary along the Site extents where applicable. Square footage based on depth of remedial cut. Remedial excavations along Site boundaries cannot be sloped and thus require excavation support.

4 The estimated volumes for the differing types of materials are based on the sampling results of the Phase II and remedial Investigation completed by Langan.

5 We assume that up to five USTs will be decommissioned. The estimated number of USTs is based on the results of the geophysical survey performed as part of the remedial investigation.

6 This estimate assumes dewatering with pre-treatment will be necessary to achieve development depth. Pre-treatment can include the following: (1) settling tank for the removal of large solids and free product, (2) granular activated carbon (GAC) filters for removal of dissolved organic compounds, (3) oil-water separator tank if free product is encountered, (4) ion exchange chambers, and (5) flocculation tanks.

7 Dust, odor and vapor control will be required throughout the duration of soil excavation. This cost estimate includes incremental costs associated with equipment and material necessary to monitor and mitigate vapor/odor emission.

9 Assumes a vapor barrier will be installed under the lowest level and along the foundation sidewalls and includes a 20% area addition for waste.

10 Estimate includes, but is not limited to, fees for the RI, Remedial Investigation Report (RIR), and preparation of a Remedial Action Work Plan (RAWP), Final Engineering Report (FER) and data validation; implementation of a CAMP as required by the NYSDEC; the presence of an on-site field personnel throughout remediation; remediation health and safety including purchase and maintenance of appropriate personal protective equipment (PPE); periodic office reporting to the regulatory agency and attendance of at least two site meetings per month. Remediation Engineer will field contractor questions related to remediation during the bidding process and support the current site owner, as necessary, during the bid leveling process. Includes submittal review, responses to Requests for Information (RFI), and coordination with development team and the architect.

11 Endpoint soil sample collection will be completed from the excavation base at a frequency of one sample per 900 square feet inlcuding QA/QC samples.

12 Costs are based on Langan's experience with regulatory programs and includes a Site Management Plan (SMP), and execution of and environmental easement.

Table 4
Track 4 Remedial Cost Estimate
Remedial Action Work Plan

250 Water Street
New York, New York
BCP Site No.: C321127
Langan Project No.: 170381202

Item No.	Item	Quantity	Unit	Unit Cost	Estimated Cost
CONTRACTOR FEES					
1	Remediation Facilities, Mobilization, Demobilization, and Site Maintenance - Remediation and decontamination facilities, site fencing, trailer, truck cleaning facilities, etc.		Lump Sum		$ 150,000.00
2	Management and Handling of Excavated Materials (Contaminated and Hazardous Materials)	11,000	Cubic Yard	$ 37.50	$ 412,500.00
3	Perimeter Support of Excavation (SOE) - Soldier Piles and Lagging	11,000	Square Foot	$ 200.00	$ 2,200,000.00
4	Off-Site Transport and Disposal of Soil - Includes transport vehicles and disposal of material at a permitted facility to achieve a Track 4 Cleanup.		Lump Sum		$ 2,000,000.00
5	Underground Storage Tank Removal - Registration, cleaning, removal and disposal of UST.	5	Each	$ 10,000.00	$ 50,000.00
6	Dewatering and Groundwater Treatment		Lump Sum		$ 900,000.00
7	Dust, Odor, and Vapor Control	8	Months	$ 10,000.00	$ 80,000.00
8	Backfill - Import and placement of clean fill. An additional 30% of material is included to account for compaction.	650	Cubic Yard	$ 55.00	$ 35,750.00
9	Vapor Barrier/Waterproofing Membrane - Materials and labor to install a vapor barrier/waterproofing membrane along the base and sidewalls of all development excavations.	80,000	Square Foot	$ 13.00	$ 1,040,000.00
				Contractor Fee Subtotal	*$ 6,868,250.00*
				10% Contingency of Contractor Fee Subtotal	*$ 686,825.00*
ENGINEERING FEES					
10	BCP Consulting, Reporting, and Engineering Services		Lump Sum		$ 1,410,000.00
11	Endpoint/Sidewall Sampling - To document residual site conditions following source material removal.	57	Samples	$ 1,200.00	$ 68,400.00
12	Post-Remediation Groundwater Monitoring - Installation of 2 groundwater monitoring wells and 8 quarterly groundwater monitoring events		Lump Sum		$ 90,000.00
13	Institutional and Engineering Control Certification - Accounts for fees associated with annual on-site inspections and preparation and submission of annual Periodic Review Reports for five years.	5	Per Year	$ 5,000.00	$ 25,000.00
				Engineering Fee Subtotal	*$ 1,593,400.00*
				10% Contingency of Engineering Fee Subtotal	*$ 159,340.00*
				Estimated Absolute Costs	**$ 9,400,000**

Table 4
Track 4 Remedial Cost Estimate
Remedial Action Work Plan

250 Water Street
New York, New York
BCP Site No.: C321127
Langan Project No.: 170381202

General Assumptions and Conditions:

- The density used for conversion from cubic yards (CY) to tons is 1.5 tons/CY.
- Costs provided are estimates.
- 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. This cost estimate is expected to be within -30% to +50% of the actual cost. Utilization of this cost 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.
- Assumes duration of remediation oversight will be 8 months.

Contractor Cost Assumptions

1 Includes mobilization and demobilization of equipment and materials necessary to excavate, transport, and dispose of the targeted soil per the Remedial Action Work Plan. Also includes labor and any project-related permit or regulation fees.
2 Management and handling of contaminated and potentially hazardous material assumes 25 percent increase in labor costs for OSHA trained labor. Baseline labor fees assumes $30 per cubic yard. Soil handling includes excavation for off-site disposal.
3 Perimeter support assumes that secant walls, soldier pile and lagging will be necessary along the Site extents where applicable. Square footage based on depth of remedial cut of 9 to 15 feet bgs. Remedial excavations along Site boundaries cannot be sloped and thus require excavation support.
4 The estimated volumes for the differing types of materials are based on the sampling results of the Phase II and remedial Investigation completed by Langan.
5 We assume that up to five USTs will be decommissioned. The estimated number of USTs is based on the results of the geophysical survey performed as part of the remedial investigation.
6 This estimate assumes dewatering with pre-treatment will be necessary to achieve development depth. Pre-treatment can include the following: (1) settling tank for the removal of large solids and free product, (2) granular activated carbon (GAC) filters for removal of dissolved organic compounds, (3) oil-water separator tank if free product is encountered, (4) ion exchange chambers, and (5) flocculation tanks.
7 Dust, odor and vapor control will be required throughout the duration of soil excavation. This cost estimate includes incremental costs associated with equipment and material necessary to monitor and mitigate vapor/odor emission.
9 Assumes a vapor barrier will be installed under the lowest level, foundation sidewalls, and includes a 20% area addition for waste.
10 Estimate includes, but is not limited to, fees for the RI, Remedial Investigation Report (RIR), and preparation of a Remedial Action Work Plan (RAWP), Final Engineering Report (FER) and data validation; implementation of a CAMP as required by the NYSDEC; the presence of an on-site field personnel throughout remediation; remediation health and safety including purchase and maintenance of appropriate personal protective equipment (PPE); periodic office reporting to the regulatory agency and attendance of at least two site meetings per month. Remediation Engineer will field contractor questions related to remediation during the bidding process and support the current site owner, as necessary, during the bid leveling process. Includes submittal review, responses to Requests for Information (RFI), and coordination with development team and the architect.
11 Endpoint soil sample collection will be completed from the excavation base at a frequency of one sample per 900 square feet including QA/QA samples.
12 To evaluate the efficacy of the remedy, two monitoring wells would be installed downgradient of the petroleum-impacted area and post-remediation groundwater monitoring will be performed. Post-remediation groundwater samples will be analyzed for Part 375 and Target Compound List (TCL)-listed volatile organic compounds (VOCs) and SVOCs. Groundwater
13 Costs are based on Langan's experience with regulatory programs and includes a Site Management Plan (SMP), and execution of and environmental easement.