LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
AGV	Air Guideline Values
ASP	Analytical Services Protocol
AST	Aboveground Storage Tank
ASTM	ASTM International
BCP	Brownfield Cleanup Program
bgs	below grade surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CAMP	Community Air Monitoring Plan
COC	Contaminant of Concern
CSM	Conceptual Site Model
DER	Division of Environmental Remediation
DUSR	Data Usability Summary Report
el	Elevation
ELAP	Environmental Laboratory Approval Program
ESA	Environmental Site Assessment
eV	electron volt
FEMA	Federal Emergency Management Agency
FWRIA	Fish and Wildlife Resources Impact Analysis
HASP	Health and Safety Plan
IDW	Investigation-Derived Waste
L/min	liters per minute
mg/kg	milligrams per kilogram
µg/L	micrograms per liter
$\mu g/m^3$	micrograms per cubic meter
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NAPL	Non-Aqueous Phase Liquid
NYC	New York City
NYCRR	New York Codes, Rules, and Regulations
NYSDOH	New York State Department of Health
NYSDEC	New York State Department of Environmental Conservation
OER	NYC Mayor's Office of Environmental Remediation
PBS	Petroleum Bulk Storage
PCB	Polychlorinated Biphenyls
PCE	Tetrachloroethene
PFAS	Per- and polyfluorinated substances
PGW	Protection of Groundwater

Acronym	Definition
PID	Photoionization Detector
PPE	Personal Protective Equipment
ppm	parts per million
ppt	parts per trillion
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
RAWP	Remedial Action Work Plan
REC	Recognized Environmental Condition
RI	Remedial Investigation
RIR	Remedial Investigation Report
RL	Reporting Limit
RRU	Restricted-Residential Use
SCO	Soil Cleanup Objective
SGV	Standards and Guidance Values
SMP	Site Management Plan
SVOC	Semivolatile Organic Compound
TAL	Target Analyte List
TCE	Trichloroethene
TCL	Target Compound List
TOGS	Technical and Operational Guidance Series
UN/DOT	United Nations / Department of Transportation
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
UU	Unrestricted Use
VOC	Volatile Organic Compound

CERTIFICATION

I, Jason Hayes, PE, certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Remedial Investigation Report 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) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

2/4/2020

Jason J. Hayes, PE, LEED AP

1.0 INTRODUCTION

This Remedial Investigation Report (RIR) 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 for Site No. C203111, as amended (collectively, the BCA), and to be amended by the forthcoming major modification of the BCA to add 404 Exterior Street, which is being submitted with this RIR.

This RIR presents environmental data and findings from the September 2017 Subsurface Investigation, the December 2018 to January 2019 Remedial Investigation (RI) of 417 and 445 Gerard Avenue and 440 Major Wm Deegan Boulevard, and the July 2019 RI of 404 Exterior Street conducted by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan). The investigations were conducted in accordance with Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 375-1, 3.8, 6.8, NYSDEC Division of Environmental Remediation (DER) Program Policy: Technical Guidance for Site Investigation and Remediation (DER-10), and the New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006, with updates. The objectives and goals of this RIR are to:

- Define the nature and extent of contamination in all media at or emanating from the site
- Generate sufficient data to evaluate the remedial action alternatives and prepare a Remedial Action Work Plan (RAWP) to be implemented concurrently with site redevelopment
- Generate sufficient data to evaluate the actual and potential threats to human health and the environment

The remainder of this report is organized as follows:

- Section 2.0 describes the setting and physical characteristics of the site
- Section 3.0 describes the site background including results of previous investigations and identified areas of concern (AOCs)
- Section 4.0 presents the investigation field procedures
- Section 5.0 describes the field observations and analytical results

- Section 6.0 presents an assessment of the exposure risks of site contaminants to human, fish, and wildlife receptors
- Section 7.0 presents the nature and extent of contamination in site media as determined through the field investigation and analysis of environmental samples
- Section 8.0 summarizes the results of the investigation and presents conclusions based on field observations and analytical results
- Section 9.0 presents the references used in preparation of this report

2.0 SITE PHYSICAL CHARACTERISTICS

2.1 Site 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. A site location map is provided as Figure 1. 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.

As part of the June 2009 Lower Concourse Rezoning (City Environmental Quality Review [CEQR] No. 08DCP071X), the site was E-Designated for hazardous materials and noise (E-227). The New York City (NYC) Mayor's Office of Environmental Remediation (OER) is aware of the Volunteer's plans to redevelop the site under the BCP.

2.1.1 Description of Surrounding Properties

The site is located in a mixed-use, urban 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 institutional buildings, vacant lots, and open space and outdoor recreation areas
	2350	1	Vacant lot (414 Gerard Avenue) BCP Site No. C203106	
		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

Direction	Adjoining and Adjacent Properties			Surrounding Properties
	Block No.	Lot No.	Description	
South	2344	112	Two-story industrial warehouse (120 East 144th Street)	institutional buildings and parking lots
	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
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

Number	Name (Approximate distance from site)	Address
9	Bronx 1 Success Academy Charter School (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 10454
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

A map showing the surrounding land uses and the locations of sensitive receptors within 1,000 feet of the site is included as Figure 2.

2.1.2 Topography

Sidewalk elevations range from about elevation (el) 12 along Exterior Street to el 22 along Gerard Avenue.[1] The topography of the site slopes west from Gerard Avenue to Exterior Street toward the Harlem River.

2.1.3 Surface Water and Drainage

The site footprint is covered by concrete slabs; therefore, the majority of runoff from the site is expected to drain to the city sewers via drains located throughout the site footprint and catch basins located along adjacent street curbs. If rainwater was to infiltrate the ground, it would percolate downwards toward the water table and join the anticipated regional flow, which flows west toward the Harlem River.

According to Effective Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) No. 3604970083F (dated September 5, 2007), the site falls within Zone X, an area

[1] Elevations are referenced to the North American Vertical Datum of 1988 (NAVD88).

of minimal flood hazard, designated for areas between the limits of 0.2 percent annual chance flood and 1 percent annual chance flood.

2.1.4 Wetlands

Wetlands on or near the site were evaluated by reviewing the National Wetlands Inventory and NYSDEC regulated wetlands map. There are no wetlands on or adjacent to the site. The nearest wetlands are associated with the Harlem River and are located about 450 feet to the west.

2.2 Geology and Hydrogeology

2.2.1 Regional and Site Geology

According to the United States Geological Survey (USGS) Bedrock and Engineering Geologic Maps of Bronx County and Parts of New York and Queens County, New York, dated 1992, bedrock lithology in the vicinity of the site consists of rock of the Lower Cambrian Age (Manhattan Schist Formation), rock of the Middle Ordovician Age (Walloomsac Formation), and rock of the Lower Ordovician to Lower Cambrian Age (Inwood Marble).

The site is underlain by fill material predominantly consisting of brown, fine- to medium-grained sand with varying amounts of silt, gravel, brick, coal, coal ash, slag, concrete, and wood. The fill was observed from surface grade to depths varying between about 2.5 and 24 feet below grade surface (bgs). Native soil predominantly consisting 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 was observed below the fill. 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. The depth to decomposed bedrock generally increased from east to west across the site footprint.

2.2.2 Regional and Site Hydrogeology

Groundwater flow is typically topographically influenced, as shallow groundwater tends to originate in areas of topographic highs and flows toward areas of topographic lows, such as rivers, stream valleys, ponds, and wetlands. A broader, interconnected hydrogeologic network often governs groundwater flow at depth or in the bedrock aquifer. Groundwater depth and flow direction are also subject to hydrogeologic and anthropogenic variables such as precipitation, evaporation, extent of vegetation cover, coverage by impervious surfaces, and subsurface structures. Other factors influencing groundwater include depth to bedrock, the presence of anthropogenic fill, and variability in local geology and groundwater sources or sinks.

Infiltration of precipitation to the water table is likely minimal due to the presence of impervious surfaces throughout the site. The majority of runoff drains to city sewers and then to one of the several wastewater treatment plants that serve the city.

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. In the northern part of the site, groundwater generally flows to the southwest towards the Harlem River. In the southern part of the site, groundwater generally flows to the northwest and southwest with the highest groundwater elevation at el. 3.12. A groundwater contour map is provided as Figure 3. Underground utilities, stratigraphy, and other subsurface structures may locally influence the direction of groundwater flow.

Groundwater in New York City is not used as a potable water source. Potable water provided to the City of New York is derived from surface impoundments in the Croton, Catskill, and Delaware watersheds.

3.0 SITE BACKGROUND

This section describes historical site use, the proposed redevelopment, and the findings from previous environmental investigations. AOCs were developed based on this information and are detailed at the end of the section.

3.1 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, 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. Historical site use is shown as Figure 4.

3.2 Proposed Redevelopment Plan

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.

3.3 Previous Environmental Reports and Documents

The following previous environmental reports and investigations were reviewed as part of this RIR and are summarized below. The reports are included in Appendix A.

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

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 (VOC), semivolatile organic compounds (SVOC), and polychlorinated biphenyls (PCB). SVOCs were detected at concentrations above 6 NYCRR Part 375 Recommended Soil Cleanup Objectives (SCO). VOCs and PCBs were not detected in the soil samples collected.

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

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 (UST) 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

June 2015 Phase I ESA for 417 Gerard Avenue (Block 2351, Lot 20), prepared by GEI Consultants (GEI)

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

- Two 550-gallon gasoline USTs and three aboveground storage tanks (AST), 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).

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

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 (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.

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

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 (RRU) SCOs in two of the four soil samples collected. Lead was detected above the Part 375 Unrestricted Use (UU) and Part 375 Protection of Groundwater (PGW)[2] SCO, but below the RRU SCO, in three of the soil samples. VOCs were 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 (SGV) 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 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

[2] The NYSDEC Part 375 PGW SCOs were only applied to analytes that also exceeded groundwater regulatory standards in groundwater samples collected from the site. The PGW SCOs are applicable to those constituents that are in areas that could be a source of groundwater contamination.

southeastern part of Lot 3. Total VOCs were detected at a maximum concentration of about 2,894 micrograms per cubic meter (µg/m^3) in the sub-slab vapor sample collected from the northeastern part of the lot. Indoor and ambient air samples were not collected.

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

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).

March 2, 2018 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), prepared by Langan

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 and summaries of analytical results are provided in Tables 1 through 3.

- 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 RRU SCOs and PGW 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 CVOCs 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 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 vacant, and will be demolished as part of site redevelopment.

Sample locations and analytical results that exceed the applicable regulatory criteria for soil, groundwater, and soil vapor are shown on Figures 5, 6A, 6B, and 7.

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 aboveground storage tank (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).

3.4 Summary 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 8. AOC 12 was identified after reviewing initial results from the RIR.

AOC 1: Lot 1 UST

A subsurface anomaly resembling a UST 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.

AOC 2: Lot 1 Oil-Water Separator

An oil-water separator was identified in the northwestern portion of 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.

AOC 3: Lot 1 AST

The April 2019 Phase I ESA identified an AST of unknown condition in one of the partial cellars. Inadvertent releases of petroleum products from this AST may have impacted groundwater, soil, and/or soil vapor.

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 the September 2017 Subsurface Investigation completed by Langan indicated concentrations of petroleum-related compounds in groundwater above SGVs.

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.

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, PGW SCOs, and SGVs during the September 2017 Subsurface Investigation and may be associated with this or other AOCs.

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 RRU SCOs, PGW SCOs, and groundwater above SGVs and may be associated with this or other AOCs.

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; the USTs 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 called in to NYSDEC, and was assigned Spill No. 1705596. Analytical results from the 2017 Subsurface Investigation indicated concentrations of petroleum-related VOCs in soil above RRU SCOs and PGW SCOs.

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.

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 on the ceiling of the Lot 20 warehouse. Inadvertent releases of petroleum products from these tanks may have impacted groundwater, soil, and/or soil vapor.

AOC 11: Historic Fill

AOC 11 represents a layer of historic fill of unknown origin identified across the site between ground surface and about 10 to 20 feet bgs. This fill layer contains SVOCs and lead at concentrations above RRU SCOs and PGW SCOs. The nature and extent of historic fill impacts was delineated and characterized during the RI.

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.

4.0 REMEDIAL INVESTIGATION

The RI was completed between December 20, 2018 and January 17 2019 for Lots 3, 12 and 20, and between July 10 and 15, 2019 for Lot 1, to investigate AOCs and to determine, to the extent practical, the nature and extent of contamination in soil, groundwater, and soil vapor. The RI included the advancement of soil borings, installation of groundwater monitoring wells and soil vapor probes, and collection of soil, groundwater, and soil vapor samples. A sample summary is included as Table 4 and sample locations are shown on Figure 8.

The RI consisted of the following:

- 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

Langan completed the RI in accordance with 6 NYCRR Part 375-3.8, NYSDEC DER-10 (May 2010), 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).

4.1 Soil Investigation

4.1.1 Investigation Methodology

A Langan field engineer documented the advancement of 28 soil borings (RB01 through RB28) by AARCO Environmental Services, Corp. (AARCO) of Lindenhurst, New York. Boring locations were selected to investigate the potential AOCs. The borings were advanced using a direct-push Geoprobe® 7822DT or Geoprobe® 7730DT track-mounted drill rig. Borings RB01 through RB28 were advanced to elevations ranging from el -4 to el -17 (16 to 32 feet bgs).

Soil was recovered continuously from the surface to the completion depth of each boring. Samples were collected into 4- or 5-foot long acetate liners using a 2-inch diameter Macro-Core® sampler. The soil was screened for visual, olfactory, and instrumental evidence of a chemical or petroleum release, and was visually classified for soil type, grain size, texture, and moisture content. Instrument screening for the presence of organic vapors was performed using a PID equipped with a 10.6 electron volt (eV) lamp. Following sample collection, borings that were not converted to groundwater monitoring wells were backfilled with clean sand or soil cuttings that did not display evidence of environmental impacts. Boring locations are shown on Figures 5 and 8 and boring logs are included in Appendix B.

4.1.2 Sampling Methodology

One hundred one soil samples, including seven duplicate samples, were collected for laboratory analysis. Three- to- four grab soil samples were collected for laboratory analysis from each boring location to further investigate AOCs and to provide vertical and horizontal delineation of identified impacts:

- one from the surficial soil (upper two feet of soil beneath concrete slab);
- one from the proposed development depth (10 feet bgs in Lots 1 and 3 and 20 feet bgs in Lots 12 and 20);
- one from within the historic fill layer, above the groundwater interface, or, if encountered, from the interval exhibiting the highest PID reading or observed impact; and
- one from the historic fill terminus, or, if observed impact was encountered, one from the interval immediately below observed impacts.

If sample depths coincided (i.e., proposed development depth was the same as the highest observed impacts), only three samples were collected from the boring.

Samples submitted for VOC analysis were collected directly from the acetate liner into laboratory-supplied TerraCore® soil samplers. The remaining sample volume was homogenized and placed in laboratory-supplied containers for additional analyses. The sample containers were labeled, placed in a laboratory-supplied cooler, and packed on ice to maintain a temperature of about 4°C. The samples were picked up and delivered via courier service to Alpha Analytical Inc. (Alpha) under standard chain-of-custody protocol. Alpha is a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified laboratory located in Westborough, Massachusetts. Soil samples were analyzed for Part 375/Target Compound List (TCL) VOCs, SVOCs, PCBs, pesticides, herbicides, Target Analyte List (TAL) metals, including hexavalent and trivalent chromium, and total cyanide. In addition, three samples collected from RB06, RB20, and RB21 that exhibited high total lead concentrations, were analyzed for toxicity characteristic leaching procedure (TCLP) lead. Sixteen samples were also analyzed for emerging contaminants, per-and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. Two emerging contaminant soil samples were collected from eight boring locations across the site. Soil samples were collected from the upper two feet of historic fill, and from the two-foot interval above the groundwater interface.

4.2 Groundwater Investigation

4.2.1 Monitoring Well Installation and Development Methodology

A Langan field engineer documented the conversion of fifteen soil borings into permanent groundwater monitoring wells by AARCO. One groundwater sample was collected from each monitoring well to characterize groundwater conditions and to investigate potential groundwater impacts associated with the AOCs. Two duplicate groundwater samples were collected from monitoring wells RMW03 and RMW23.

The annulus of each groundwater monitoring well was filled with No. 2 sand to a depth of about 1 to 2 feet above the top of the screen followed by a bentonite seal to grade surface. Following installation, the groundwater monitoring wells were developed by AARCO personnel using a submersible pump until the water ran clear. Purged groundwater was containerized in labeled United Nations/Department of Transportation (UN/DOT)-approved 55-gallon drums awaiting disposal at a permitted facility.

Well Name	Tax Lot	Depth (feet bgs)	Soil Boring Name	Screened Depth Interval (feet bgs)
RMW01	3	20	RB01	5 to 20
RMW03	3	25	RB03	10 to 25
RMW04	3	24	RB04	9 to 24
RMW05	3	23	RB05	8 to 23
RMW07	3	24	RB07	4 to 24
RMW09	12	28	RB09	13 to 28
RMW10	12	28	RB10	18 to 28
RMW11	12	28	RB11	13 to 28
RMW14	12	27	RB14	17 to 27
RMW16	12	27	RB16	17 to 27
RMW17	20	28	RB17	18 to 28
RMW18	20	27	RB18	17 to 27
RMW22	20	27	RB22	17 to 27
RMW23	1	19	RB23	9 to 19
RMW25	1	20	RB25	10 to 20

The top of casing elevations of the thirteen monitoring wells were surveyed by Langan on January 24, 2019 and July 24, 2019. Synoptic groundwater levels were measured using a Solinst® 122 oil/water interface probe on January 17, 2019 and July 26, 2019.

Monitoring and observation well construction details and groundwater elevations are included in Table 5, monitoring well locations are shown on Figure 6A, 6B, and 8, and well construction logs are included in Appendix C.

4.2.2 Groundwater Sampling

Groundwater samples were collected up to one week following well development from January 14 to 17 2019, and on July 12, 2019. Samples were collected in accordance with the United States Environmental Protection Agency's (USEPA) low-flow groundwater sampling procedure ("Low Stress [low-flow] Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells", dated July 30, 1996 and revised September 19, 2017) to allow for collection of representative samples. Prior to sample collection, groundwater was purged from each well while monitoring physical and chemical groundwater parameters (i.e., pH, conductivity, turbidity, dissolved oxygen, temperature, and oxidation-reduction potential). Groundwater was purged until physical and chemical groundwater parameters stabilized or after the well was purged for one hour, whichever was sooner. Groundwater samples were collected with a peristaltic pump, submersible monsoon pump, or bladder pump with dedicated polyethylene tubing. Groundwater samples for 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS) analyses were collected using standard procedures to avoid cross contamination and included, but not limited to, use of PFAS-free sample tubing and equipment and not using materials that may contain PFAS (i.e. latex gloves and waterproof clothing).

Fifteen groundwater samples and two duplicate sample were collected into labeled, laboratory-supplied containers, placed in a laboratory-supplied cooler, and packed on ice to maintain a temperature of about 4°C. The samples were picked up and delivered via courier service to Alpha under standard chain-of-custody protocol. Groundwater samples were analyzed for Part 375/TCL VOCs, Part 375/TCL SVOCs, Part 375/TCL PCBs, pesticides, herbicides, TAL metals (total and dissolved), hexavalent and trivalent chromium, and total cyanide. Samples from five wells (RMW07 on Lot 3, RMW09 on Lot 12, RMW22 on Lot 20, RMW23 on Lot 1, and RMW25 on Lot 1) were additionally analyzed for 1,4-dioxane and PFAS.

Groundwater sampling logs are included in Appendix D.

4.3 Soil Vapor Investigation

4.3.1 Soil Vapor Probe Installation

A Langan field engineer documented the installation of two soil vapor points (RSV01 and RSV02) and nine sub-slab soil vapor probes (RSSV01 through RSSV09) by AARCO. Soil vapor points RSV01 and RSV02 were installed using a direct push Geoprobe® 7822DT track-mounted drill rig to about 8 and 9 feet bgs, respectively (about 2 feet above the water table). Sub-slab vapor points were installed using an electric hand drill to approximately 2 inches below the base of the concrete slab.

Soil vapor points were installed in accordance with the NYSDOH "Guidance for Evaluating Soil Vapor Intrusion in the State of New York, with updates" (October 2006) and were comprised of 1.875-inch polyethylene implants threaded into 3/16-inch-diameter polyethylene tubing. The annulus of each soil vapor point was filled with No. 2 sand to a depth of about 4 inches above top of implant followed by a hydrated bentonite seal to surface grade. Sub-slab vapor points were comprised of 3/16-inch diameter inert polyethylene tubing. The annulus of each sub-slab vapor point was sealed with hydrated bentonite to surface grade.

Soil vapor and sub-slab vapor point locations are shown on Figures 7 and 8, and soil vapor and sub-slab vapor point construction/sampling logs are included in Appendix E.

4.3.2 Soil Vapor Sampling and Analysis

As a quality assurance/quality control (QA/QC) measure, a helium tracer gas was introduced into an above-grade sampling chamber to verify that the soil vapor and sub-slab vapor probes were properly sealed above the target sampling depth, thereby preventing subsurface infiltration of ambient air. Direct readings of less than 10 percent helium in the sampling tube were considered sufficient to verify a tight seal at each sample point.

Each soil vapor probe was purged using a MultiRAE meter at a rate of 0.2 liters per minute (L/min) to evacuate a minimum of three sample volumes prior to sample collection. The purged soil vapor was also monitored for VOCs. After purging was complete, soil vapor samples on Lots 3, 12, and 20 were collected into laboratory-supplied, batch-certified, 2.7-Liter Summa® canisters that were calibrated for a sampling rate of about 0.05 L/min over about 120 minutes of sampling. Lots 3, 12, and 20 were vacant during the time of sample collection; therefore, soil vapor samples were collected over a 2-hour period in accordance with the Remedial Investigation Work Plan (RIWP). Sub-slab and soil vapor samples on Lot 1 were calibrated for a sampling rate of about 0.005 L/min over about 480 minutes of sampling. Lot 1 was occupied during the time of sample collection;therefore, soil vapor samples were collected over an 8-hour period in accordance with the RIWP. For QA/QC purposes, two ambient air samples were collected: one on the Exterior Street sidewalk and one in the outdoor lot at the southwestern corner of Lot 3. The canisters were labeled and retrieved by a courier for delivery to Alpha under standard chain-of-custody protocol. Soil vapor samples were analyzed for VOCs by USEPA Method TO-15.

Soil vapor construction/sampling logs are included in Appendix E.

4.4 Quality Control Sampling

During the RI, field blanks, trip blanks, field duplicate samples, matrix spike/matrix spike duplicate (MS/MSD) samples, and an ambient air sample were collected and submitted for laboratory analysis. QA/QC samples include the following quality control samples:

Soil QA/QC samples

- Six field blanks
- Nine trip blank samples
- Seven field duplicate samples
- Five MS/MSD samples

Groundwater QA/QC samples

- Two field blank samples
- Four trip blank samples
- Two field duplicate sample
- One MS/MSD duplicate sample

Soil Vapor QA/QC Samples

- Two ambient air samples

The field duplicates were collected to assess the accuracy of the analytical methods relative to the sample matrix. The duplicates were collected from the same material as the primary sample by splitting the volume of homogenized sample collected in the field into two sample containers.

The trip blank samples were collected to assess the potential for contamination of the sample containers and samples during the trip from the laboratory, to the field, and back to the laboratory for analysis. Trip blanks contain approximately 40 milliliters of acidic water (doped with hydrochloric acid) that is sealed by the laboratory when the empty sample containers are shipped to the field, and unsealed and analyzed by the laboratory when the sample shipment is received from the field. The trip blank samples were analyzed for VOCs.

Field blank samples were collected to determine the effectiveness of the decontamination procedures for the groundwater sampling equipment train and the cleanliness of unused neoprene gloves and acetate liners used to collect soil samples. Field blank samples consisted of deionized, distilled water provided by the laboratory that has passed through the sampling apparatus. Field blank samples were analyzed for same lists as the corresponding sampling event and sample matrix.

MS/MSD samples were collected to assess the effect of the sample matrix on the recovery of target compounds or target analytes. MS/MSD samples were collected from the same material as the primary sample by splitting the volume of the homogenized sample collected in the field into three sample containers.

Ambient air samples were collected to assess ambient air conditions and determine whether conditions existed during soil vapor sampling that could have potentially interfered with sampling results. The ambient air samples were analyzed for the same parameter list as the soil vapor samples.

4.5 Data Validation

Data from the RI and March 2018 subsurface investigation were validated by a Langan data validator in accordance with USEPA and NYSDEC validation protocols. Copies of the data usability summary reports (DUSRs) and the data validator's credentials are included in Appendix F.

4.5.1 Data Usability Summary Report Preparation

A DUSR was prepared for each sampling matrix. The DUSR presents the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain-of-custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method.

For each of the organic analytes, the following was assessed:

- Holding times
- Instrument tuning
- Instrument calibration
- Blank results
- System monitoring compounds or surrogate recovery compounds (as applicable)
- Internal standard recovery results
- MS/MSD results
- Target compound identification
- Chromatogram quality
- Pesticide cleanup (if applicable)
- Compound quantization and reported detection limits

- System performance
- Results verification

For each of the inorganic analytes, the following was assessed:

- Holding times
- Calibrations
- Blank results
- Interference check sample
- Laboratory check samples
- Duplicates
- Matrix Spike
- Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES) QC
- ICP serial dilutions
- Results verification and reported detection limits

Based on the results of data validation, the validated analytical results reported by the laboratory were assigned one of the following usability flags:

- "U" – The analyte was analyzed for but was not detected at a level greater than or equal to the reporting limit (RL) or the sample concentration for results was impacted by blank contamination.
- "UJ" – The analyte was not detected at a level greater than or equal to the RL; however, the reported RL is approximate and may be inaccurate or imprecise.
- "J" – The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
- "R" – The sample results are not useable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.

After data validation was complete, validated data was used to prepare the tables and figures included in this report.

4.6 Field Equipment Decontamination

Handheld sampling equipment, including the interface probe, water quality meter, and sampling pump, was decontaminated by hand using an Alconox-based solution and triple rinsed with distilled water. Liquids were temporarily contained in 5-gallon buckets, and between rinses, equipment was placed such that contact with the ground was avoided. Decontamination wastewater was drummed for future disposal at a permitted facility.

4.7 Investigation-Derived Waste Management

Investigation-derived wastes (IDW) generated during the RI were containerized, as necessary. Soil cuttings were used to backfill the respective boring. If the soil cuttings contained evidence of petroleum impacts or did not fit back into the boring, the soil cuttings were placed into UN/DOT-approved 55-gallon drums in preparation for removal by a licensed waste hauler and disposal at a permitted facility. Aqueous waste from monitoring well development and purging and decontamination water were placed into UN/DOT-approved 55-gallon steel drums with sealed tops.

5.0 FIELD OBSERVATIONS AND ANALYTICAL RESULTS

This section summarizes the RI field observations and laboratory analytical results. Soil analytical results are compared to the Part 375-6.8(a) UU SCOs, Part 375-6.8(b) RRU and PGW SCOs, and RCRA Maximum Concentrations for Toxicity Characteristic. Groundwater analytical results are compared to the NYSDEC Division of Water TOGS Class GA SGVs and USEPA Health Advisory Limit. The nature and extent of contamination are discussed in Section 7.0.

A summary of the RI soil, groundwater, and soil vapor samples is included in Table 4. Copies of the laboratory analytical reports are included in Appendix G. Summaries of the analytical results for the soil, groundwater, and soil vapor samples are provided in the following tables:

- Table 6: Soil Sample Analytical Results Summary
- Table 7: Soil Sample Analytical Results Summary – Total and TCLP Lead
- Table 8: Groundwater Sample Analytical Results Summary
- Table 9: Soil Vapor Sample Analytical Results Summary

The following sections describe the RI field observations and analytical data.

5.1 Geology and Hydrogeology

Geologic and hydrogeologic observations are described below. A groundwater contour map is provided as Figure 3. A cross-sectional diagram showing inferred soil profiles is included as Figures 9A and 9B and soil boring logs are included in Appendix B.

5.1.1 Historic Fill Material

Historic fill material predominantly consisting 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.

5.1.2 Native Soil

Native soil encountered below historic fill predominantly consists of fine- to medium-grained sand with varying amounts of fine gravel, peat, 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), southern part of Lot 12 (RB12), and throughout Lot 20 (RB17, RB19, RB22) .

5.1.3 Bedrock

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

5.1.4 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.

5.2 Soil Findings

5.2.1 Field Screening Observations

Petroleum-like impacts, evidenced by odors, staining, and/or PID readings above background, were observed in 12 of 28 soil borings and are listed below:

Soil Boring	Depth Interval of Petroleum Impacts (feet bgs)	Maximum PID (ppm)	Other Observations	Tax Lot
RB01	13 to 15	1,015	Odor	3
RB03	2 to 3 and 13 to 15	161 and 34	Odor and Staining	3
RB09	18 to 27	7,913	Odor and Staining	12
RB10	18 to 31	686	Odor and Staining	12
RB11	17 to 28	1,321	Odor and Staining	12
RB12	8 to 9	180	Odor	3
RB13	19 to 30	385	Odor and Staining	12
RB14	18 to 32	626	Odor and Staining	12
RB15	19 to 28	1,101	Odor and Staining	12

Soil Boring	Depth Interval of Petroleum Impacts (feet bgs)	Maximum PID (ppm)	Other Observations	Tax Lot
RB18	1 to 8	21.6	Solvent-like Odor	20
RB19	20 to 22	47	Odor and Staining	20

The borings listed above were located primarily in the northern part of the site, in the vicinity of known or former gasoline USTs. The depths of petroleum impacts were delineated vertically at all 12 borings. No other visual, olfactory, and PID readings indicative of chemical or petroleum impacts were observed during the RI.

5.2.2 Analytical Results

One hundred and one soil samples, including seven duplicate samples, were collected and analyzed for Part 375/TCL VOCs, Part 375/TCL SVOCs, Part 375/TCL PCBs, pesticides, herbicides, TAL metals including hexavalent and trivalent chromium, and total cyanide. Thirty-one soil samples were analyzed also for the emerging contaminants PFAS and 1,4-dioxane, with sample locations selected based on groundwater sampling data. In addition, three samples collected from RB06, RB20, and RB21, which exhibited high total lead concentrations, were analyzed for TCLP lead. A summary of laboratory detections for soil samples collected during the RI, with comparisons to the UU SCOs, RRU SCOs, PGW SCOs, and the Resource Conservation Recovery Act (RCRA) Maximum Concentration of Contaminants for the Toxicity Characteristic for lead (5 milligrams per liter [mg/L]), is included in Tables 6 and 7 and shown on Figure 5. The analytical results are summarized below.

VOCs

Ten VOCs were detected above the UU and/or RRU SCOs in soil samples collected at or below the groundwater interface in soil borings RB01, RB03, RB04, RB08, RB09, RB10, RB11, RB13, RB14, RB15, RB19, and RB26. VOCs exceeded SCOs above the groundwater interface in soil boring RB12, located in the vicinity of the oil-water separator on Lot 3. These soil borings are located in the northern part of the site (with the exception of RB19 and RB26) and adjacent to current and historical gasoline tanks and oil-water separators. The table below provides a summary of each VOC that exceeds the UU, PGW, and/or RRU SCOs. Analytes detected at concentrations above the RRU SCOs are shown in bold and above the PGW SCOs are italicized:

Contaminant	Minimum detection (mg/kg)	Sample name	Maximum detection (mg/kg)	Sample name	UU SCOs (mg/kg)	RRU SCOs (mg/kg)	PGW SCOs (mg/kg)
1,2,4-Trimethylbenzene	*11*	RB12_8-9	***110***	RB13_18-20	3.6	52	3.6
1,3,5-Trimethylbenzene	*23*	RB14_23-25	*38*	RB13_18-20	6.4	52	8.4
2-Butanone	Same as maximum		0.35	RB01_14-15	0.12	100	~
Acetone	0.051	RB15_18-20	9.3	RB10_18-20	0.05	100	~
Benzene	*0.13*	RB15_0-2	***9.5***	RB10_18-20	0.06	4.8	0.06
Ethylbenzene	*1.6*	SODUP03_010219 (parent sample RB09_19-21)	*37*	RB13_18-20	1	41	1
n-Butylbenzene	14	SODUP03_010219 (parent sample RB09_19-21)	17	RB14_23-25	12	100	~
n-Propylbenzene	*6.7*	RB10_18-20	*44*	SODUP03_010219 (parent sample RB09_19-21)	3.9	100	3.9
Toluene	*1.6*	RB13_18-20	*8.5*	RB10_18-20	0.7	100	0.7
Total Xylenes	0.31	RB19_20-22	***120***	RB13_18-20	0.26	100	1.6

SVOCs

Nine SVOCs were detected at concentrations above the UU and/or RRU SCOs. SVOCs above SCOs were detected in borings across the site within the 0 to 2 foot interval except at borings RB02, RB11, RB13, RB16, RB20, RB23, RB24, RB36, and RB28. SVOCs above UU/RRU SCOs were also detected at most boring locations in deeper sample intervals, from 6 to 8 feet at RB18 to 20 to 22 feet at RB19. The table below provides a summary of each SVOC that exceeds the Part 375 UU and/or RRU SCOs and the range of concentrations above the SCOs. Analytes detected at concentrations above the RRU SCOs are shown in bold and above the PGW SCOs are italicized:

Contaminant	Minimum detection (mg/kg)	Sample name	Maximum detection (mg/kg)	Sample name	UU SCOs (mg/kg)	RRU SCOs (mg/kg)	PGW SCOs (mg/kg)
3-Methylphenol/4-Methylphenol	0.37	RB19_20-22	0.38	RB10_18-20	0.33	100	~
Benzo(a)anthracene	***1.1***	RB05_19-21 and RB22_0-2	***20***	RB12_0-2	1	1	1
Benzo(a)pyrene	**1.1**	RB05_19-21 and RB22_0-2	**19**	RB12_0-2	1	1	22
Benzo(b)fluoranthene	**1.1**	RB07_0-2, RB15_0-2 and RB18_0-2	***24***	RB12_0-2	1	1	1.7
Benzo(k)fluoranthene	0.82	RB10_0-2	***8.2***	RB12_0-2	0.8	3.9	1.7
Chrysene	*1.1*	RB03_0-2 and RB22_0-2	***18***	RB12_0-2	1	3.9	1
Dibenzo(a,h)anthracene	**0.34**	RB02_10-12	**2.8**	RB12_0-2	0.33	0.33	~
Indeno(1,2,3-cd)pyrene	**0.53**	RB07_8-10	**12**	RB12_0-2	0.5	0.5	8.2
Naphthalene	*21*	SODUP03_010219 (parent sample RB09_19-21)	*22*	RB13_22	12	100	12

PCBs

PCBs were not detected in soil samples at concentrations above UU SCOs.

Herbicides

Herbicides were not detected in soil samples.

Pesticides

Five pesticides were detected at concentrations above the Part 375 UU SCOs. No pesticides were detected above RRU SCOs. The table below provides a summary of each pesticide that exceeded the Part 375 UU SCOs and the range of concentrations above the SCOs.

Contaminant	Minimum detection (mg/kg)	Sample name	Maximum detection (mg/kg)	Sample name	UU SCOs (mg/kg)
4,4'-DDD	Same as maximum		0.00669	RB16_13-15	0.0033
4,4'-DDE	0.00667	RB07_8-10	0.101	RB06_0-2	0.0033
4,4'-DDT	0.00366	RB08_10-12	0.265	RB05_0-2	0.0033
Dieldrin	Same as maximum		0.0169	RB12_8-9	0.005
Endrin	Same as maximum		0.0252	RB16_13-15	0.014

Metals

Twelve metals were detected at concentrations above the Part 375 UU, PGW SCOs, and/or RRU SCOs. The table below provides a summary of each metal that exceeded the Part 375 UU, PGW, and/or RRU SCOs and the range of concentrations above the SCOs. Analytes detected at concentrations above the RRU SCOs are shown in bold and above the PGW SCOs are italicized:

Contaminant	Minimum detection (mg/kg)	Sample name	Maximum detection (mg/kg)	Sample name	UU SCOs (mg/kg)	RRU SCOs (mg/kg)	PGW SCOs (mg/kg)
Arsenic	**14.3**	RB28_0-2	***43.7***	RB01_0-2	13	16	16
Barium	**456**	RB07_8-10	***1,460***	RB08_0-2	350	400	820
Cadmium	3.08	RB20_7-9	**7.4**	RB03_0-2	2.5	4.3	7.5
Hexavalent Chromium	Same as maximum		1.54	RB07_0-2	1	110	~
Trivalent Chromium	35	RB05_8-10	52	RB01_0-2	30	180	~
Copper	52.1	RB19_0-2	**969**	RB20_7-9	50	270	1720
Lead	69.4	RB15_18-20	***2,940***	RB21_0-2	63	400	450
Mercury	0.186	RB14_0-2	***5.62***	RB17_4-6	0.18	0.81	0.73
Nickel	30.1	RB05_8-10	***8,770***	RB20_7-9	30	310	130
Selenium	*10.9*	RB07_10-12	*12.5*	RB10_18-20	3.9	180	4
Silver	9.66	RB03_2-3	35.7	RB03_0-2	2	180	~
Zinc	114	RB06_8-10	3,040	RB03_0-2	109	10,000	10,000

TCLP Lead

Samples collected from 0 to 2 feet bgs in RB06 and RB21, and 13 to 15 feet bgs in RB20 were atypical of lead values in urban fill. These three samples were analyzed for TCLP lead and compared against the RCRA Maximum Concentration of Contaminants for the Toxicity Characteristic for lead (5 mg/L). A hazardous concentration of lead was detected in one sample, RB06_0-2, located in the southeast corner of Lot 3.

PFAS (21-compound list) and 1,4-Dioxane

1,4-Dioxane was not detected in soil samples. One or more of ten PFAS were detected in 6 of the 31 borings sampled for PFAS. No Part 375 SCOs exist for 1,4-dioxane or PFAS. The maximum detected PFAS concentrations are listed below::

Contaminant	Maximum detection (mg/kg)	Sample name
N-ethyl perfluorooctane- sulfonamidoacetic acid	0.000114	RB17_0-2
Perfluorobutanoic acid	0.000044	RB07_8-10
Perfluorodecanoic acid	0.000165	RB08_0-2
Perfluoroheptanoic acid	0.000059	RB07_0-2 and RB07_8-10
Perfluorohexanoic acid	0.0001	RB07_8-10
Perfluorononanoic acid	0.0001	RB07_0-2
Perfluorooctanesulfonic acid	0.00116	RB07_0-2
Perfluorooctanoic acid	0.000428	RB07_0-2
Perfluoropentanoic acid	0.000082	RB27_0-2
Perfluoroundecanoic acid	0.00011	RB08_0-2

5.3 Groundwater Findings

5.3.1 Field Observations

Monitoring wells were gauged for non-aqueous phase liquid (NAPL) with an oil-water interface probe. NAPL was not encountered in monitoring wells. PID headspace readings above background levels were detected in monitoring wells RMW03, RMW09, RMW10, RMW11, and RMW14. The maximum PID headspace reading was 730 ppm in RMW10 located in the northeast corner of Lot 12. Groundwater elevations ranged from el 2.26 to el 3.12, which correspond to depths of about 12.08 and 18.95 feet bgs. Groundwater generally flows to the west toward the Harlem River.

5.3.2 Analytical Results

Seventeen groundwater samples, including two duplicate samples, were collected. Samples were analyzed for Part 375/TCL VOCs, Part 375/TCL SVOCs, Part 375/TCL PCBs, pesticides, herbicides, TAL metals (total and dissolved), hexavalent and trivalent chromium, and total cyanide. At least one groundwater sample per tax lot (RMW07, RMW09, RMW22, RMW23, and RMW25) were also analyzed for the emerging contaminates 1,4-dioxane and PFAS. A summary of the laboratory detections for groundwater samples collected during the RI is included in Tables 8 and 9, and shown on Figures 6A and 6B with comparisons to the SGVs and the USEPA Health Advisory Limit. The analytical results are summarized below.

VOCs

Thirteen VOCs were detected above the SGVs in groundwater samples collected from monitoring wells RMW01, RMW03, RMW09, RMW10, RMW11, and RMW14. These monitoring wells are located in the northern part of the site, and adjacent to current and historical gasoline tanks and oil-water separators. The table below provides a summary of each VOC that exceeded the SGVs and the range of concentrations above the SGVs.

Contaminant	Minimum detection (mg/kg)	Sample name	Maximum detection (mg/kg)	Sample name	SGVs
1,2,4,5-Tetramethylbenzene	10	RMW01	120	RMW14	5
1,2,4-Trimethylbenzene	8.4	RMW03	13	RMW11	5
1,3,5-Trimethylbenzene	Same as maximum		210	RMW14	5
Acrylonitrile	Same as maximum		77	RMW11_011719	5
Benzene	2.5	RMW01	840	RMW09	1
Ethylbenzene	120	RMW11	200	RMW14	5
Isopropylbenzene	20	RMW03	180	RMW14	5
n-Butylbenzene	9.4	RMW10	40	RMW14	5
n-Propylbenzene	13	RMW03 and RMW03	380	RMW14	5
p/m-Xylene	11	RMW03	32	RMW14	5
sec-Butylbenzene	12	RMW11	16	RMW14	5
Toluene	Same as maximum		48	RMW09	5

SVOCs

Nine SVOCs were detected above the SGVs in groundwater samples. The table below provides a summary of each SVOC that exceed the SGVs and the range of concentrations above the SGVs.

Contaminant	Minimum detection (mg/kg)	Sample name	Maximum detection (mg/kg)	Sample name	SGVs
Acenaphthene	32	RMW01 and GWDUP01 (parent sample RMW03)	33	RMW03	20
Benzo(a)anthracene	0.04	RMW07 and RMW16	0.3	RMW01	0.002
Benzo(a)pyrene	0.02	RMW18	0.28	RMW14	0
Benzo(b)fluoranthene	0.03	RMW18	0.33	RMW14	0.002
Benzo(k)fluoranthene	0.01	RMW18	0.13	RMW14	0.002
Chrysene	0.03	RMW18	0.31	RMW01	0.002
Indeno(1,2,3-cd)pyrene	0.02	RMW10 and RMW18	0.31	RMW22	0.002
Naphthalene	28	RMW03	370	RMW09	10
Pentachlorophenol	Same as maximum		9.2	RMW04	1
Phenol	1.2	RMW10	9.5	RMW09	1

PCBs

PCBs were not detected in groundwater samples.

Herbicides

Herbicides were not detected in groundwater samples.

Pesticides

Pesticides were not detected in groundwater samples at concentrations above the SGVs.

Metals

Groundwater samples collected from each well contained total and dissolved metals at concentrations above the SGVs. The table below provides a summary of each metal that exceeded the SGVs and the range of concentrations above the SGVs.

Contaminant	Minimum detection (mg/kg)	Sample name	Maximum detection (mg/kg)	Sample name	SGVs
Total Metals					
Iron	656	RMW07	36,400	RMW18	300
Lead	28.11	RMW10	239.4	RMW22	25
Magnesium	35,800	RMW07	80,600	RMW05	35,000
Manganese	342.5	RMW05	2,553	RMW18	300
Sodium	26,900	RMW11	523,000	RMW01	20,000
Dissolved Metals					
Iron	313	RMW05	31,800	RMW09	300
Magnesium	36,900	RMW18	80,800	RMW05	35,000
Manganese	354	RMW16	2,390	RMW09	300
Sodium	28,000	RMW11	517,000	RMW01	20,000

PFAS (21-compound list) and 1,4-Dioxane

Perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) were detected below the USEPA Health Advisory Limit of 0.07 µg/L (70 parts per trillion [ppt]) combined. The maximum combined concentration of PFOA and PFOS was 0.017 µg/L (7 ppt) detected in RMW23. 1,4-dioxane was not detected in the RMW07, RMW09, and RMW22. There is no SGV for PFAS and 1,4-dioxane.

5.4 Soil Vapor Findings

Nine sub-slab vapor, two soil vapor samples, and two ambient air samples were collected and submitted for laboratory analysis of USEPA TO-15 VOCs. No standard currently exists for sub-slab and soil vapor samples in New York State. Sub-slab and soil vapor sample results are summarized in Table 9 and shown on Figure 7.

VOCs detected in soil vapor samples include:

Contaminant	Maximum detection (µg/m³)	Vapor point location	Tax Lot (Block 2451)
1,2,4-Trimethylbenzene	32.4	SV06	Lot 12
1,3,5-Trimethylbenzene	19.7	RSSV04	Lot 12
1,2-Dichloroethane	2.44	RSSV03	Lot 12
1,3-Butadiene	0.469	RAA01	Lot 3
2,2,4-Trimethylpentane	41.2	SV08	Lot 20
2-Butanone	83.5	SV01	Lot 3
2-Hexanone	45.9	SV08	Lot 20
4-Ethyltoluene	6.78	RSSV04	Lot 12
Acetone	111	SV06	Lot 12
Benzene	141	SV01	Lot 3
Carbon tetrachloride	27.2	RSSV08	Lot 1
Carbon disulfide	240	SV01	Lot 3
Chloroform	10.5	RSSV04	Lot 12
Chloromethane	1.17	RAA01	Lot 3
Cyclohexane	516	SV06	Lot 12
Dichlorodifluoromethane	3.45	RAA01	Lot 3
Ethanol	28.3	RAA01	Lot 3
Ethylbenzene	76	RSSV07	Lot 20
Heptane	3500	SV01	Lot 3
Isopropanol	4.87	SV06	Lot 12
Methylene Chloride	2.73	RSSV03	Lot 12
n-Heptane	57	RSSV04	Lot 12
n-Hexane	6340	SV01	Lot 3
o-Xylene	76	RSSV07	Lot 20
p/m-Xylene	267	RSSV07	Lot 20
Tert-Butyl Alcohol	90.6	SV06	Lot 12
Tetrachloroethene (PCE)	62.4	SV01	Lot 3
Tetrahydrofuran	2.68	RSV02	Lot 3
Toluene	403	RSV01	Lot 3
Trichlorofluoromethane	5.16	RSSV01	Lot 3

Sample location RSSV09 was located in the southwestern part of Lot 1. Sub-slab vapor samples were compared to the New York State Department of Health NYSDOH Guidance for Evaluating Soil Vapor Intrusion. Full evaluation using the Decision Matrices requires both sub-slab vapor and indoor air data; indoor air data was not collected because existing building will be demolished as part of site redevelopment. However, the Decision Matrices can still provide guidance based on sub-slab vapor concentrations as they relate to ranges of possible indoor air concentrations.

PCE was detected in all sub-slab and soil vapor samples except sub-slab vapor point RSSV02. PCE concentrations ranged from 2.16 $\mu g/m^3$ in RSSV05 to 57.1 $\mu g/m^3$ at RSSV01. PCE's daughter products, TCE and cis-1,2-dichloroethene (DCE), were not detected in any sub-slab or soil vapor samples. PCE, TCE, and cis-1,2-DCE were not detected in the ambient air sample. A conservative comparison of the PCE concentrations in sub-slab vapor to the Decision Matrices recommends actions ranging from "no further action" to "mitigate".

Carbon tetrachloride was detected in two sub-slab soil vapor samples on Lot 1 at concentrations ranging from 3.03 $\mu g/m^3$ in RSSV09 to 27.2 $\mu g/m^3$ in RSSV08. A conservative comparison of the carbon tetrachloride concentrations in sub-slab vapor to the Decision Matrices recommends actions ranging from "no further action" to "mitigate".

Total VOC concentrations ranged from about 42.23 $\mu g/m^3$ in RSSV05 to 991 $\mu g/m^3$ in RSSV09. The ambient air total VOC concentration was 62.07 $\mu g/m^3$. Petroleum-related compounds, including benzene, toluene, ethylbenzene, xylenes (BTEX), were detected in all sub-slab and soil vapor samples, including the ambient air sample. BTEX concentrations detected in soil vapor ranged from about 24.12 $\mu g/m^3$ in RSSV05 to 531.2 $\mu g/m^3$ in RSSV09. BTEX concentrations detected in the ambient air samples ranged between 3.1 $\mu g/m^3$ in RAA02 and 8.17 $\mu g/m^3$ in RAA01

5.5 Quality Control Results

Quality control sample results were evaluated during data validation. The duplicates, field blanks, and MS/MSD sample pairs for soil and groundwater were collected at a frequency of 1 per 20 primary samples. The field duplicate results closely matched the results from their parent samples thereby demonstrating the accuracy of the analytical methods. The equipment and trip blank results indicated field decontamination procedures were effective and highlighted no cross-contamination issues during sample transport, respectively. Full laboratory reports are provided in Appendix G.

5.6 Data Usability

New York Analytical Services Protocols (ASP) Category B laboratory reports for the soil, groundwater, soil vapor samples were provided by Alpha and reviewed by a Langan data validator for samples collected during the RI and March 2018 Subsurface Investigation. Data qualifiers were updated following completion of the DUSRs. The DUSRs are included in Appendix F.

The data were determined to be mostly acceptable. Completeness, defined as the percentage of analytical results that are judged to be valid, is 100% for soil, groundwater, and soil vapor.

5.7 Evaluation of Areas of Concern

This section discusses the results of the RI and previous investigations with respect to the AOCs described in Section 3.4. The Part 375 RRU SCOs are the applicable soil standards for comparison based on the anticipated use of the site as a mixed-use residential and commercial development. The results were also compared to the Part 375 UU SCOs to evaluate whether unrestricted land use is practical. Some sample locations are associated with multiple AOCs, and locations are shown on Figure 8.

5.7.1 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.

<u>AOC 1 Findings Summary</u>

The following borings, monitoring wells and sub-slab soil vapor points are associated with this AOC: RB24, RB25/RMW25, RSSV08, and RSSV09.

AOC 1 Soil

Staining and/or PID readings were not observed in borings RB24 and RB25 or in monitoring well RMW25. Although petroleum-like odors were not observed, chemical-like odors were observed between 6 and 7 feet bgs in RB24 and between 15 and 16 feet bgs in RB25. VOCs were not detected above the UU, PGW and/or RRU SCOs in soil samples collected from those borings.

AOC 1 Groundwater

Petroleum-like odors, sheen, and PID headspace readings were not observed in RMW25. VOCs were not detected at concentrations above the SGVs.

AOC 1 Soil Vapor

Petroleum-related VOCs, including BTEX, were detected in RSSV08 and RSSV09. BTEX were detected at concentrations ranging from 194.2 μg/m^3 in RSSV08 to 531.2 μg/m^3 in RSSV09 (highest concentration at the site). Carbon tetrachloride was detected in RSSV08 at 27.2 μg/m^3, a concentration that may warrant mitigation.

AOC 1 Conclusions

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.

5.7.2 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.

AOC 2 Findings Summary

The following borings, monitoring wells and sub-slab soil vapor points are associated with this AOC: RB27, RB28, RSSV08, and RSSV09.

AOC 2 Soil

Staining and/or PID readings were not observed in borings RB26 and RB27 or in monitoring well RMW25. PID readings up to 16.3 ppm were observed in RB28; however, staining or odors were not identified. Although petroleum-like odors were not observed, chemical-like odors were observed between 15 and 16 feet bgs in RB25. Petroleum-related VOCs were not detected above the UU, PGW, and/or RRU SCOs in soil samples collected from those borings.

AOC 2 Groundwater

Petroleum-like odors, sheen, and PID headspace readings were not observed in RMW25. Petroleum-related VOCs were not detected at concentrations above the SGVs.

AOC 2 Soil Vapor

Petroleum-related VOCs, including BTEX, were detected in RSSV08 and RSSV09. BTEX concentrations were detected at concentrations of 194.2 μg/m^3 in RSSV08 to 531.2 μg/m^3 in RSSV09 (highest concentration at the site).

AOC 2 Conclusions

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.

5.7.3 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.

AOC 3 Findings Summary

The following borings and sub-slab soil vapor points are associated with this AOC: RB27, RB28, RSSV08, and RSSV09.

AOC 3 Soil

Staining and/or PID readings were not observed in RB27. PID readings up to 16.3 ppm were observed in RB28; however, staining or odors were not identified. Petroleum-related VOCs were not detected above the UU, PGW, and/or RRU SCOs in soil samples collected from those borings.

AOC 3 Soil Vapor

Petroleum-related VOCs, including BTEX, were detected in RSSV08 and RSSV09. BTEX concentrations were detected at concentrations of 194.2 $\mu g/m^3$ in RSSV08 to 531.2 $\mu g/m^3$ in RSSV09 (highest concentration at the site).

AOC 3 Conclusions

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.

5.7.4 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.

AOC 4 Findings Summary

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.

AOC 4 Soil

Petroleum-like odors, staining and/or PID readings of up to 1,015 ppm were observed in RB01 from 13 to 15 feet bgs, RB03 from 1 to 2 feet bgs and 13 to 15 feet bgs, and SB01 from 11 to 12 feet bgs and 15 to 16 feet bgs. VOCs, at a maximum of 12.7 mg/kg, were detected above the UU, PGW, and/or RRU SCOs in soil samples collected between 10 and 18 feet bgs in soil borings RB01, RB03, SB01.

AOC 4 Groundwater

PID headspace readings of up to 3.1 ppm and petroleum-like odors were apparent at MW01 and RMW03. Total VOCs, at a maximum of 1,320.55 µg/L, were detected above the SGVs in MW01, RMW01, and RMW03.

AOC 4 Soil Vapor

Petroleum-related VOCs, including BTEX, were detected in soil vapor and sub-slab soil vapor at concentrations generally above VOC concentrations detected in the ambient air sample. BTEX concentrations in vapor samples ranged from 30.7 µg/m^3 to 521.88 µg/m^3 at RSSV01 and RSV01 respectively, as compared to the ambient air sample, which exhibited BTEX concentrations of 8.17 µg/m^3.

The ambient air sample collected in the asphalt-paved open area on Lot 3 contained concentrations of petroleum-related VOCs, which may be related to automotive emissions from street traffic, or to vapors emanating through preferential pathways in the asphalt-paved area.

AOC 4 Conclusions

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.

5.7.5 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.

AOC 5 Findings Summary

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

AOC 5 Soil

Petroleum-like odors, staining and/or PID readings up to 1,015 ppm were observed in RB01 between 13 and 15 feet bgs, and in RB12 between 8 and 9 feet bgs. Total VOCs, at a maximum of 34.4 mg/kg were detected above the UU, PGW, and/or RRU SCOs in soil samples collected between 0 and 15 feet bgs in soil borings RB01 and RB12 in the vicinity of the oil-water separator.

AOC 5 Groundwater

Petroleum-like odors and PID headspace readings were not observed in wells in the vicinity of this AOC. Petroleum-related VOCs were detected at concentrations above the SGVs at a value of 26.6 µg/L in RMW01.

AOC 5 Soil Vapor

Petroleum-related VOCs, including BTEX, were detected in soil vapor and sub-slab soil vapor at concentrations generally above VOC concentrations detected in ambient air samples. BTEX concentrations in vapor samples ranged from 373.8 µg/m^3 to 521.88 µg/m^3 at SSV1 and RSV01 respectively; the ambient air sample exhibited BTEX concentrations of 9.039 µg/m^3.

The ambient air sample collected in the asphalt-paved open area on Lot 3 contained concentrations of petroleum-related VOCs, which may be related to automotive emissions from street traffic or to vapors emanating through preferential pathways in the asphalt-paved area.

AOC 5 Conclusions

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.

5.7.6 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.

AOC 6 Findings Summary

The following borings, monitoring wells and sub-slab soil vapor points are associated with this AOC: RB10, RB11, SB06, RMW10, RMW11, MW06, and RSSV02.

AOC 6 Soil

Petroleum-like odors, staining and/or PID readings up to 3,300 ppm were observed in SB06 between 18 and 24 feet bgs, RB10 between 18 and 31 feet bgs, and RB11 between 17 and 28 feet bgs. VOCs, at a maximum of 152.65 mg/kg, were detected above the UU, PGW, and/or RRU SCOs in soil samples collected from 18 to 21 feet bgs in the vicinity of the suspect UST.

AOC 6 Groundwater

Petroleum-related VOCs were detected at concentrations above the SGVs in the northern part of Lot 12. Petroleum-like odors and PID headspace readings up to approximately 730 ppm were observed in MW06, RMW10 and RMW11.

AOC 6 Soil Vapor

Petroleum-related VOCs, including BTEX, were detected in SV06 at a concentration of 143 $\mu g/m^3$.

AOC 6 Conclusions

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.

5.7.7 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 RRU SCOs, groundwater above NYSDEC TOGS SGVs in SB06/MW06, and soil vapor sample SV06; detections may be associated with this or other AOCs.

AOC 7 Findings Summary

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.

AOC 7 Soil

Petroleum-like odors, staining and/or PID readings up to 7,913 ppm (highest reading at the site) were observed in SB06 between 18 and 24 feet bgs, RB09 between 18 and 27 feet bgs, RB11 between 17 and 28 feet bgs, RB13 between 9 and 30 feet bgs, and RB14 between 19 and 32 feet bgs. Total VOCs (maximum concentration of 446 mg/kg) and naphthalene, (maximum concentration of 33 mg/kg), respectively, were detected above the UU, PGW, and/or RRU SCOs in soil samples collected from 18 to 25 feet bgs in soil borings SB06, RB09, RB11, RB13, and RB14. Spill No. 1705596 (discussed in 5.7.8) was reported prior to investigation of AOC 7 and located in the same area as AOC 8; therefore impacts associated with AOCs 7 and 8 may be related to the same Spill No. 1705596.

AOC 7 Groundwater

Petroleum-like odors, PID headspace readings up to approximately 400 ppm, and VOCs, at a maximum of 1,860 µg/L were detected above the SGVs were detected in MW06, RMW09, RMW11, and RMW14.

AOC 7 Soil Vapor

Petroleum-related VOCs, including BTEX, were detected in SV06 at a concentration of 143.0 $\mu g/m^3$.

AOC 7 Conclusions

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.

5.7.8 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.

<u>AOC 8 Findings Summary</u>

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.

AOC 8 Soil

Petroleum-like odors, staining and/or PID readings up to approximately 1,200 ppm were observed in SB08 between 23 and 25 feet bgs, SB11 between 18 and 25 feet bgs, SB13 between 18 and 25 feet bgs, RB14 between 19 and 32 feet bgs, and RB15 between 19 and 28 feet. Total VOCs, at a maximum of 442.04 mg/kg, were detected above the UU, PGW, and/or RRU SCOs in soil samples collected from 18 to 25 feet bgs in SB08, SB11, SB12, SB13, RB14, and RB15.

AOC 8 Groundwater

Petroleum-like odors and PID headspace readings up to approximately 35 ppm, and total VOCs, at a maximum of 1,590 µg/L, were detected above the SGVs in MW08 and RMW14.

AOC 8 Soil Vapor

Petroleum-related VOCs, including BTEX, were detected in sub-slab soil vapor at concentrations that ranged from 165.75 $\mu g/m^3$ to 196.79 $\mu g/m^3$ at RSSV03 and RSSV04 respectively.

<u>AOC 8 Conclusions</u>

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.

5.7.9 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.

<u>AOC 9 Findings Summary</u>

The following borings, monitoring wells and sub-slab soil vapor points are associated with this AOC: SB09, RB21, RB22, RMW22, and RSSV06.

AOC 9 Soil

Petroleum-like odors and staining were not observed in any borings or monitoring wells installed to investigate this AOC. Petroleum-related VOCs did not exceed the UU, PGW, and/or RRU SCOs in soil samples collected from soil directly from 0 to 8 feet bgs in SB09, RB21, and RB22.

AOC 9 Groundwater

Petroleum-related VOCs were detected at concentrations below the SGVs in RMW22.

AOC 9 Soil Vapor

Petroleum-related VOCs, including BTEX, were detected in SV06 at a concentration of 143.0 $\mu g/m^3$.

AOC 9 Conclusion

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 RRU SCOs and the SGVs. SVOCs were detected in soil and groundwater at concentrations above UU, PGW, and/or RRU 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.

5.7.10 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.

AOC 10 Findings Summary

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

AOC 10 Soil

Petroleum-like odors, staining and/or PID readings up to approximately 50 ppm were observed in RB19 between 20 and 22 feet bgs. One VOC, total xylenes, was detected above the UU, but below the PGW SCO, at a value of 0.31mg/kg in the soil sample collected from the groundwater interface (20 to 22 feet bgs) in RB19.

AOC 10 Groundwater

Petroleum-related VOCs were detected at concentrations below the SGVs in RMW18 and RMW22. Petroleum-related VOCs were not detected in RMW23.

AOC 10 Soil Vapor

Petroleum-related VOCs, including BTEX, were detected in RSSV07 at a concentration of 420.75 $\mu g/m^3$.

<u>AOC 10 Conclusion</u>

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 RRU 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.

5.7.11 AOC 11: Historic Fill

AOC 11 represents a layer of historic 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 RRU SCOs. The nature and extent of historic fill impacts was delineated and characterized during the RI.

AOC 11 Findings Summary

AOC 11 is a site-wide AOC. All borings and monitoring wells are associated with this AOC.

AOC 11 Soil

Historic fill material contains SVOCs, pesticides, and metals at concentrations above the Part 375 UU and/or RRU SCOs. The historic fill layer ranges from about 2.5 to 24 feet bgs and consists 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.

SVOCs, specifically PAHs, were detected in historic fill samples collected across the site, from soil immediately beneath the concrete slab up to 24 feet bgs. PAHs detected in soil likely are associated with historic fill.

Arsenic, barium, cadmium, hexavalent and trivalent chromium, copper, mercury, nickel, silver, and zinc were detected above UU, PGW, and/or RRU SCOs in historic fill samples collected throughout the site. Lead was detected above UU, PGW, and/or RRU SCOs in historic fill samples collected from borings across the site. Lead was detected at a concentration above the RCRA Maximum Concentration of Contaminants for the Toxicity Characteristic for lead (5 mg/L) in RB06 from 0 to 2 feet bgs. Five pesticides, 4,4'-DDD, 4,4'-DDE, 4,4-DDT', dieldrin, and endrin were detected above the UU SCOs

One pesticide, 4,4'-DDE, arsenic, copper, lead, mercury, selenium and/or zinc were detected in native soil above UU SCOs in borings RB07, RB10, RB19, RB21, and RB22 and may be a result of infiltration of historic fill material into the borehole during sample collection.

AOC 11 Groundwater

SVOCs (primarily PAHs) were detected at concentrations above the SGVs in all groundwater samples. Metals (including iron, lead, magnesium, manganese, and sodium) were detected at concentrations above the SGVs in groundwater samples. Lead was not detected in groundwater samples at dissolved concentrations; therefore, the detections in unfiltered samples are likely the result of suspended solids in groundwater derived from historic fill. Iron, magnesium, manganese, and sodium were detected in dissolved groundwater samples above SGVs and are characteristic of naturally-occurring groundwater conditions.

AOC 11 Conclusions

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.

5.7.12 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 Findings Summary

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.

AOC 12 Soil

Carbon tetrachloride and PCE were detected in soil; however, neither were detected above UU SCOs.

AOC 12 Groundwater

Carbon tetrachloride and PCE were not detected in groundwater.

AOC 12 Soil Vapor

Carbon tetrachloride was detected in two sub-slab soil vapor samples at concentrations ranging from 3.03 $\mu g/m^3$ in RSSV09 to 27.2 $\mu g/m^3$ in RSSV08. Carbon tetrachloride was not detected in RAA02. PCE was detected in five soil vapor samples and eight sub-slab soil vapor samples. Detected concentrations ranged between 2.16 $\mu g/m^3$ and 62.4 $\mu g/m^3$ in RSSV05 and SV01, respectively. PCE was not detected in RSSV02, and RAA01.

AOC 12 Conclusions

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.

6.0 QUALITATIVE HUMAN AND FISH/WILDLIFE EXPOSURE ASSESSMENT

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

In addition to the human health exposure assessment, NYSDEC DER-10 requires an on-site and off-site Fish and Wildlife Resources Impact Analysis (FWRIA) if certain criteria are met. According to the requirements stipulated in Section 3.10 and Appendix 3C of DER-10, there was no need to prepare an FWRIA for the site. A completed form of DER-10 Appendix 3C is included in Appendix H.

6.1 Current Conditions

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 is bound by East 146th Street to the north, Gerard Avenue to the east, and 144th Street to the south, and Exterior Street to the west. 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). According to previous reports, geophysical surveys, and/or site visits, there is an unregistered AST, UST and oil-water separator on Lot 1, an oil-water separator on Lot 3, three abandoned in-place gasoline USTs of unknown size and on oil-water separator on Lot 12, and four ASTs and an oil-water separator on Lot 20. Previous reports note the presence of two 550-gallon gasoline USTs on Lot 20 and two USTs on Lot 3.

6.2 Proposed Conditions

Current plans call for the mixed-use residential and commercial 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.

6.3 Summary of Environmental Conditions

AOCs include an AST and UST of unknown contents located in Lot 1, gasoline tanks located in Lots 3 and 12, a UST and associated open petroleum spill in Lot 12, oil-water separators located in Lots 1, 3, 12, and 20, historic fill across the site, and carbon tetrachloride and PCE impacts to soil vapor. Contaminants of concern (COCs) associated with the AOCs include VOCs, SVOCs, pesticides, and metals.

Soil

Petroleum-related VOCs were detected in the northern part of the site above the UU, PGW, and/or RRU SCOs in soil samples collected between 13 and 32 feet bgs, with the exception of RB13, which had localized impacts at 0 to 2 and 8 to 9 feet bgs. Petroleum-related contamination was localized to the northern part of the site across Lots 3 and 12. Lot 3 formerly contained two 550-gallon gasoline USTs in the western-central part of the lot and contains an oil-water separator on the northeast corner of the lot; Lot 12 contains three abandoned in-place gasoline USTs of unknown capacity in the northeast and southeast corners of the lot and an oil-water separator in the southeast corner of the lot. Residual petroleum-related contamination was localized in the southern part of Lot 20, which contains four ASTs. Petroleum-related VOCs in soil and groundwater and the open petroleum spill are likely related to the historical petroleum bulk storage at the site and the presence of oil-water separators on both lots.

Petroleum-related SVOCs above UU, PGW, and/or RRU SCOs in soil may be related to the quality of historic fill. SVOCs above SGVs were observed in groundwater samples collected from across the site and are attributed to historic fill quality from entrained sediment in the groundwater samples.

Historic fill contains SVOCs, metals, and pesticides at concentrations above the Part 375 UU, PGW, and/or RRU SCOs. One sample collected from the 0- to 2-foot interval contains hazardous concentrations of lead. The deepest historic fill samples exceeding the SCOs were found between 23 and 24 feet bgs. 4,4'-DDT and four metals (arsenic, trivalent chromium, lead, mercury) were detected above Part 375 UU and PGW 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.

Groundwater

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. Petroleum-related VOCs including 1,2,4,5-tetramethylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, acrylonitrile, benzene, ethylbenzeneiso-propylbenzene, n-butylbenzene, n-propylbenzene, naphthalene, p/m-xylene, sec-butylbenzene, and toluene were detected above SGVs. SVOCs including acenaphthene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd) pyrene, pentachlorophenol, and phenol were detected above SGVs.