REMEDIAL ACTION WORK PLAN

for

GERARD AVENUE AND EAST 146th STREET
404 Exterior Street, 417 and 445 Gerard Avenue,
440 Major Wm Deegan Boulevard
Bronx, New York
NYSDEC BCP Site No. C203111

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February 19, 2020
Langan Project No. 170487003

LANGAN

CERTIFICATION

I, Jason J. Hayes, certify that I am currently a New York State registered professional engineer as defined in 6 NYCRR Part 375 and that this Remedial Action Work Plan (RAWP) was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

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

DRAFT

NYS Professional Engineer	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.

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LIST OF ACRONYMS

Acronym	Definition
AGV	Air Guideline Value
AOC	Area of Concern
AST	Aboveground Storage Tank
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
Bgs	Below Grade Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Total Xylene
BUD	Beneficial Use Determination
CAMP	Community Air Monitoring Plan
CFR	Code of Federal Regulations
CQAP	Construction Quality Assurance Plan
CPP	Citizen Participation Plan
CSM	Conceptual Site Model
CVOC	Chlorinated Volatile Organic Compound
DER	Division of Environmental Remediation
DMM	Division of Materials Management
EC	Engineering Control
EE	Environmental Easement
el	Elevation
ELAP	Environmental Laboratory Approval Program
EPA	United States Environmental Protection Agency
ESA	Environmental Site Assessment
ESI	Environmental Site Investigation
FEMA	Federal Emergency Management Agency
FER	Final Engineering Report
HASP	Health and Safety Plan
IC	Institutional Control
ISCO	In-Situ Chemical Oxidation
µg/L	Microgram Per Liter
µg/m^3	Microgram Per Cubic Meter
mg/kg	Milligram Per Kilogram
mg/L	Milligram per Liter
NAVD88	North American Vertical Datum of 1988
NYCRR	New York Codes, Rules and Regulations
NYCDEP	New York City Department of Environmental Protection

Acronym	Definition
NYCDOB	New York City Department of Buildings
NYCDOT	New York City Department of Transportation
NYCOER	New York City Office of Environmental Remediation
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSHA	United States Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbon
PBS	Petroleum Bulk Storage
PCB	Polychlorinated Biphenyls
PCE	Tetrachloroethene
PFAS	Per- and poly-fluroalkyl substances
PGW	Protection of Groundwater
PID	Photoionization Detector
PPE	Personal Protective Equipment
ppm	Parts per million
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QEP	Qualified Environmental Professional
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCA	Recycled Concrete Aggregate
RCRA	Resource Conservation and Recovery Act
RE	Remediation Engineer
REC	Recognized Environmental Condition
RI	Remedial Investigation
RIR	Remedial Investigation Report
RURR	Restricted Use Restricted-Residential
SCG	Standards, Criteria, and Guidance
SCO	Soil Cleanup Objective
SGV	Standards and Guidance Values
SMMP	Soil/Materials Management Plan
SMP	Site Management Plan
SOE	Support of Excavation
SPDES	State Pollution Discharge Elimination System
SVOC	Semivolatile Organic Compound
TAL	Target Analyte List

Acronym	Definition
TCL	Target Compound List
TOGS	Technical and Operational Guidance Series
UST	Underground Storage Tank
UU	Unrestricted Use
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

This Remedial Action Work Plan (RAWP) was prepared on behalf of 445 Gerard LLC (the Volunteer) for the Gerard Avenue and East 146th Street site at 404 Exterior Street, 417 and 445 Gerard Avenue, and 440 Major Wm Deegan Boulevard in the Mott Haven neighborhood of the Bronx, New York (the site). The Volunteer entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) on June 27, 2018 and Brownfield Cleanup Program (BCP) Site No. C203111 was assigned to 417 and 445 Gerard Avenue and 440 Major Wm Deegan Boulevard (Bronx Borough Tax Block 2351, Lots 3, 12, and 20) by NYSDEC. A major modification to add 404 Exterior Street to the BCA was approved by the NYSDEC on December 18, 2019. The Volunteer proposes to remediate the site for residential and commercial use.

This RAWP summarizes the nature and extent of contamination as determined from data gathered during the September 2017 Subsurface Investigation, the Remedial Investigation (RI) of 417 and 445 Gerard Avenue and 440 Major Wm Deegan Boulevard completed from December 20, 2018 to January 17, 2019, and the RI of 404 Exterior Street completed between July 10 and 15, 2019. This RAWP identifies and evaluates remedial action alternatives, including Track 1 and Track 4 cleanups, their associated costs, and the recommended and preferred remedy. The remedy described in this document is consistent with the procedures defined in Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 375-3.8 and the NYSDEC Division of Environmental Remediation (DER) Program Policy: Technical Guidance 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 404 Exterior Street, 417 and 445 Gerard Avenue, and 440 Major Wm Deegan Boulevard, in the Mott Haven neighborhood of the Bronx, New York and is identified as Block 2351, Lots 1, 3, 12, and 20, on the Bronx Borough Tax Map. The site encompasses an area of about 38,000 square feet (about 0.87 acres) and is improved with a one-story warehouse with a partial cellar operated by a food distribution company (Lot 1), a vacant one-story warehouse and parking lot (Lot 3); a vacant one-story warehouse (Lot 12); and a vacant one-story warehouse with a partial cellar (Lot 20). The site is bound by East 146th Street to the north, Gerard Avenue to the east, East 144th Street to the south, and Exterior Street to the west.

According to a survey prepared by Langan, surface elevations range from about elevation (el) 13.4 feet (on Lots 1 and 3) to el 22 feet (on Lots 12 and 20). The topography of the site slopes west toward Harlem River, which is about 450 feet west of the site, with the surrounding land sloping towards the west.

Commercial and industrial facilities have occupied the site since the early 1900s. Lot 1 was occupied by a chemical laboratory/chemical manufacturing facility from 1944 to 1951, paint company from 1956 to 1965, and unspecified manufacturing facility from 1951 to 2007; Lot 3 was occupied by a parking garage from 1935 to 1977; Lot 12 was occupied by a taxi dispatch center (1930s to 1960s), an auto repair shop (1960s to 1980s), and an unspecified manufacturer (1990s to 2012); and Lot 20 was occupied by a public garage (1935-1951), a fire door manufacturer (1970s), a Con Edison garage (1977 to 1993), and a mirror fabrication facility (1993 to 2015). According to previous Phase I Environmental Site Assessments (ESAs) prepared by AEI Consultant and GEI Consultants, operations ceased on Lot 12 after 2016, and on Lot 20 sometime between 2005 and 2016. Lot 3 was most recently occupied by an advertising company (Clear Channel Outdoor) and was vacated sometime between March 2018 and the beginning of the RI in December 2018. Lot 1 is occupied by a food distribution company.

Summary of the Remedial Investigation

RI findings and conclusions are as follows:

1. Stratigraphy: Historic fill consisting predominantly of brown, fine- to medium-grained sand, with varying amounts of silt, clay, gravel, brick, coal, coal ash, slag, concrete, asphalt, glass, plastic, metal, ceramic tile, wood ash, and wood, was encountered across the site beneath the surface cover to depths ranging from about 2.5 to 24 feet bgs. Native soil encountered below historic fill consists predominantly of fine-to medium-grained sand with varying amounts of fine gravel and silt, and a clay layer varying in thickness between 1 and 7 feet, which was encountered at depths ranging between 13 and 24 feet. Bedrock was not encountered during a geotechnical investigation performed by Langan in September 2017; however, weathered rock consisting of decomposed mica, schist, quartz, and granite was encountered in several boring locations between 63 and 103 feet bgs.

2. Hydrogeology: Synoptic groundwater measurements were collected on July 26, 2019 from 14 of the 15 groundwater monitoring wells (RMW09 was inaccessible). Groundwater elevations ranged from el 2.26 to el 3.12, which correspond to depths of about 12.08 and 18.95 feet bgs, respectively. Groundwater generally flows to the west toward the Harlem River. Underground utilities, stratigraphy, and other subsurface structures may locally influence the direction of groundwater flow.

3. Petroleum Impacts in Soil, Groundwater and Soil Vapor: Petroleum impacts were identified across an area of roughly 16,650 square feet, occupying about 55% of the site. Petroleum-related VOCs were identified in several borings in the northern part of the site at concentrations that exceeded the Unrestricted Use (UU), Protection of Groundwater

(PGW) and/or Restricted Use Restricted-Residential (RURR) SCOs. Petroleum impacts in soil were primarily identified at or just below the groundwater interface. Petroleum-related VOCs in soil are likely related to impacted groundwater from releases associated with former site operations. Petroleum-related VOCs above NYSDEC Division of Water Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values (SGVs) for Class GA groundwater (SGVs) were identified in monitoring wells MW01, MW06, MW08, RMW01, RMW03, RMW09, RMW10, RMW11, and RMW14. Naphthalene was also identified in MW01, MW06, and RMW14 at concentrations above the SGV. SVOCs, specifically PAHs, above SGVs were identified in all monitoring wells with the exception of RMW11, RMW23, and RMW25. The concentrations of PAHs in groundwater, which are attributed to entrained sediments, are likely related to the on-site historic fill. Dissolved metals (including iron, magnesium, manganese, and sodium) were detected at concentrations above the SGVs in groundwater samples collected throughout the site. The petroleum-related VOCs detected in soil vapor are likely related to releases associated with former on-site operations.

4. Historic Fill: SVOCs were detected in historic fill across the site at concentrations exceeding the UU, PGW, and/or RURR SCOs to depths of up to 20 feet bgs. Metals, including lead, arsenic, and mercury, were detected in historic fill across the site at concentrations exceeding the UU and/or RURR SCOs to depths of up to 25 feet bgs. A hazardous concentration of lead was identified in one surficial sample (0 to 2 bgs) from RB06 located in the southern part of Lot 3. Pesticides were detected at concentrations above UU SCOs in seven borings. SVOCs, metals and pesticides in soil are likely related to the nature of the historic fill material.

5. Native Soil: 4,4'-DDT and four metals (arsenic, trivalent chromium, lead, mercury) were detected above Part 375 UU SCOs in native soil samples collected from five borings (RB07, RB18, RB19, RB21, RB22). These detections may be a result of infiltration of historic fill material into the borehole during sample collection.

6. Soil Vapor: Petroleum-related VOCs were detected in soil vapor. The chlorinated solvents carbon tetrachloride and PCE were detected at concentrations of up to 27.2 µg/m^3 and 57.1 µg/m^3, respectively. Carbon tetrachloride and PCE in soil vapor may be indicative of an off-site chemical release associated with historical or current use of surrounding properties, or from former site operations, although carbon tetrachloride and PCE were not identified in soil or groundwater.

Qualitative Human Health Exposure Assessment

Based on the conceptual site model (CSM) and the review of environmental data, complete on-site exposure pathways appear to be present, in the absence of engineering controls, in current and construction-phase conditions. The complete exposure pathways indicate there is a risk of exposure to humans from site contaminants via exposure to soil, groundwater, and soil vapor if mitigation and controls are not implemented.

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

Contaminant sources include historic fill with varying concentrations of SVOCs, metals, and pesticides; petroleum-impacted soil and groundwater containing varying concentrations of VOCs and/or SVOCs; and soil vapor with carbon tetrachloride, PCE, and petroleum-related VOCs.

Contaminant release and transport mechanisms include potential release and transport during penetration of the site cover for soil, groundwater, and soil vapor sampling. The potential receptors are the tenants in Lot 1, the on-site sampling personnel, and the nearby public. Under current conditions, the likelihood of exposure to humans is limited due to the following:

- The site footprint is covered by a continuous concrete building slabs and an asphalt-paved lot (Lot 3), which prevents direct contact with soil, groundwater, and soil vapor.
- The site is fenced off and warehouse buildings on Lots 3, 12, and 20 are vacant and locked, preventing access to the public.
- The warehouse building on Lot 1 is locked, preventing access to the public.
- Sampling activities are completed in accordance with a health and safety plan (HASP) and community air monitoring plan (CAMP) that is designed to monitor and prevent exposure to soil, groundwater, and soil vapor contaminants.
- Groundwater at the site is not a potable water source.

Construction/Remediation Activities

During the excavation and foundation construction stage of redevelopment, which includes remediation, points of exposure include disturbed and exposed soil during excavation, dust and potential organic vapors generated during excavation, and contaminated groundwater

encountered during excavation and/or dewatering operations. Routes of exposure include ingestion and dermal absorption of contaminated soil and groundwater, inhalation of potential organic vapors arising from contaminated soil vapor and groundwater, and inhalation of dust originating from contaminated soil. The receptor population includes construction and remediation workers and, to a lesser extent, the public adjacent to the site.

The potential for completed exposure pathways is present since all five elements exist; however, the risk can be avoided or minimized by applying appropriate health and safety measures during construction and remediation, such as monitoring the air for organic vapors and dust, using vapor and dust suppression measures, cleaning truck undercarriages and securing tarp covers before they leave the site to prevent off-site soil tracking, maintaining site security, and wearing the appropriate personal protective equipment (PPE).

A health and safety plan (HASP), a RAWP, and a CAMP that include 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. Such measures will prevent completion of potential migration pathways for soil, groundwater, and soil vapor.

Proposed Future Conditions

For the proposed future conditions, residual contaminants may remain on-site. If residual impacts exist and engineering/institutional controls are not implemented, points of exposure could include potential cracks in the foundation of the proposed development, exposure during any future ground-intrusive work, or inhalation of vapors entering the building. The receptor population includes residential and commercial use occupants, employees, and the nearby community, including children. The possible routes of exposure can be avoided or mitigated by removal of contaminated soil or construction and maintenance of a site capping system (e.g., concrete building slab or at least 2 feet of clean soil), installation of a vapor barrier/waterproofing, and implementation of a Site Management Plan (SMP), if necessary, depending on the remedy.

Human Health Exposure Assessment Conclusions

1. Human exposure to site contaminants is limited under current conditions due to the surface cover, and access is limited to investigation workers, workers on Lot 1 and authorized guests. The primary exposure pathways are dermal contact, ingestion, and inhalation of soil, groundwater, or soil vapor by site investigation workers and, to a lesser extent, the nearby public. The exposure risks can be avoided or minimized by following

the appropriate HASP and vapor and dust suppression measures, and by implementing a CAMP during investigation activities.

2. In the absence of mitigation and controls, there is potential for exposure during the construction-phase activities. The primary exposure pathways are:

    a. Dermal contact, ingestion, and inhalation of contaminated soil, groundwater, 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 can be avoided or minimized by implementing a CAMP and by following the appropriate HASP, vapor and dust suppression, site security measures, and following a NYSDEC-approved RAWP.

3. The existence of a complete exposure pathway for site contaminants to human receptors during proposed future conditions is unlikely, as contaminated soil will be excavated and transported to an off-site disposal facility, groundwater will be remediated, and residual soil will be capped, if required, with an impermeable cover or 2 feet of clean soil. Regional groundwater is not used as a potable water source in New York City. The potential pathway for soil vapor intrusion into the building would be addressed by installation of a vapor barrier/waterproofing, which will minimize soil vapor infiltration.

4. It is possible that a complete exposure pathway exists for the migration of site contaminants to off-site human receptors during current, construction-phase, and future conditions. Monitoring and control measures have been and will continue to be used during investigation and construction to prevent completion of this pathway. Under future conditions, the site will be remediated and engineering and institutional controls will be implemented, if necessary, to prevent completion of this pathway

Summary of the Remedy

The selected remedy will include the following elements:

- Completion of in-situ groundwater treatment via injection of activated persulfate and oxygen release compound on the northern half of the site
- Abatement of hazardous materials (including asbestos-containing material [ACM] identified in floor tile, pipe and boiler insulation, roofing materials, duct tar, window and door caulking, and various mastics; lead-based paint [LBP] identified at various locations in the four buildings; and other universal waste and miscellaneous hazardous waste

articles) and demolition of the existing buildings in order to prepare the site for remediation

- Screening of all excavated soil for visual, olfactory or instrumental indications of contamination during intrusive site work
- Construction of the support of excavation (SOE) system to facilitate the Track 4 remediation
- Dewatering and treatment, as necessary, to accommodate the removal of material that exceeds SCOs, reach the proposed development subgrade depth, and facilitate foundation construction
- Excavation, stockpiling, off-site transport, and disposal of historic fill and native soil to achieve a Track 4 cleanup - Installation of SOE will be required. The following soil types will be removed to achieve a Track 4 cleanup:
    - Soil in the upper two feet of material that exceeds the RURR SCOs
    - Soil above the groundwater table that exceeds the PGW SCOs, as defined by 6 NYCRR Part 375-6.8 for those contaminants found in site groundwater above SGVs. Soil below the groundwater table that exceed the PGW SCOs, as defined by 6 NYCRR Part 375-6.8 for those contaminants found in site groundwater above SGVs will be treated via an in-situ chemical oxidation program
    - Soil that exceeds the 6 NYCRR Part 371 hazardous criteria for lead
    - Soils that create a nuisance condition, as defined in Commissioner Policy CP-51 Section G
- Removal and decommissioning of any encountered USTs, associated appurtenances (e.g., fill lines, vent line, and electrical conduit) or other potential sources and disposal off-site
- Collection and analysis of bottom documentation soil samples in accordance with DER-10 to document post-excavation conditions in relation to PGW and RURR SCOs
- Importation of certified-clean material (i.e., material meeting the lower of PGW and RURR SCOs), recycled concrete aggregate (RCA), or virgin, native crushed stone to backfill over-excavated areas to construction depth
- Development and implementation of a HASP and CAMP for the protection of on-site workers, community/residents, and the environment during remediation and construction activities

- Establishment of use restrictions (institutional controls [IC]) including prohibitions on the use of groundwater from the site and prohibitions on sensitive site uses, such as farming or vegetable gardening in residual site soil, to mitigate future exposure pathways
- Establishment of engineering controls (EC), which include installation of a site cover system consisting of the concrete building foundation and/or a minimum of two feet of clean fill in areas not capped by the building foundation. A vapor barrier/waterproofing membrane will be installed as part of the composite cap, and will also serve to mitigate potential soil vapor intrusion into the planned building.
- Establishment of an approved SMP to facilitate long-term management of ECs and ICs, including the performance of periodic inspections and certification that the controls are performing as they were intended
- Recording of an Environmental Easement (EE) to memorialize the remedial action and the ECs and ICs, and require that future owners of the site continue to maintain these controls

1.0 INTRODUCTION

This Remedial Action Work Plan (RAWP) was prepared on behalf of 445 Gerard LLC (the Volunteer) for the Gerard Avenue and East 146th Street site at 404 Exterior Street, 417 and 445 Gerard Avenue, and 440 Major Wm Deegan Boulevard in the Mott Haven neighborhood of the Bronx, New York (the site). The Volunteer intends to remediate the site in conjunction with redevelopment under the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP), pursuant to the June 27, 2018 Brownfield Cleanup Agreement (BCA) for Site No. C203111 and major modification of the BCA to add 404 Exterior Street. The Volunteer proposes to remediate the site for residential and commercial use.

This RAWP summarizes the nature and extent of contamination as determined from data gathered during the September 2017 Subsurface Investigation, the Remedial Investigation (RI) of 417 and 445 Gerard Avenue and 440 Major Wm Deegan Boulevard completed from December 20, 2018 to January 17, 2019, and the RI of 404 Exterior Street completed between July 10 and 15, 2019. This RAWP identifies and evaluates remedial action alternatives, including Track 1 and 4 cleanups, their associated costs, and the recommended and preferred remedy. The remedy described in this document is consistent with the procedures defined in Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 375-3.8 and the NYSDEC Division of Environmental Remediation (DER) Program Policy: Technical Guidance for Site Investigation and Remediation (DER-10) and complies with applicable federal, state, and local laws, regulations, and requirements. The NYSDEC and New York State Department of Health (NYSDOH) have not yet determined if the site poses a significant threat to human health and the environment. The significant threat determination will be made following receipt of the results from the supplemental remedial investigation (SRI) requested by the NYSDEC in a letter dated January 27, 2020. The RI for this site did not identify fish and wildlife resources.

1.1 Site Location and Description

The site is located at 404 Exterior Street, 417 and 445 Gerard Avenue, and 440 Major Wm Deegan Boulevard, in the Mott Haven neighborhood of the Bronx, New York and is identified as Block 2351, Lots 1, 3, 12, and 20, on the Bronx Borough Tax Map. The site encompasses an area of about 38,000 square feet (about 0.87 acres) and is improved with a one-story warehouse with a partial cellar operated by a food distribution company (Lot 1), a vacant one-story warehouse and parking lot (Lot 3); a vacant one-story warehouse (Lot 12); and a vacant one-story warehouse with a partial cellar (Lot 20). The site is bound by East 146th Street to the north, Gerard Avenue to the east, East 144th Street to the south, and Exterior Street to the west. The United States Geological Survey (USGS) 7.5 minute series Central Park Quadrangle Map with the site boundary is provided as Figure 1. A boundary map is attached to the Brownfield Cleanup Agreement (BCA), as required

by Environmental Conservation Law (ECL) Title 14 Section 27-1419. The site boundary is consistent with the tax lot boundary for Block 2351. A site plan is provided as Figure 2.

According to the survey prepared by Langan, surface elevations range from about elevation (el) 12 feet (on Lots 1 and 3) to el 22 feet (on Lots 12 and 20). The topography of the site slopes west toward Harlem River, which is about 450 feet west of the site, with the surrounding land sloping towards the west. The survey is included as Appendix A.

1.2 Redevelopment Plan

The proposed redevelopment plan and end use is described here to provide the basis for this assessment. However, the Remedial Action contemplated under this RAWP may be implemented independent of the proposed redevelopment plan. The purpose of the project is to implement remedial measures that are protective of human health and the environment, while developing a contaminated parcel of land into a viable community, recreational, and residential space.

Current plans call for the development to include abatement and demolition of the existing warehouse buildings and construction of a 12-story mixed-use residential and commercial building with a partial cellar and total building footprint of about 38,000 square feet. The cellar slab elevation is at about 12 feet NAVD88. The site cover will consist of the concrete building foundation slab.

The proposed project is consistent with the Lower Concourse Special Mixed Use Paired District (M1-4/R8A) zoning. This paired district promotes development and expansion of the longstanding mix of residential, commercial, industrial, and cultural use throughout the area. M1 districts typically include light industrial uses such as woodworking shops, repair shops, and wholesale service and storage facilities, and R8 districts promote residential development.

1.3 Description of Surrounding Property

The site is located in a mixed-use area with commercial, industrial, institutional, and parking uses nearby. The following is a summary of surrounding property usage:

Direction	Adjoining and Adjacent Properties			Surrounding Properties
	Block No.	Lot No.	Description	
North	East 146th Street			Vacant lots
	2351	22	11-story Holiday Inn and an active construction site (500 Exterior Street)	
East	Gerard Avenue			Multi-story industrial and

Direction	Adjoining and Adjacent Properties			Surrounding Properties
	Block No.	Lot No.	Description	
	2350	1	Vacant lot (414 Gerard Avenue) BCP Site No. C203106	institutional buildings, vacant lots, and open space and outdoor recreation areas
		5	One-story industrial warehouse (444 Gerard Avenue)	
		24	Two-story institutional building (131 East 146th Street)	
South	East 144th Street			Multi-story industrial and institutional buildings and parking lots
	2344	112	Two-story industrial warehouse (120 East 144th Street)	
	2349	90	Twelve-story storage warehouse (385 Gerard Avenue)	
West	Major Wm Deegan Boulevard (also known as Exterior Street)			Harlem River
	2349	100	Parking Lot (339 Exterior Street)	
		103	Two-story industrial warehouse (441 River Avenue)	
		107	Two-story industrial warehouse (445 River Avenue)	

Public infrastructure (storm drains, sewers, and underground utility lines) exists within the streets surrounding the site.

Land use within a half-mile radius is urban and includes residential, commercial, institutional, and light industrial buildings and public parks. The nearest ecological receptor is the Harlem River, located about 450 feet west of the site. Sensitive receptors, as defined in NYSDEC DER-10, located within a half mile of the site are listed in the following table:

Number	Name (approximate distance from site)	Address
1	Family Life Academy Charter School III (450 feet south of the site)	370 Gerard Avenue Bronx, NY 10451
2	Community School for Social Justice (650 feet south of the site)	350 Gerard Avenue Bronx, NY 10451
3	Health Opportunities High School (750 feet south of the site)	350 Gerard Avenue Bronx, NY 10451

Number	Name (approximate distance from site)	Address
4	Cuddly Bundles Childcare (1,090 feet northeast of the site)	137 East 150th Street Bronx, NY 10451
5	KIPP NYC College Prep (1,220 feet east of the site)	201 East 144th Street Bronx, NY 10451
6	Children's Pride, New York City Housing Authority Day Care Center (1,700 feet east of the site)	414 Morris Avenue Bronx, NY 10451
7	Sunshine Learning Center (1,730 feet southeast of the site)	253 East 142nd Street Bronx, NY 10451
8	Cardinal Hayes High School (1,740 feet northeast of the site)	650 Grand Concourse Bronx, NY 10451
9	Bronx 1 Success Academy Charter School (about 1,800 feet southeast of the site)	339 Morris Avenue Bronx, NY 10451
10	P.S. 018 John Peter Zenger (2,050 feet east of the site)	502 Morris Avenue Bronx, NY 10451
11	KIPP Academy Elementary School (2,230 feet northeast of the site)	730 Concourse Village West Bronx, NY 10451
12	Careers in Sports High School (2,300 feet northeast of the site)	730 Concourse Village West Bronx, NY 10451
13	Family Life Academy Charter School II (2,550 feet southeast of the site)	296 East 140th Street Bronx, NY 10451
14	New Explorers High School (2,600 feet northeast of the site)	730 Concourse Village West Bronx, NY 10451
15	Bronx Leadership Academy II High School (2,630 feet northeast of the site)	730 Concourse Village West Bronx, NY 10451

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The RI was completed in accordance with 6 NYCRR Part 375, DER-10, the NYSDEC Draft BCP Guide (May 2004), and the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006 and subsequent updates). The RI on Lots 3, 12, and 20 was completed between December 20, 2018, and January 17, 2019 under the NYSDEC-approved RIWP. The RI on Lot 1 was completed between July 10 and 15, 2019, prior to its acceptance into the BCP, under the general guidance of the NYSDEC-approved RIWP. The RIs were completed to investigate AOCs and to determine, to the extent practical, the nature and extent of contamination in soil, groundwater, and soil vapor. The RIR was approved by the NYSDEC on January 27, 2020. A Supplemental Remedial Investigation (SRI) is being conducted per the NYSDEC request letter dated January 27, 2020.

2.1 Field Investigation

2.1.1 Borings and Wells

A total of 28 borings and 17 monitoring wells were installed. The boring and monitoring well locations and the dates of installation are shown below:

Boring Location/Monitoring Well Location	Date Installed
RB01/RMW01	12/27/2018
RB02	12/26/2018
RB03/RMW03	12/26/2018
RB04/RMW04	12/21/2018
RB05/RMW05	12/21/2018
RB06	12/21/2018
RB07/RMW07	12/20/2018
RB08	12/27/2018
RB09/RMW09	1/2/2019
RB10	1/8/2019
RB11/RMW11	1/2/2019
RB12	12/26/2018

Boring Location/Monitoring Well Location	Date Installed
RB13	1/7/2019
RB14/RMW14	1/7/2019
RB15	1/8/2019
RB16/RMW16	1/8/2019
RB17	1/4/2019
RB18	1/4/2019
RB19	1/3/2019
RB20	1/4/2019
RB21	1/3/2019
RB22/RMW22	1/3/2019
RB23/RMW23	7/10/2019
RB24	7/10/2019
RB25/MW25	7/11/2019
RB26	7/11/2019
RB27	7/11/2019
RB28	7/11/2019

A total of 13 vapor points were installed. The vapor points and the date of installation are listed below:

Soil Vapor Point / Ambient Air Location	Date Installed
RSV01	1/2/2019
RSV02	1/2/2019
RSSV01	1/2/2019
RSSV02	1/2/2019
RSSV03	1/2/2019
RSSV04	1/2/2019
RSSV05	1/9/2019
RSSV06	1/9/2019
RSSV07	1/2/2019
RSSV08	7/15/2019
RSSV09	7/15/2019
RAA01	1/2/2019
RAA02	7/15/2019

2.1.2 Samples Collected

- Advancement of 28 soil borings and collection of 101 grab soil samples (including seven duplicate samples)
- Installation of 15 groundwater monitoring wells and collection of 17 groundwater samples (including two duplicate samples)
- Surveying and synoptic gauging of newly installed groundwater monitoring wells to determine local groundwater flow direction
- Installation of two soil vapor points and nine sub-slab vapor points, and collection of two soil vapor samples, nine sub-slab vapor samples, and two ambient air sample

2.1.3 Chemical Analytical Work Performed

Sample No.	Sample ID	Boring Location	Sample Depth (feet bgs)	Date	Analysis
	SOIL SAMPLES				
1	RB01_0-2	RB01/RMW01	0 to 2	12/27/2018	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide
2	RB01_9-11		9 to 11	12/27/2018	
3	RB01_14-15		13 to 15	12/27/2018	
4	RB01_25-27		25 to 27	12/27/2018	
5	RB02_0-2	RB02	0 to 2	12/26/2018	
6	RB02_7-9		7 to 9	12/26/2018	
7	RB02_10-12		10 to 12	12/26/2018	
8	RB02_13-15		13 to 15	12/26/2018	
9	RB03_0-2	RB03/RMW03	0 to 2	12/26/2018	
10	RB03_2-3		2 to 3	12/26/2018	
11	RB03_10-12		10 to 12	12/26/2018	
12	RB03_17-18		17 to 18	12/26/2018	
13	RB04_0-2	RB04/RMW04	0 to 2	12/21/2018	
14	RB04_8-10		8 to 10	12/21/2018	
15	RB04_13-15		13 to 15	12/21/2018	
16	RB04_18-20		18 to 20	12/21/2018	
17	RB05_0-2	RB05/RMW05	0 to 2	12/21/2018	
18	RB05_8-10		8 to 10	12/21/2018	
19	RB05_13-15		13 to 15	12/21/2018	
20	RB05_19-21		19 to 21	12/21/2018	
21	RB06_0-2	RB06	0 to 2	12/21/2018	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, Total Cyanide, and TCLP Lead
22	RB06_8-10	RB06	8 to 10	12/21/2018	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals,

Sample No.	Sample ID	Boring Location	Sample Depth (feet bgs)	Date	Analysis
23	RB06_10-12	RB06	10 to 12	12/21/2018	Hexavalent/Trivalent Chromium, and Total Cyanide
24	RB07_0-2	RB07/RMW07	0 to 2	12/20/2018	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide, PFAS, and 1,4-Dioxane
25	RB07_8-10		8 to 10	12/20/2018	
26	RB07_10-12		10 to 12	12/20/2018	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide
27	RB08_0-2	RB08	0 to 2	12/27/2018	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide, PFAS, and 1,4-Dioxane
28	RB08_10-12		10 to 12	12/27/2018	
29	RB08_12-14		12 to 14	12/27/2018	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide
30	RB08_14-16		14 to 16	12/27/2018	
31	RB09_0-2	RB09/RMW09	0 to 2	1/2/2019	
32	RB09_19-21		19 to 21	1/2/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide, PFAS, and 1,4-Dioxane
33	RB09_28-30		28 to 30	1/2/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide
34	RB10_0-2	RB10	0 to 2	1/8/2019	
35	RB10_18-20		18 to 20	1/8/2019	
36	RB10_33-35		33 to 35	1/8/2019	
37	RB11_0-2	RB11/RMW11	0 to 2	1/2/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide, PFAS, and 1,4-Dioxane
38	RB11_19-21		19 to 21	1/2/2019	
39	RB11_28-30		28 to 30	1/2/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide
40	RB12_0-2	RB12	0 to 2	12/26/2018	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide
41	RB12_10-12		10 to 12	12/26/2018	
42	RB12_8-9		8 to 9	12/26/2018	
43	RB12_9-10		9 to 10	12/26/2018	
44	RB13_0-2	RB13	0 to 2	1/7/2019	

Sample No.	Sample ID	Boring Location	Sample Depth (feet bgs)	Date	Analysis
45	RB13_18-20	RB13	18 to 20	1/7/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide
46	RB13_22-24	RB13	22 to 24	1/7/2019	
47	RB13_33-35	RB13	33 to 35	1/7/2019	
48	RB14_0-2	RB14/RMW14	0 to 2	1/7/2019	
49	RB14_18-20		18 to 20	1/7/2019	
50	RB14_23-25		23 to 25	1/7/2019	
51	RB14_33-35		33 to 35	1/7/2019	
52	RB15_0-2	RB15	0 to 2	1/8/2019	
53	RB15_18-20		18 to 20	1/8/2019	
54	RB15_23-25		23 to 25	1/8/2019	
55	RB15_28-30		28 to 30	1/8/2019	
56	RB16_0-2	RB16/RMW16	0 to 2	1/8/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide, PFAS, and 1,4-Dioxane
57	RB16_18-20		18 to 20	1/8/2019	
58	RB16_13-15		13 to 15	1/8/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide
59	RB17_0-2	RB17	0 to 2	1/4/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide, PFAS, and 1,4-Dioxane
60	RB17_4-6		4 to 6	1/4/2019	
61	RB17_8-10		8 to 10	1/4/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide
62	RB17_18-20		18 to 20	1/4/2019	
63	RB18_0-2	RB18	0 to2	1/4/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide, PFAS, and 1,4-Dioxane
64	RB18_6-8		6 to 8	1/4/2019	
65	RB18_15-17		15 to 17	1/4/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide
66	RB18_18-20		18 to 20	1/4/2019	
67	RB19_0-2	RB19	0 to 2	1/3/2019	
68	RB19_20-22	RB19	20 to 22	1/3/2019	

Sample No.	Sample ID	Boring Location	Sample Depth (feet bgs)	Date	Analysis
69	RB19_24-25	RB19	24 to 25	1/3/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide
70	RB20_0-2	RB20	0 to 2	1/4/2019	
71	RB20_7-9		7 to 9	1/4/2019	
72	RB20_13-15		13 to 15	1/4/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, Total Cyanide, and TCLP Lead
73	RB20_18-20		18 to 20	1/4/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide
74	RB21_0-2	RB21	0 to 2	1/3/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, Total Cyanide, and TCLP Lead
75	RB21_2-4		2 to 4	1/3/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide
76	RB21_18-20		18 to 20	1/3/2019	
77	RB22_0-2	RB22/RMW22	0 to 2	1/3/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide, PFAS, and 1,4-Dioxane
78	RB22_3-5		3 to 5	1/3/2019	
79	RB22_20-22		20 to 22	1/4/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide
80	RB23_0-2	RB23/RMW23	0 to 2	7/10/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, Total Cyanide, PFAS, and 1,4-Dioxane
81	RB23_10-12		10 to 12	7/10/2019	
82	RB23_13-15		13 to 15	7/10/2019	
83	RB23_0-2	RB24	0 to 2	7/10/2019	
84	RB23_3-5		10 to 12	7/10/2019	
85	RB23_20-22		13-15	7/10/2019	
86	RB25_0-2	RB25/MW25	0 to 2	7/11/2019	
87	RB25_9-11		10 to 12	7/11/2019	
88	RB25_11-13		13-15	7/11/2019	
89	RB26_0-2	RB26	0 to 2	7/11/2019	
90	RB26_10-12	RB26	10 to 12	7/11/2019	

Sample No.	Sample ID	Boring Location	Sample Depth (feet bgs)	Date	Analysis
91	RB26_14-16	RB26	14 to 16	7/11/2019	
92	RB27_0-2	RB27	0 to 2	7/11/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, Total Cyanide, PFAS, and 1,4-Dioxane
93	RB27_9-11		9 to 11	7/11/2019	
94	RB27_11-13		11 to 13	7/11/2019	
95	RB28_0-2	RB28	0 to 2	7/11/2019	
96	RB28_6- 8		6 to 8	7/11/2019	
97	RB28_14-16		14 to 16	7/11/2019	
	SOIL QA/QC SAMPLES				
98	SODUP01_122118	RB04	8 to 10	12/21/2018	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide
99	SODUP02_122718	RB08	14 to 16	12/27/2018	
100	SODUP03_010219	RB09	19 to 21	1/2/2019	
101	SODUP04_010719	RB14	23 to 25	1/4/2019	
102	SODUP05_010819	RB15	23 to 25	1/8/2019	
103	SODUP06_070919	RB11	0 to 2	7/9/2019	PFAS and 1,4-Dioxane
104	SODUP06_071119	RB28	6 to 8	7/11/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, Total Cyanide, PFAS (21-compound list), and 1,4-Dioxane
105	RB01_25-27	RB01	25 to 27	12/29/2018	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide
106	RB21_2-4	RB21	2 to 4	1/3/2019	
107	RB13_22-24	RB13	22 to 24	1/7/2019	
108	RB10_33-35	RB10	23 to 24	1/8/2019	
109	RB15_28-30	RB15	24 to 24	1/8/2019	
110	SOFB01_122118	NA	NA	12?21/18	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide
111	SOFB02_122718			12/27/2018	
112	SOFB03_010719			1/7/2019	

Sample No.	Sample ID	Boring Location	Sample Depth (feet bgs)	Date	Analysis
113	SOFB04_010819	NA	NA	1/8/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, and Total Cyanide
114	SOFB05_070919			7/9/2019	
115	SOFB05_071019			7/10/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Hexavalent/Trivalent Chromium, Total Cyanide, PFAS (21-compound list), and 1,4-Dioxane
116	SOTB01_122118	NA	NA	12/21/2018	Part 375/TCL VOCs
117	SOTB02_122618			12/26/2018	
118	SOTB03_122718			12/27/2018	
119	SOTB04_010219			1/2/2019	
120	SOTB05_010319			1/3/2019	
121	SOTB06_010719			1/7/2019	
122	SOTB07_010819			1/8/2019	
123	SOTB06_071019			7/10/2019	
124	SOTB07_071119			7/11/2019	
	GROUNDWATER SAMPLES				
1	RMW01_011619	RB01/RMW01	5 to 20	1/16/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals (total and dissolved), Hexavalent/Trivalent Chromium, and Total Cyanide
2	RMW03_011519	RB03/RMW03	10 to 25	1/15/2019	
3	RMW04_011519	RB04/RMW04	9 to 24	1/15/2019	
4	RMW05_011519	RB05/RMW05	8 to 23	1/15/2019	
5	RMW07_011619	RB07/RMW07	4 to 24	1/16/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals (total and dissolved), Hexavalent/Trivalent Chromium, Total Cyanide, PFAS, and 1,4-Dioxane
6	RMW09_011619	RB09/RMW09	13 to 28	1/16/2019	

Sample No.	Sample ID	Boring Location	Sample Depth (feet bgs)	Date	Analysis
7	RMW10_011719	RB10/RMW10	18 to 28	1/17/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals (total and dissolved), Hexavalent/Trivalent Chromium, and Total Cyanide
8	RMW11_011719	RB11/RMW11	13 to 28	1/17/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals (total and dissolved), Hexavalent/Trivalent Chromium, and Total Cyanide
9	RMW14_011719	RB14/RMW14	17 to 27	1/17/2019	
10	RMW16_011719	RB16/RMW16	17 to 27	1/17/2019	
11	RMW17_011719	RB17/RMW17	18 to 28	1/17/2019	
12	RMW18_011419	RB18/RMW18	17 to 27	1/14/2019	
13	RMW22_011419	RB22/RMW22	17 to 27	1/14/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals (total and dissolved), Hexavalent/Trivalent Chromium, Total Cyanide, PFAS, and 1,4-Dioxane
14	RMW23_071219	RB23/RMW23	9 to 19	7/12/2019	
15	RMW25_071219	RB25/RMW25	10 to 20	7/12/2019	
	GROUNDWATER QA/QC SAMPLES				
16	GWDUP01_011519	RB03/RMW03	10 to 25	1/15/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals (total and dissolved), Hexavalent/Trivalent Chromium, and Total Cyanide
17	GWDUP02_071219	RB23/RMW23	9 to 19	7/12/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals (total and dissolved), Hexavalent/Trivalent Chromium, Total Cyanide, PFAS, and 1,4-Dioxane
18	RMW04_011519	RB04/RMW04	9 to 24	1/15/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals (total and dissolved), Hexavalent/Trivalent Chromium, and Total Cyanide
19	GWFB01_011419	NA	NA	1/14/2019	PFAS and 1,4-Dioxane
20	GWFB02_011619		NA	1/16/2019	Part 375/TCL VOCs, SVOCs, PCBs, Pesticides, Herbicides, TAL Metals (total and dissolved), Hexavalent/Trivalent Chromium, Total Cyanide, PFAS, and 1,4-Dioxane
21	GWTB01_011419	NA	NA	1/14/2019	Part 375/TCL VOCs
22	GWTB02_011519			1/15/2019	
23	GWTB03_011519			1/16/2019	

Sample No.	Sample ID	Boring Location	Sample Depth (feet bgs)	Date	Analysis
24	GWTB04_011519	NA	NA	1/17/2019	Part 375/TCL VOCs
	SOIL VAPOR SAMPLES				
1	RSV01_123118	RSV01	9	1/2/2019	TO-15 VOCs
2	RSV02_123118	RSV02	8	1/2/2019	
3	RSSV01_123118	RSSV01	0.5	1/2/2019	
4	RSSV02_123118	RSSV02	1.17	1/2/2019	
5	RSSV03_123118	RSSV03	1.17	1/2/2019	
6	RSSV04_123118	RSSV04	1.17	1/2/2019	
7	RSSV05_010919	RSSV05	0.33	1/9/2019	
8	RSSV06_010919	RSSV06	0.83	1/9/2019	
9	RSSV07_123118	RSSV07	0.83	1/2/2019	
10	RSSV08_071519	RSSV08	0.5	7/15/2019	
11	RSSV09_071519	RSSV07	0.5	7/15/2019	
	SOIL VAPOR QA/QC SAMPLES				
12	RAA01_123118	RAA01	NA	1/2/2019	TO-15 VOCs
13	RAA02_071519	RAA02	NA	7/15/2019	TO-15 VOCs

Notes:

1. VOC = Volatile Organic Compound
2. SVOC = Semi-volatile Organic Compound
3. PCB = Polychlorinated Biphenyl
4. TCL = Target Compound List
5. TAL = Target Analyte List
6. TCLP = Toxicity Characteristic Leaching Procedure
7. NA = Not Applicable
8. MS/MSD = Matrix Spike/Matrix Spike Duplicate
9. QA/QC = Quality Assurance/Quality Control
10. bgs = Below Grade Surface
11. PFAS = Per- and polyfluoroalkyl substances

2.1.4 Summary of Remedial Investigation Findings

The conclusions are based on data collected during the September 2017 Subsurface Investigation and RI. Soil, groundwater, and soil vapor analytical results are shown on Figures 3, 4a, 4b, and 5. Cross-sectional diagrams showing inferred soil profiles are included as Figures 6A and 6B. The findings summarized herein are based on qualitative data (field observations and instrumental readings) and laboratory analytical soil, groundwater, and soil vapor sample results. Findings and conclusions are as follows:

1. Stratigraphy: Historic fill consisting predominantly of brown, fine- to medium-grained sand with varying amounts of silt, clay, gravel, brick, coal, coal ash, slag, concrete, asphalt, glass, plastic, metal, ceramic tile, wood ash, and wood was encountered across the site beneath the surface cover to depths ranging from about 2.5 to 24 feet bgs. Native soil encountered below historic fill consists predominantly of fine- to medium-grained sand with varying amounts of fine gravel and silt, and a clay layer varying in thickness between 1 and 7 feet, which was encountered at depths ranging between 13 and 24 feet. Bedrock was not encountered during the remedial investigation or a geotechnical investigation performed by Langan in September 2017; however, weathered rock consisting of decomposed mica, schist, quartz, and granite was encountered in several boring locations between 63 and 103 feet bgs.

2. Hydrogeology: Synoptic groundwater measurements were collected on July 26, 2019 from 14 of the 15 groundwater monitoring wells (RMW09 was inaccessible). Groundwater elevations ranged from el 2.26 to el 3.12, which correspond to depths of about 12.08 and 18.95 feet bgs, respectively. Groundwater generally flows to the west toward the Harlem River. Underground utilities, stratigraphy, and other subsurface structures may locally influence the direction of groundwater flow.

3. Petroleum Impacts in Soil, Groundwater and Soil Vapor: Petroleum impacts were generally identified in soil samples at or below the water table from about 13 to 32 feet bgs, across an area of roughly 16,650 square feet, occupying about 55% of the site. Petroleum-related VOCs were identified in several borings in the northern part of the site at concentrations that exceeded the UU, PGW and/or RURR SCOs. Petroleum impacts in soil were primarily identified at or just below the groundwater interface. Petroleum-related VOCs in soil are likely related to impacted groundwater from releases associated with former site operations. Petroleum-related VOCs above NYSDEC Division of Water Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values (SGVs) for Class GA groundwater (SGVs) were identified in monitoring wells MW01, MW06, MW08, RMW01, RMW03, RMW09, RMW10, RMW11, and RMW14. Naphthalene was also identified in MW01, MW06, and RMW14 at

concentrations above the SGV. SVOCs above SGVs were identified in all monitoring wells with the exception of RMW11, RMW23, and RMW25. The concentrations of SVOCs in groundwater, which are attributed to entrained sediments, are likely related to the on-site historic fill. Dissolved metals (including iron, magnesium, manganese, and sodium) were detected at concentrations above the SGVs in groundwater samples collected throughout the site. The petroleum-related VOCs detected in soil vapor are likely related to releases associated with former on-site operations.

4. Historic Fill: SVOCs were detected in historic fill across the site at concentrations exceeding the UU, PGW and/or RURR SCOs to depths of up to 20 feet bgs. Metals, including lead, arsenic, and mercury, were detected in historic fill across the site at concentrations exceeding the UU and/or RURR SCOs to depths down to 25 feet bgs. A hazardous concentration of lead was identified in one surficial sample (0 to 2 bgs) from RB06 located in the southern part of Lot 3. Pesticides were detected at concentrations above UU SCOs in seven borings. SVOCs, metals and pesticides in soil are likely related to the nature of the historic fill material.

5. Native Soil: 4,4'-DDT and four metals (arsenic, trivalent chromium, lead, mercury) were detected above Part 375 UU SCOs in native soil samples collected from five borings (RB07, RB18, RB19, RB21, and RB22). These detections may be a result of infiltration of historic fill material into the borehole during sample collection.

6. Soil Vapor: Petroleum-related VOCs were detected in soil vapor; Total BTEX and Total VOCs were detected at concentrations of up to 949 µg/m^3 and 10,472 µg/m^3, respectively. The chlorinated solvents carbon tetrachloride and PCE were detected at concentrations of up to 27.2 µg/m^3 and 57.1 µg/m^3, respectively. Carbon tetrachloride and PCE in soil vapor may be indicative of an off-site chemical release associated with historical or current use of surrounding properties, or from former site operations, although carbon tetrachloride and PCE were not identified in soil or groundwater.

2.1.5 Significant Threat

NYSDEC and NYSDOH have not determined whether this site poses a significant threat to human health and the environment.

2.2 Site History

2.2.1 Historical Site Use

Commercial and industrial facilities have occupied the site since the early 1900s. Lot 1 was occupied by a chemical laboratory/chemical manufacturing facility from 1944 to 1951, paint

company from 1956 to 1965, unspecified manufacturing facility from 1951 to 2007, and food distribution company (2019); Lot 3 was occupied by a parking garage from 1935 to 1977; Lot 12 was occupied by a taxi dispatch center (1930s to 1960s), an auto repair shop (1960s to 1980s), and an unspecified manufacturer (1990s to 2012); and Lot 20 was occupied by a public garage (1935-1951), a fire door manufacturer (1970s), a Con Edison garage (1977 to 1993), and a mirror fabrication facility (1993 to 2015). According to previous Phase I Environmental Site Assessments (ESAs) prepared by AEI Consultant and GEI Consultants, operations ceased on Lot 12 after 2016, and on Lot 20 sometime between 2005 and 2016. Lot 3 was most recently occupied by an advertising company (Clear Channel Outdoor) and was vacated sometime between March 2018 and the beginning of the RI in December 2018. Operations ceased on Lot 1 in 2019.

2.2.2 Previous Environmental Reports

Previous environmental reports were reviewed and summarized below and are included in Appendix B.

- *Phase II Subsurface Investigation for 445 Gerard Avenue (Block 2351, Lot 12), dated March 7, 2012, prepared by AEI Consultants (AEI) for JP Morgan Chase Bank*
- *Phase I ESA for 445 Gerard Avenue (Block 2351, Lot 12), dated April 16, 2012, prepared by AEI for JP Morgan Chase Bank*
- *Phase I ESA for 417 Gerard Avenue (Block 2351, Lot 20), dated June 2015, prepared by GEI Consultants (GEI) for Galaxy General Contracting and 417 Gerard LLC*
- *Phase I ESA for 440 Exterior Street (Block 2351, Lot 3), dated August 28, 2015, prepared by AEI for Treetop Development*
- *Limited Phase II Subsurface Investigation for 440 Exterior Street (Block 2351, Lot 3), dated October 12, 2015, prepared by AEI for Treetop Development*
- *Phase I ESA for 445 Gerard Avenue (Block 2351, Lot 12), dated August 18, 2016, prepared by AEI for Treetop Development*
- *Subsurface Investigation Letter Report for 440 Exterior Street (Block 2351, Lot 3), 445 Gerard Avenue (Block 2351, Lot 12) and 417 Gerard Avenue (Block 2351, Lot 20), dated March 2, 2018, prepared by Langan for Treetop Development*
- *Phase I ESA for 404 Exterior Street (Block 2351, Lot 1), dated April 3, 2019, prepared by Langan for 445 Gerard Avenue Holdings LLC*

Phase II Subsurface Investigation for 445 Gerard Avenue (Block 2351, Lot 12), dated March 7, 2012, prepared by AEI Consultants (AEI) for JP Morgan Chase Bank

AEI completed a Phase II Subsurface Investigation at Lot 12 in February 2012 to investigate environmental concerns identified in an October 2010 Phase I ESA prepared by AB Property Evaluations, Inc. (the Phase I ESA was not available for review). The Phase II investigation included a geophysical survey, advancement of eight soil borings, and collection of soil samples. Soil samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and polychlorinated biphenyls (PCBs). SVOCs were detected at concentrations above NYSDEC 6 NYCRR Part 375 Recommended Soil Cleanup Objectives (SCOs). VOCs and PCBs were not detected in the soil samples collected.

Phase I ESA for 445 Gerard Avenue (Block 2351, Lot 12), dated April 16, 2012, prepared by AEI for JP Morgan Chase Bank

The April 2012 AEI Phase I ESA identified the following environmental concerns:

- Historical operations on Lot 12, including a taxi dispatch center from the 1930s to the 1960s, an auto repair shop from the 1960s to the 1980s, and unspecified manufacturing from the 1990s to 2012
- Three gasoline underground storage tanks (USTs) of unknown size associated with Lot 12 between the years 1935 and 1980 - The USTs were said to be abandoned in place
- Floor drains and an oil-water separator inside the building

Phase I ESA for 417 Gerard Avenue (Block 2351, Lot 20), dated June 2015, prepared by GEI Consultants (GEI) for Galaxy General Contracting and 417 Gerard LLC

The June 2015 GEI Phase I ESA identified the following recognized environmental conditions (REC):

- Two 550-gallon gasoline USTs and three aboveground storage tanks (ASTs), two 275-gallon and one of unknown size, located in the partial cellar in the southwestern corner of the building
- Floor drains and an oil-water separator inside the building
- Lot 20 is E-Designated for hazardous materials, air quality, and noise (E-227)

Phase I ESA for 440 Exterior Street (Block 2351, Lot 3), dated August 28, 2015, prepared by AEI for Treetop Development

The August 2015 AEI Phase I ESA identified the following RECs:

- Lot 3 was a parking garage with a 550-gallon gasoline UST from at least 1935 to 1977. A second gasoline UST of unknown size was associated with Lot 3 from 1947 to 1977.
- Three gasoline USTs of unknown size were associated with the eastern-adjoining property (i.e., Lot 12) between the years 1935 and 1980. Two 550-gallon gasoline USTs were associated with the property to the southeast (Lot 20) from at least 1935 to 1951.

Limited Phase II Subsurface Investigation for 440 Exterior Street (Block 2351, Lot 3), dated October 12, 2015, prepared by AEI for Treetop Development

AEI completed the Limited Phase II Subsurface Investigation at Lot 3 in September 2015 to investigate RECs identified in their August 2015 Phase I ESA. The Phase II investigation included a geophysical survey; advancement of four soil borings; installation of three temporary groundwater monitoring wells, two sub-slab vapor probes, and two soil vapor probes; and collection of soil, groundwater, sub-slab vapor, and soil vapor samples. Field observations and laboratory analytical results are summarized below:

- Soil: SVOCs were detected above 6 NYCRR Part 375 Restricted Use Restricted-Residential (RURR) SCOs in two of the four soil samples collected. Lead was detected above the Part 375 Unrestricted Use (UU) SCO, but below the RURR SCO, in three of the soil samples. VOCs were not detected above the UU SCOs. Pesticides, PCBs, and metals (with the exception of lead) were not analyzed.
- Groundwater: Petroleum-related VOCs, SVOCs, and lead were detected at concentrations above the NYSDEC Division of Water Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values (SGVs) for Class GA groundwater. Pesticides, PCBs, and metals (with the exception of lead) were not analyzed.
- Soil Vapor: Petroleum-related VOCs and chlorinated VOCs (CVOC) were detected in sub-slab vapor samples, and chlorinated VOCs were detected in the soil vapor sample. Although not a direct comparison standard, tetrachloroethene (PCE) concentrations above the New York State Department of Health (NYSDOH) Air Guideline Value (AGV) were detected in the sub-slab vapor sample collected from the northeastern part of Lot 3 and the soil vapor sample collected from the southeastern part of Lot 3. Total VOCs were detected at a maximum concentration of about 2,894 micrograms per cubic meter ($\mu g/m^3$) in the sub-slab vapor sample collected from the northeastern part of the lot. Indoor and ambient air samples were not collected.

Phase I ESA for 445 Gerard Avenue (Block 2351, Lot 12), dated August 18, 2016, prepared by AEI for Treetop Development

The August 2012 AEI Phase I ESA did not identify RECs associated with the lot; however, the environmental concerns identified during the April 2012 Phase I ESA (see above) were listed as historical RECs (HRECs).

Subsurface Investigation Letter Report for 440 Exterior Street (Block 2351, Lot 3), 445 Gerard Avenue (Block 2351, Lot 12) and 417 Gerard Avenue (Block 2351, Lot 20), dated March 2, 2018, prepared by Langan for Treetop Development

Langan completed a subsurface investigation at the site in September 2017 to further evaluate the quality of subsurface soil, groundwater, and soil vapor. The investigation included a geophysical survey, advancement of 13 soil borings, installation of three temporary groundwater monitoring wells and three soil vapor probes, and collection of soil, groundwater, soil vapor, and ambient air samples. Field observations and laboratory analytical results are summarized below.

- Geophysical Survey: Three tank-like structures were identified: one in the northeastern corner of the building on Lot 12, one in the southeastern corner of the building on Lot 12, and one in the southeastern corner of the building on Lot 20.
- Soil: Evidence of petroleum impacts (e.g., staining, odors, and photoionization detector [PID] readings up to 3,300 parts per million [ppm]) were observed in samples collected from borings advanced on each of the three lots. Based on field observations, NYSDEC was contacted and Spill No. 1705596 was assigned to Lot 12. VOCs, SVOCs, and metals were detected at concentrations above the RURR SCOs in soil samples collected from across the site footprint. One pesticide (4,4'-DDT) was detected at a concentration above the UU SCO in one soil sample collected from the southwestern corner of Lot 3. PCBs were not detected above the UU SCOs.
- Groundwater: Petroleum-related VOCs, SVOCs, and metals were detected at concentrations above the SGVs in groundwater samples collected from each lot. PCBs were not detected above the SGVs and pesticides were not analyzed.
- Soil Vapor: Petroleum-related VOCs and chlorinated VOCs were detected in soil vapor samples collected from each lot at concentrations above those detected in the ambient air sample. Although not a direct comparison standard, PCE concentrations above the NYSDOH AGV were detected in the soil vapor sample collected from the western part of Lot 3 (SV01_090716). Total VOCs were detected at a maximum concentration of about 10,472 µg/m^3 in SV01_090716. Indoor air samples were not collected because the existing building is currently vacant, and will be demolished as part of site redevelopment.

April 3, 2019 Phase I ESA for 404 Exterior Street (Block 2351, Lot 1) prepared by Langan

The April 2019 Langan Phase I ESA identified the following recognized environmental conditions (RECs):

- Historical use of Lot 1 included a chemical laboratory and/or chemical manufacturing facility (1944-1951), paint company (1956, 1965), and unspecified manufacturing (1951-2007). An unregistered AST of unknown condition, and storage of unknown chemicals were observed in the cellar during the site reconnaissance. Close inspection of the AST and chemical storage areas was precluded by concrete encasement, storage equipment and debris.
- Current and historical operations on surrounding properties included the following:
    - Garage with a 550-gallon gasoline underground storage tank (UST) (1935 – 1951) at 440 Exterior Street (north-adjoining and cross-gradient property)
    - Auto repair and/or garage with two 550-gallon gasoline USTs (1935 – 1951) at 417 Gerard Avenue (east-adjoining and up-gradient property)
    - Miscellaneous manufacturing facilities (1940 – 2005) and Resource Conservation and Recovery Act (RCRA) Large Quantity Generators (LQG) (1981, 1990, 1992, 1994, and 1998) at 385 Gerard Avenue (south-adjoining and cross-gradient property)
    - Auto repair and/or garage with one or two 550-gallon gasoline USTs (1927 – 1978), auto repair (1980-1993), and unspecified manufacturing facility (1989-2007) at 445 Gerard Avenue (northeast-adjoining and up-gradient property)
    - Documented soil, groundwater, and soil vapor contamination at adjoining 445 Gerard Avenue (BCP Site No. C203111 and open Spill No. 1705596), as well as the nearby 414 Gerard Avenue (BCP Site No. C203106) and 477 Gerard Avenue (BCP Site No. C203071).

2.3 Geological Conditions

Geologic and hydrogeologic observations are described below. Subsurface profiles are included as Figures 6A and 6B. Soil boring logs, a groundwater contour map, and groundwater monitoring well construction logs are appended to the RIR.

2.3.1 Historic Fill Material

Historic fill material consisting predominantly of brown, fine- to medium-grained sand, with varying amounts of silt, clay, gravel, brick, coal, coal ash, slag, concrete, asphalt, glass, plastic, metal, ceramic tile, wood ash, and wood, was encountered across the site beneath the surface

cover to depths ranging from about 2.5 to 24 feet bgs. The thickness of the fill layer generally increases from the southern site boundary to the northern site boundary.

2.3.2 Native Soil Layers

Native soil encountered below historic fill consists predominantly of fine- to medium-grained sand with varying amounts of fine gravel and silt, and a clay layer varying in thickness between 1 and 7 feet. The clay or silty clay layer was encountered at depths ranging between 13 and 27 feet in the northern part of Lot 1 (RB24 and RB26), throughout Lot 3 (RB01, RB02, RB06, RB08), the southern part of Lot 12 (RB12), and throughout Lot 20 (RB17, RB19, RB22).

2.3.3 Bedrock

Bedrock was not encountered during the RI or during a geotechnical Investigation performed by Langan in September 2017; however decomposed rock consisting of decomposed mica, schist, quartz and granite was encountered at several geotechnical boring locations between 63 and 103 feet bgs. The bedrock surface is likely to slope down from east to west (toward the Harlem River).

2.3.4 Hydrogeology

Synoptic groundwater measurements were collected on July 26, 2019 from 14 of the 15 groundwater monitoring wells (RMW09 was inaccessible). Groundwater elevations ranged from el 2.26 to el 3.12, which correspond to depths of about 12.08 to 18.95 feet bgs, respectively. Groundwater generally flows to the west toward the Harlem River. Underground utilities, stratigraphy, and other subsurface structures may locally influence the direction of groundwater flow. A groundwater elevation contour map is provided as Figure 3 of the final RIR that is included in Appendix B.

2.4 Contamination Conditions

2.4.1 Conceptual Site Model

A conceptual site model (CSM) has been developed based on the findings of the RI and previous investigations. The purpose of the CSM is to develop a simplified framework for understanding the distribution of impacted materials, potential migration pathways, and potentially complete exposure pathways.

Potential Sources of Contamination

Potential sources of contamination include historical and current petroleum bulk storage at the site, historic fill, the oil-water separators, and potential off-site sources.

Historic fill material encountered beneath surface cover to depths ranging from about 2.5 to 24 feet bgs originated from unidentified source areas and was placed as backfill in the late 1890s and early 1900s. Pesticides detected at concentrations above the Part 375 UU SCO collected across the site are likely related to the historic fill. SVOCs detected at concentrations above the Part 375 UU, PGW, and/or RURR SCOs may be related to the nature of historic fill. Metals detected at concentrations above the Part 375 UU and/or RURR SCOs may be related to the historic fill or regional soil quality. 4,4'-DDT and four metals (arsenic, trivalent chromium, lead, mercury) were detected above Part 375 UU SCOs in native soil samples collected from five borings (RB07, RB18, RB19, RB21, RB22). These detections may be a result of infiltration of historic fill material into the borehole during sample collection.

Evidence of petroleum-related contamination observed in the northern part of the site is related to historical releases from historical and current gasoline USTs and oil-water separators on Lots 3 and 12. Evidence of SVOCs in the groundwater on Lot 20 may be related to entrained sediment and related to historic fill quality.

Petroleum-related VOCs were detected in soil vapor. Carbon tetrachloride and PCE detections in soil vapor may be indicative of an off-site chemical release associated with historical or current use of surrounding properties. Additional soil vapor data will be collected in the sidewalks of East 144th Street and East 146th Street as part of an SRI requested by the NYSDEC in a letter dated January 27, 2020.

Exposure Media

The impacted media include soil, groundwater, and soil vapor. Petroleum-related VOCs in soil and groundwater were detected above standards in the northern part of the site. Historic fill-related metals were detected in soil across the site. Lead was detected in the 0- to 2-foot interval at hazardous concentrations in one boring (RB06). SVOCs were identified in historic fill material and in groundwater in the southern part of the site and five pesticides were identified in historic fill material across the site. Petroleum-related VOCs were detected in soil vapor. PCE was detected in vapor samples collected throughout the site footprint and carbon tetrachloride was detected in vapor samples in Lot 1.

Receptor Populations

The site is improved with one one-story warehouse with a partial cellar, which is occupied by a food distribution company (Lot 1), two one-story vacant warehouses (Lots 3 and 12), and one one-story vacant warehouse with a partial cellar (Lot 20). Current receptor populations include the tenants in Lot 1 and public and pedestrians 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, employees, and the nearby community, including children.

2.4.2 Description of Areas of Concern

Based on the history of the site and the findings of previous environmental investigations, the AOCs further investigated during the RI are described below and shown on Figure 7. AOC 12 was identified after reviewing initial results from the RIR.

2.4.2.1 AOC-1: Lot 1 UST

A subsurface anomaly resembling a UST (of unknown contents) in the northeast corner of the warehouse on Lot 1, and a vent pipe and fill port on the East 144th Street sidewalk were identified during a geophysical survey completed as part of the July 2019 RI. Inadvertent releases of petroleum products from this UST may have impacted groundwater, soil, and/or soil vapor. The following borings, monitoring wells and sub-slab soil vapor points are associated with this AOC: RB24, RB25/RMW25, RSSV08, and RSSV09.

Petroleum contamination was not observed in soil and groundwater where an anomaly indicative of a UST was identified during the geophysical survey. Petroleum-related VOCs were detected in soil vapor and may be indicative of a release of petroleum product, which may be associated with the UST or other AOCs. VOCs were not detected above UU, PGW, and/or RURR SCOs in samples collected from RB24 and RB25 where chemical-like odors were observed.

2.4.2.2 AOC-2: Lot 1 Oil-Water Separator

An oil-water separator was identified on Lot 1 during a geophysical survey completed as part of the July 2019 RI. Inadvertent releases of petroleum products from this oil-water separator may have impacted groundwater, soil, and/or soil vapor. The following borings, monitoring wells and sub-slab soil vapor points are associated with this AOC: RB27, RB28, RSSV08, and RSSV09.

Petroleum contamination was not observed in soil and groundwater where the oil-water separator was identified during the geophysical survey. Petroleum-related VOCs were detected in soil vapor and may be indicative of a release of petroleum product, which may be associated with the oil-water separator or other AOCs. VOCs were not detected above UU, PGW, and/or RURR SCOs in samples collected from RB25 where chemical-like odors were observed.

2.4.2.3 AOC-3: Lot 1 AST

An aboveground storage tank of unknown condition and unknown contents was identified in the partial cellar during the April 2019 Phase I ESA. Inadvertent releases of petroleum products from

this AST may have impacted groundwater, soil, and/or soil vapor. The following borings and sub-slab soil vapor points are associated with this AOC: RB27, RB28, RSSV08, and RSSV09.

Petroleum contamination was not observed in soil where the AST was identified during the Phase I ESA. Petroleum-related VOCs were detected in soil vapor and may be indicative of a release of petroleum product, which may be associated with the AST or other AOCs.

2.4.2.4 AOC-4: Lot 3 Gasoline Tanks

Based on a review of Sanborn Fire Insurance Maps, one 550-gallon gasoline UST was present on Lot 3 from at least 1935 to 1977; a second gasoline UST of unknown size was present from 1974 to 1977. Findings from the October 2015 Phase II ESI completed by AEI and Langan's September 2017 Subsurface Investigation indicated concentrations of petroleum-related compounds in groundwater above SGVs. The following borings, monitoring wells, sub-slab and soil vapor points are associated with this AOC: SB01, RB01, RB03, RB04, MW01, AEI-GW2, AEI-GW3, RMW01, RMW03, RMW04, RSV01 and RSSV01.

Petroleum-related contamination was observed in the northwestern part of Lot 3, which formerly contained one 550-gallon gasoline UST and a second gasoline UST of unknown capacity. Based on field observations and laboratory analytical results, the petroleum-impacts within this area were limited primarily to soil and groundwater at or below the water table. The depth of petroleum impacts was delineated vertically (as evidenced by the absence of visual/olfactory observations, PID readings above background, and/or analytical data indicating petroleum-related VOCs) at 25 feet bgs in RB01.

The horizontal extent of petroleum impacts from the gasoline tanks in the northwestern part of the site was delineated to the south and extends to the following boring locations in which petroleum impacts were absent: RB04/RMW04 and RB06. Petroleum-related contamination may be related to inadvertent releases from the historical gasoline USTs at the site.

Petroleum-related VOCs were detected in soil vapor at concentrations greater than the ambient air sample.

The presence of petroleum-related VOCs in soil and groundwater above applicable regulatory criteria, and of BTEX in soil vapor samples is indicative of a release of petroleum products, which may be associated with the historical USTs.

2.4.2.5 AOC-5: Lot 3 Oil-Water Separator

An oil-water separator was identified on Lot 3 during a geophysical survey completed as part of the September 2017 Subsurface Investigation. Inadvertent releases of petroleum products from this oil-water separator may have impacted groundwater, soil, and/or soil vapor. The following

borings, monitoring wells and sub-slab and soil vapor points are associated with this AOC: RB01, RB02, RB12, RMW01, SSV1, and RSV01.

Petroleum-related contamination was observed in the northeast part of the Lot 3, where an oil-water separator was identified during the geophysical survey. Based on field observations and laboratory analytical results, the petroleum-impacts within this area are present in soil, groundwater, and soil vapor. Petroleum-impacts were observed in groundwater and soil from about 8 to 15 feet bgs. The depth of petroleum impacts was delineated vertically (as evidenced by the absence of visual/olfactory observations, PID readings above background, and/or analytical data indicating petroleum-related VOCs) at 25 feet bgs in RB01 and 12 feet bgs in RB12.

The horizontal extent of petroleum impacts from the oil-water separator in the northeastern part of the Lot 3 was delineated to the south and southwest and extends to the following boring locations in which petroleum impacts were absent: RB02, RB04/RMW04 and RB06. Petroleum-related contamination may be related to inadvertent releases from the oil-water separator.

Petroleum-related VOCs including BTEX were detected in sub-slab and soil vapor at concentrations greater than the ambient air sample.

The presence of petroleum-related VOCs in soil and groundwater above applicable regulatory criteria, and BTEX and their breakdown compounds in soil vapor samples is indicative of a release of petroleum products, which may be associated with the oil-water separator.

2.4.2.6 AOC-6: Lot 12 Gasoline Tanks in Northeast Corner

The August 2012 AEI Phase I ESA identified three gasoline USTs of unknown sizes on Lot 12 that were abandoned in place. The September 2017 geophysical survey identified a subsurface anomaly indicative of a UST in the northeast corner of the warehouse. Concentrations of petroleum-related compounds in soil and groundwater were detected above UU SCOs and NYSDEC TOGS SGVs in boring and temporary monitoring well SB06/MW06 during the September 2017 Subsurface Investigation and may be associated with this or other AOCs. The following borings, monitoring wells and sub-slab soil vapor points are associated with this AOC: RB10, RB11, SB06, RMW10, RMW11, MW06, and RSSV02.

Petroleum-related contamination was observed in the northeast part of the Lot 12, where an anomaly indicative of a UST was identified during the geophysical survey. Based on field observations and laboratory analytical results, the petroleum-impacts within this area are present in soil, groundwater, and soil vapor. Petroleum-impacts were observed in groundwater and soil at or below the water table from about 17 to 31 feet bgs. The depth of petroleum impacts was delineated vertically (as evidenced by the absence of visual/olfactory observations, PID readings

above background, and/or analytical data indicating petroleum-related VOCs) at 28 and 32 feet bgs in RB11 and RB10, respectively.

The horizontal extent of petroleum impacts from the UST in the northeastern part of the Lot 12 was delineated to the south, southeast, and southwest and extends to the following boring locations in which petroleum impacts were absent: SB04, RB16/RMW16, RB17/RMW17 and RB20. Petroleum-related contamination may be related to inadvertent releases from the UST or other petroleum bulk storage at the site.

Petroleum-related VOCs including BTEX were detected in soil vapor at concentrations greater than the ambient air sample.

The presence of petroleum-related VOCs in soil and groundwater above applicable regulatory criteria, and of BTEX and their breakdown compounds in soil vapor samples is indicative of a release of petroleum products, which may be associated with the UST.

2.4.2.7 AOC-7: Lot 12 Oil-Water Separator

An oil-water separator was identified on Lot 12 during a geophysical survey that was completed as part of the September 2017 Subsurface Investigation. Concentrations of petroleum-related compounds were detected in soil above RURR SCOs, groundwater above NYSDEC TOGS SGVs in SB06/MW06, and soil vapor sample SV06; detections may be associated with this or other AOCs. The following borings, monitoring wells and sub-slab soil vapor points are associated with this AOC: SB06, RB09, RB11, RB13, RB14, MW06, RMW09, RMW11, RMW14, and SV06.

Petroleum-related contamination was observed in the northeast part of the Lot 12, where an oil-water separator was identified during the geophysical survey. Based on field observations and laboratory analytical results, the petroleum-impacts within this area are present in soil, groundwater, and soil vapor. Petroleum-impacts were observed in groundwater and soil from 9 to 32 feet bgs. The depth of petroleum impacts was delineated vertically (as evidenced by the absence of visual/olfactory observations, PID readings above background, and/or analytical data indicating petroleum-related VOCs) at 29 feet in RB11, 28 feet in RB09, 31 feet in RB13, and 33 feet in RB14.

The horizontal extent of petroleum impacts in Lot 12 was delineated to the south, southeast, and southwest and extends to the following boring locations in which petroleum impacts were absent: SB04, RB16/RMW16, RB17/RMW17, and RB20. Petroleum-related contamination may

be related to inadvertent releases from the oil-water separator or other petroleum storage at the site.

Petroleum-related VOCs including BTEX and their breakdown components were detected in soil vapor at concentrations greater than the ambient air sample.

The presence of petroleum-related VOCs and/or naphthalene in soil and groundwater above applicable regulatory criteria, and of BTEX and their breakdown compounds in soil vapor samples is indicative of a release of petroleum products, which may be associated with the oil-water separator on-site.

2.4.2.8 AOC-8: Lot 12 Gasoline Tanks and Associated Spill in Southeast Corner

The August 2012 AEI Phase I ESA identified three gasoline USTs of unknown sizes on Lot 12, which were said to have been abandoned in place. The September 2017 geophysical survey identified a subsurface anomaly indicative of a UST in the southeast corner on Lot 12. Observations noted during the September 2017 Subsurface Investigation included PID readings up to 3,300 ppm, petroleum-like odors, and staining. Based on field observations, a spill was reported to NYSDEC, and was assigned Spill No. 1705596. The following borings, monitoring wells and sub-slab soil vapor points are associated with this AOC: SB08, SB11, SB12, SB13, RB14, RB15, MW08, RMW14, RSSV03, and RSSV04.

Petroleum-related contamination was observed near where an anomaly indicative of a UST was identified during the geophysical survey. Based on field observations and laboratory analytical results, the petroleum-impacts within this area are present in soil, groundwater, and soil vapor. Petroleum-impacts were observed in groundwater and soil at or below the groundwater table from about 18 to 32 feet bgs. The depth of petroleum impacts was delineated vertically (as evidenced by the absence of visual/olfactory observations, PID readings above background, and/or analytical data indicating petroleum-related VOCs) at 29 and 33 feet bgs in RB15 and RB14, respectively.

The horizontal extent of petroleum impacts from the suspected gasoline tanks in Lot 12 was delineated to the south, southeast, and southwest and extends to the following boring locations in which petroleum impacts were absent: RB16/RMW16, RB17/RMW17, and RB20. Petroleum-related contamination may be related to inadvertent releases from the UST or other petroleum storage at the site.

Petroleum-related VOCs including BTEX and their breakdown components were detected in soil vapor at concentrations greater than the ambient air sample.

The presence of petroleum-related VOCs in soil and groundwater above applicable regulatory criteria, and of BTEX and their breakdown compounds in soil vapor samples is indicative of a

release of petroleum products, which may be associated with the suspected UST in the southeast corner of Lot 12.

2.4.2.9 AOC-9: Lot 20 Oil-Water Separator

An oil-water separator was identified on Lot 20 during a geophysical survey that was completed as part of the September 2017 Subsurface Investigation. Inadvertent releases of petroleum products from this oil-water separator may have impacted the groundwater, soil, and/or soil vapor. The following borings, monitoring wells and sub-slab soil vapor points are associated with this AOC: SB09, RB21, RB22, RMW22, and RSSV06.

Petroleum-related contamination was not observed in the vicinity of the oil-water separator. Petroleum-related VOCs were not detected at concentrations above UU, PGW, and/or RURR SCOs and the SGVs. SVOCs were detected in soil and groundwater at concentrations above UU, PGW, and/or RURR SCOs and SGVs; however, concentrations of SVOCs above the SCOs were present in shallow soils (up to 8 feet bgs) and not in samples collected at the groundwater interface. Therefore, the presence of SVOCs in shallow soil may be attributed to quality of historic fill rather than to petroleum-impacts to soil from the oil-water separator. Additionally, the SVOCs above SGVs in groundwater samples may be attributed to entrained sediment.

Petroleum-related VOCs were detected in sub-slab soil vapor samples; however, these detections may be related to the petroleum spill to the north (AOCs 3 through 8). Based on field observations and laboratory analytical results, the presence of the oil-water separator in this area does not appear to have impacted soil, groundwater and sub-slab soil vapor.

2.4.2.10 AOC-10: Lot 20 ASTs

The June 2015 AEI Phase I ESA identified two 275-gallon fuel oil ASTs and a third fuel oil AST of unknown size in the partial cellar of Lot 20. A site visit completed by Langan in January 2018 confirmed the presence of the ASTs, and identified one additional 12-gallon fuel oil AST attached to the ceiling of the Lot 20 warehouse. Inadvertent releases of petroleum products from these tanks may have impacted groundwater, soil, and/or soil vapor. The following borings, monitoring wells and sub-slab soil vapor sample points are associated with this AOC: SB07, RB18/RMW18, RB19, RB22/RMW22, RB23/RMW23, and RSSV07.

Petroleum-related contamination was observed in the vicinity of the ASTs. Based on field observations and laboratory analytical results, the petroleum-impacts within this area are present in soil and sub-slab soil vapor. Total xylenes were detected above UU SCOs in one sample collected from the groundwater interface. The depth of petroleum impacts was delineated vertically (as evidenced by the absence of visual/olfactory observations, PID readings above background, and/or analytical data indicating petroleum-related VOCs) at 24 feet bgs in RB19. The horizontal extent of petroleum impacts from the ASTs was delineated to the north, east,

west, and south and extends to the following boring locations in which petroleum impacts were absent: SB07, RB18, RB19, RB21, RB22, and RB23.

The detected concentration may be indicative of residual petroleum products from the nearby petroleum spill to the north. SVOCs were detected in soil and groundwater at concentrations above UU, PGW, and/or RURR SCOs and NYSDEC SGVs.; the presence of SVOCs in shallow soil may be attributed to the historic fill quality. Additionally, the SVOCs above SGVs in groundwater samples may be attributed to entrained sediment. Petroleum-related VOCs were detected in sub-slab soil vapor samples; however, these detections may be related to the petroleum spill to the north or documented petroleum impacts associated with Lots 3 and 12. Based on field observations and laboratory analytical results, the presence of the ASTs in this area does not appear to have impacted soil, groundwater and sub-slab soil vapor.

2.4.2.11 AOC-11: Historic Fill

AOC 11 represents a layer of historical fill of unknown origin identified across the site between ground surface and depths ranging from about 2.5 to 24 feet below bgs. This fill layer contains SVOCs, metals and pesticides, at concentrations above RURR SCOs. The nature and extent of historical fill impacts was delineated and characterized during the RI. AOC 11 is a site-wide AOC. All borings and monitoring wells are associated with this AOC.

According to historical topographical maps, extensive land reclamation likely occurred to create the site as it exists today. Historic fill is ubiquitous across the site at depths ranging from 2.5 feet bgs in RB21 to 24 feet bgs in RB15.

PAHs detected in soil samples are attributed to historic fill quality.

Iron, magnesium, manganese, and sodium detected in groundwater samples above the SGVs are indicative of regional groundwater conditions. SVOCs detected in groundwater may be the result of entrained sediments in groundwater samples and associated with historic fill quality, and/or with on-site petroleum impacts.

2.4.2.12 AOC-12: Carbon Tetrachloride and PCE Impacts to Soil Vapor from an Off-Site Source

Analytical results from the RI indicate the presence of carbon tetrachloride and PCE in sub-slab and soil vapor points across the site at concentrations greater than the ambient air sample. AOC 12 is a site-wide AOC. The following sub-slab, soil vapor, and ambient air samples are associated with this AOC: RSSV01 through RSSV09, RSV01, RSV02, SV01, SV06, SV08, and RAA01.

PCE was detected at concentrations above ambient air concentrations in all but one sub-slab soil vapor sample collected across the site. Carbon tetrachloride was detected in RSSV08 at a concentration that may warrant mitigation. Because carbon tetrachloride and PCE were not

detected in soil or groundwater above the UU SCOs or SGVs, respectively, carbon tetrachloride and PCE concentrations in soil vapor may be indicative of an off-site chemical release associated with historical or current use of surrounding properties.

2.4.3 Identification of Standards, Criteria and Guidance

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

- 29 CFR Part 1910.120 – Hazardous Waste Operations and Emergency Response
- 6 NYCRR Part 371 – Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 372 – Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities
- 6 NYCRR Subpart 373-4 – Facility Standards for the Collection of Household Hazardous Waste and Hazardous Waste from Conditionally Exempt Small Quantity Generators
- 6 NYCRR Subpart 374-1 – Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
- 6 NYCRR Subpart 374-3 – Standards for Universal Waste
- 6 NYCRR Part 375 – Environmental Remediation Programs
- 6 NYCRR Part 376 – Land Disposal Restrictions
- 6 NYCRR Part 750 – State Pollutant Discharge Elimination System (SPDES) Permits
- 12 NYCRR Part 56 – Industrial Code Rule 56 (Asbestos)
- CP-43 – Commissioner Policy on Groundwater Monitoring Well Decommissioning (December 2009)
- CP-51 – Soil Cleanup Guidance (2010)
- DER-10 – Technical Guidance for Site Investigation and Remediation (May 3, 2010)
- DER-23 – Citizen Participation Handbook for Remedial Programs (March, 2010)
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006)
- TOGS 1.1.1 – Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- USEPA OSWER Directive 9200.4-17 – Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (December 1997)

- Screening and Assessment of Contaminated Sediment (Division of Fish, Wildlife and Marine Resources, June 2014)

2.4.4 Soil/Fill Contamination

Historic fill consisting predominantly of brown, fine- to medium-grained sand, with varying amounts of silt, clay, gravel, brick, coal, coal ash, slag, concrete, asphalt, glass, plastic, metal, ceramic tile, wood ash, and wood, was encountered across the site beneath the surface cover to depths ranging from about 2.5 to 24 feet bgs. SVOCs, metals, and pesticides detected at concentrations above the Part 375 UU, PGW, and/or RURR SCOs are likely related to the quality of historic fill. One sample collected from soil boring RB06 contains hazardous concentrations of lead in the 0- to 2-foot interval.

Petroleum-related contamination in the northern part of the site was generally identified at or below the water table from about 13 to 32 feet bgs, with the exception of RB03 and RB13, where localized impacts were identified. Field evidence of petroleum impacts were observed at RB03 between 1 and 2 feet bgs and petroleum-related VOCs were detected above UU, PGW, and/or RURR SCOs at RB13 between 0 to 2 and 8 to 9 feet bgs. The depth of petroleum impacts was delineated vertically (as evidenced by the absence of visual/olfactory observations, PID readings above background, and/or analytical data indicating petroleum-related VOCs at, or below, the groundwater interface) at RB04/RMW04, RB06, RB16/RMW16, RB17/RMW17, and RB20.

The horizontal extent of the petroleum impacts in the northern part of the site was delineated to the eastern, western, and northern site boundaries, and is defined by petroleum impacts in soil and groundwater at RB01/RMW01, RB02, RB03/RMW03, RB09/RMW09 through RB11/RMW11, RB12, RB13, RB14/RMW14, RB15, SB01/MW01, SB06/MW06, SB08/MW08, and SB11 through SB13 and the absence of petroleum impacts in RB04/RMW04, RB06, RB16/RMW16, RB17/RMW17, and RB20. The petroleum-impacted area is roughly 16,650 square feet and occupies about 55% of the site. Petroleum-related contamination is related to the historical and current petroleum bulk storage and/or the oil-water separators on-site.

2.4.5 On-Site and Off-Site Groundwater Contamination

PID headspace readings of up to 730 ppm, petroleum-like odors, and petroleum-related VOCs and/or SVOCs above SGVs were observed at monitoring wells MW01, MW06, MW08, RMW03, RMW09, RMW10, RMW11, and RMW14. Petroleum impacts to groundwater were delineated horizontally by the absence of visual/olfactory observations, PID headspace readings above background, and/or petroleum-related VOCs above SGVs in monitoring wells RMW04, RMW05, RMW16, and RMW17. Petroleum-related VOCs were localized to the northern part of the site and are related to the historical and current petroleum bulk storage at the site.

SVOCs were detected at concentrations above the SGVs in groundwater samples collected throughout the site and, with the exception of naphthalene, are likely related to entrained sediments from historic fill.

Dissolved metals (including iron, magnesium, manganese, and sodium) were detected at concentrations above the SGVs in groundwater samples collected throughout the site. Iron, magnesium, manganese, and sodium are attributable to regional groundwater conditions and are not indicative of a release.

2.4.6 Soil Vapor Contamination

All but one vapor sample contained PCE detections that may be indicative of an off-site chemical release associated with historical or current use of surrounding properties. Two vapor samples contained carbon tetrachloride that may also be indicative of an off-site chemical release associated with historical or current use of surrounding properties. The petroleum-related VOCs detected in soil vapor are likely related to the historical and current USTs and/or oil-water separators located on each lot. Additional soil vapor data will be collected in the sidewalks of East 144th Street and East 146th Street as part of an SRI, as requested by the NYSDEC in a letter dated January 27, 2020.

2.5 Environmental and Public Health Assessments

2.5.1 Qualitative Human Exposure Assessment

Based on the CSM and the review of environmental data, complete on-site exposure pathways appear to be present, in the absence of engineering controls, in current and construction-phase conditions. The complete exposure pathways indicate there is a risk of exposure to humans from site contaminants via exposure to soil, groundwater, and soil vapor if mitigation and controls are not implemented.

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.

2.5.1.1 Current Conditions

Contaminant sources include historic fill with varying concentrations of SVOCs, metals, and pesticides; petroleum-impacted soil and groundwater containing varying concentrations of VOCs and/or SVOCs; and soil vapor with carbon tetrachloride, PCE, and petroleum-related VOCs.

Contaminant release and transport mechanisms include potential release and transport during penetration of the site cover for soil, groundwater, and soil vapor sampling. The potential

receptor is the on-site sampling personnel, workers on Lot 1, and the nearby public. Under current conditions, the likelihood of exposure to humans is limited due to the following:

- The site footprint is covered by a continuous concrete building slabs and an asphalt-paved lot (Lot 3), which prevents direct contact with soil, groundwater, and soil vapor.
- The site is fenced off and warehouse buildings on Lots 3, 12, and 20 are vacant and locked, preventing access to the public.
- The warehouse building on Lot 1 is locked, preventing access to the public
- Sampling activities are completed in accordance with a HASP and CAMP that is designed to monitor and prevent exposure to soil, groundwater, and soil vapor contaminants.
- Groundwater at the site is not a potable water source.

2.5.1.2 Construction/Remediation Activities

During the excavation and foundation construction stage of redevelopment, which includes remediation, points of exposure include disturbed and exposed soil during excavation, dust and potential organic vapors generated during excavation, and contaminated groundwater encountered during excavation and/or dewatering operations. Routes of exposure include ingestion and dermal absorption of contaminated soil and groundwater, inhalation of potential organic vapors arising from contaminated soil vapor and groundwater, and inhalation of dust originating from contaminated soil. The receptor population includes construction and remediation workers and, to a lesser extent, the public adjacent to the site.

The potential for completed exposure pathways is present since all five elements exist; however, the risk can be avoided or minimized by applying appropriate health and safety measures during construction and remediation, such as monitoring the air for organic vapors and dust, using vapor and dust suppression measures, cleaning truck undercarriages and securing tarp covers before they leave the site to prevent off-site soil tracking, maintaining site security, and wearing the appropriate personal protective equipment (PPE).

A HASP, a RAWP, and a CAMP that include 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. Such measures will prevent completion of potential migration pathways for soil, groundwater, and soil vapor contaminants.