DRAFT REMEDIAL INVESTIGATION REPORT
210 GREENPOINT AVENUE REDEVELOPMENT
NYSDEC BCP SITE C224348
BROOKLYN, NEW YORK

PREPARED FOR
210 GREENPOINT REALTY LLC
HAUPPAUGE, NY 11788

PREPARED BY:

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25 August 2022
File No. 0205127

New York State Department of Environmental Conservation
Region 2 – Division of Environmental Remediation
625 Broadway
Albany, NY 12233

Attention: Mr. Michael Sollecito

Subject: Draft Remedial Investigation Report
210 Greenpoint Avenue Redevelopment
Brooklyn, New York
BCP Site No. C224348

Ladies and Gentlemen,

On behalf of 210 Greenpoint Realty LLC (210 Greenpoint), Haley & Aldrich of New York is submitting for the review and approval of the New York State Department of Environmental Conservation (NYSDEC) this draft Remedial Investigation Report (RIR) for the 210 Greenpoint Avenue Redevelopment (C224348), located in the Greenpoint area of Brooklyn, NY (Site). This draft RIR was developed in accordance with the NYSDEC (6 NYCRR) Part 375 Brownfield Cleanup Regulations dated December 2006, the "Technical Guidance for Site Investigation and Remediation" (DER-10 dated May 2010) and other relevant NYSDEC technical and administrative guidance.

Please do not hesitate to contact us if there are any questions regarding this submittal or any other aspects of the project.

Sincerely yours,
HALEY & ALDRICH OF NEW YORK

DRAFT	**DRAFT**	**DRAFT**
James M. Bellew	Matthew Levy	Matthew Forshay, E.I.T.
Principal	Project Manager	Project Environmental Engineer

Cc: 210 Greenpoint Realty LLC; Attn. Mr. Joel Kohn and Mr. Jacob Kohn
Cris-Sandra Maycock – NYSDEC
Gerard Burke – NYSDEC
Jane O'Connell – NYSDEC
Scarlett McLaughlin – NYSDOH
Christine Leas. – Sive, Paget & Riesel P.C.

Certification

This report documents remedial investigation activities conducted 210 Greenpoint Avenue, Brooklyn, New York.

I, James M. Bellew, certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Remedial Investigation Report[1] was prepared in accordance with all statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Final Submission Will Be Certified

James M. Bellew, Principal *Date*

[1] *Certification applies to remedial investigation activities conducted prior to the execution of a Brownfield Cleanup Agreement for the property.*

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List of Acronyms and Abbreviations

A	
AGV	Air Guidance Value
Alpha	Alpha Analytical Laboratories, Inc.
AMSL	Above Mean Sea Level
AOCs	Areas of Concern
ASP	Analytical Services Protocol
AWQS	NYSDEC Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA Water
B	
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene, total xylenes
C	
CEQR	City Environmental Quality Review
CHASP	Construction Health & Safety Plan
COCs	Contaminants of Concern
CP-51	Commissioners Policy-51 *(specifically "October 2010 NYSDEC Commissioners Policy 51")*
CVOCs	Chlorinated volatile organic compounds
D	
DER-10	Division of Environmental Remediation-10 *(specifically "May 2010 NYSDEC Technical Guidance for Site Investigation and Remediation")*
DOT	Department of Transportation
DPK	DPK Consulting LLC
DUSR	Data Usability Summary Report
E	
Eastern	Eastern Environmental Solutions
ELAP	Environmental Laboratory Approval Program
EnviroTrac	EnviroTrac Ltd.
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
ESI	Environmental Site Investigation
F	
Ft bgs	Feet below grade surface
G	
GPR	Ground penetrating radar
GPRS	GPRS, Inc.

H

Haley & Aldrich	Haley & Aldrich of New York
HASP	Health & Safety Plan
HAZWOPER	Health Administration Hazardous Waste Operations and Emergency Response
HREC	Historic Recognized Environmental Condition

L

L/min	Liters per minute
LNAPL	Light Non-Aqueous Phase Liquid

M

MCL	Maximum Contaminant Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MDL	Method Detection Limit
mg/kg	Milligrams per Kilogram
MTBE	Methyl tert-butyl ether

N

NNO	Notice of No Objection
NTP	Notice to Proceed
NTU	Nephelometric turbidity units
6NYCRR	NYSDEC Title 6 of New York Codes, Rules and Regulations
NYCOER	New York City Office of Environmental Remediation
NYCRR	New York Codes, Rules and Regulations
NY-MCL	New York Maximum Concentrations Limit
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health

P

PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PCE	Perchloroethene/tetrachloroethene
PFAS	Per- and Polyfluoroalkyl Substances
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic acid
PGWSCOs	Protection of Groundwater Soil Cleanup Objectives
PPE	Personal protective equipment
Ppm	Parts per million
PQL	Practical quantitation limit
PVC	Polyvinyl Chloride
PID	Photoionization Detector

Q

QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan

QHHEA	Qualitative Human Health Exposure Assessment
R	
RA	Remedial Action
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RCSCOs	Restricted Commercial Soil Cleanup Objectives
REC	Recognized Environmental Condition
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
RRSCO	Restricted-Residential Soil Cleanup Objectives
S	
SCG	Standards, Criteria and Guidelines
SCO	Soil Cleanup Objective
SGV	NYSDEC Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA Water
Site	the property located at 210 Greenpoint Avenue, Brooklyn, New York
SVE	Soil Vapor Extraction
SVOC	Semi-Volatile Organic Compound
T	
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity characteristic leaching procedure
TOGS 1.1.1	Technical and Operational Guidance Series 1.1.1 *(Specifically "June 1998 NYSDEC Division of Water Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values, Class GA for the protection of a source of drinking water modified per the April 2000 addendum")*
U	
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µg/m^3	micrograms per cubic meter
UST	Underground Storage Tank
UUSCOs	Unrestricted Use Soil Cleanup Objectives
V	
VOCs	Volatile Organic Compounds

1. Introduction

This Remedial Investigation Report (RIR) was developed by Haley & Aldrich of New York (Haley & Aldrich) on behalf of 210 Greenpoint Realty LLC for the proposed development of the property located at 210 Greenpoint Avenue, Brooklyn, New York (the Site). 210 Greenpoint Realty LLC applied to and was accepted into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) as a Volunteer. A Brownfield Cleanup Agreement (BCA) was executed by the NYSDEC and 210 Greenpoint Realty LLC (the "Volunteer") on 14 April 2022 (BCP Site No. C224348).

The Site, identified as Block 2576, Lot 7 on the New York City tax map, is located in the borough of Brooklyn and is comprised of one 13,675 square foot (sq ft) tax lot improved with a one story 840 sq ft building. The Site is currently vacant and was most recently occupied by an active retail petroleum station operated by Speedway LLC.

The Site is located within a residential and commercial area. The Site is bounded by Greenpoint Avenue, followed by a residential apartment building and two mixed-use buildings with commercial businesses occupying the street-level units ("Kimchee Market" and "Pueblo Querido") to the north; Greenpoint Avenue and McGuinness Boulevard intersection, followed by a public facility (FDNY Engine 238 & Ladder 106), and a portion of a gasoline service station occupied by BP to the northeast; McGuinness Boulevard, followed by a commercial building occupied by "Key Food Supermarkets" to the east; a mid-rise office building with a parking garage and a portion of a mid-rise residential apartment building to the south; and multi-family residential buildings to the west. The Project Locus is depicted on Figure 1, and existing Site features are displayed on the Site Map provided as Figure 2.

According to the New York City Planning Commission Zoning Map 13a, the Site is located within a residential and commercial zoning district (R7-A and R6-B with a C2-4 commercial overlay). The intended use post development is mixed-use (residential and commercial), mixed-income building that will provide approximately 33 new affordable residential rental units. The proposed development of this property will be consistent with the current zoning.

The Site is listed with an environmental E-Designation (E-287) for hazardous materials, noise (window wall attenuation and alternative means of ventilation), and air quality (HVAC limited to natural gas and exhaust stack location limitations) resulting from a City Environmental Quality Review (CEQR) effective 10 December 2012 (CEQR #10DCP024K). Satisfaction of the E-Designation requirements is subject to review and approval by the New York City Mayor's Office of Environmental Remediation (NYCOER) to obtain a Notice to Proceed (NTP) and/or a Notice of No Objection (NNO) prior to obtaining building permits.

The activities of this Remedial Investigation (RI) were completed from 05 May 2022 through 13 May 2022, in conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and NYSDEC-approved March 2022 Remedial Investigation Work Plan (RIWP).

1.1 PURPOSE AND OBJECTIVES

As part of the BCP requirements, the RI was conducted at the Site from 05 May 2022 through 13 May 2022 to investigate and delineate the nature and extent of contamination identified at the Site during the previous subsurface investigations.

A subsurface investigation was completed in May 2002 by EnviroTrac Ltd. (EnviroTrac), a Closure Request and Third Quarterly 2006 Update Report was completed in October 2006 by EnviroTrac, a Phase I Environmental Site Assessment (ESA) was completed by Haley & Aldrich in October 2021, and a Limited Phase II Environmental Site Investigation (ESI) was completed by Haley & Aldrich in November 2021.

Upon review of the analytical results of the November 2021 Limited Phase II ESI, historical fill, contaminated with heavy metals and semi-volatile organic compounds (SVOCs) (specifically polycyclic aromatic hydrocarbons [PAHs]), was identified as widely distributed throughout the Site at depths ranging from immediately below the impervious site cover to 4.5 feet below grade surface (ft bgs). Several volatile organic compounds (VOCs) were identified above detection limits in soil vapor adjacent to the underground storage tank (UST) area and filling area. Groundwater was not encountered during the Limited Phase II ESI due to drilling constraints, therefore, it was not adequately characterized throughout the Site. While the Limited Phase II ESI provided preliminary Site characterization data, it did not fully determine the nature and extent of soil, groundwater, and soil vapor contamination at the Site.

Details on the previous assessments/investigations performed at the Site (i.e., Phase I and Phase IIs) are provided in Section 3 of this report. Copies of previous environmental reports are provided in Appendix A.

On behalf of 210 Greenpoint Realty LLC, Haley & Aldrich implemented and completed the RI in May 2022 in conformance with DER-10 and per the NYSDEC-approved March 2022 RIWP. The objective of the RI was to determine the nature and extent of contamination in soil, groundwater, and soil vapor at the Site. Results of the RI were used to confirm the results of the previous Site characterization activities, potentially identify an on-site source, and to determine a course for remedial action.

2. Site Background

2.1 SITE LOCATION AND DESCRIPTION

The Site, identified as Block 2576, Lot 7 on the New York City tax map, is an irregular-shaped lot approximately 13,675-square-feet in size (approximately 0.314 acres). The Site is currently vacant and was most recently occupied by an active retail petroleum station operated by Speedway LLC. The Site is located within an urban area surrounded by mixed-use commercial and residential properties, and is bounded by Greenpoint Avenue, followed by a residential apartment building and two mixed-use buildings with commercial businesses occupying the street-level units ("Kimchee Market" and "Pueblo Querido") to the north; Greenpoint Avenue and McGuinness Boulevard intersection, followed by a public facility (FDNY Engine 238 & Ladder 106), and a portion of a gasoline service station occupied by BP to the northeast; McGuinness Boulevard, followed by a commercial building occupied by "Key Food Supermarkets" to the east; a mid-rise office building with a parking garage and a portion of a mid-rise residential apartment building to the south; and multi-family residential buildings to the west.

A Project Locus is provided as Figure 1, and existing Site features are displayed on the Site Map provided as Figure 2. The sample location map is provided as Figure 3.

According to the New York City Planning Commission Zoning Map 13a, the Site is located within a residential and commercial zoning district (R7-A and R6-B with a C2-4 commercial overlay). The intended use post development is mixed-use (residential and commercial), mixed-income building that will provide approximately 33 new affordable residential rental units under the 421-a program. The proposed development of this property will be consistent with the current zoning.

The Site is listed with an environmental E-Designation (E-287) for hazardous materials, noise (window wall attenuation and alternative means of ventilation), and air quality (HVAC limited to natural gas and exhaust stack location limitations) resulting from a City Environmental Quality Review (CEQR) effective 10 December 2012 (CEQR #10DCP024K). Satisfaction of the E-Designation requirements is subject to review and approval by the New York City Mayor's Office of Environmental Remediation (NYCOER) to obtain a Notice to Proceed (NTP) and/or a Notice of No Objection (NNO) prior to obtaining building permits.

2.2 GEOLOGY AND HYDROGEOLOGY

The ground level elevation on the Site is between approximately 15 and 20 feet (ft) above mean sea level (amsl), and the depth to bedrock is estimated at approximately 80 to 100 ft bgs. The Site's stratigraphy, from the surface down, consists of historical fill (immediately below impervious site cover and concrete foundations) generally consisting of light to dark brown, medium to fine silty sand with varying amounts of gravel, brick, concrete, wood, and asphalt was observed from surface grade to depths extending approximately 1 to 12 ft bgs in each soil boring. The historical fill interval is deepest in the central portion of the Site as identified in RI soil borings SB-1 and SB-2, where historical fill was observed up to 9 to 10 ft bgs (historical fill material was observed at 12 ft bgs in SB-3). The historical fill layer was underlain by a potential native layer consisting of light brown to black medium to fine silty sand and sand with varying amounts of silt and gravel. The native interval was observed up to the

terminus depth of each soil boring, ranging from 15 to 50 feet bgs. Groundwater was encountered at depths ranging from approximately 4.21 to 8.95 ft bgs, with the highest groundwater elevations observed in the central region of the Site and lowest in the northern region of the Site. Groundwater elevations ranged from elevation 4.89 ft at MW-01 to elevation 8.63 ft at MW-02 (elevation refers to the North American Vertical Datum of 1988 [NAVD88]) and is inferred to flow from the east-southeast to the west-northwest. A groundwater contour map is provided in Figure 4.

2.3 SITE HISTORY

The Site was firstly developed in the 1800s and occupied by commercial, residential, and vacant properties until the early 1940s when the majority of the Site began to operate as an auto repair garage and auto sales shop. By the late 1970s, the entire Site is identified as a filling station with a one-story commercial structure located in the southwest corner. An overhead canopy was developed on a portion of the Site in the late 1970s and remained on Site to the present. From the late 1970s to present, the Site features and operations remained generally unchanged (i.e., active gasoline filling station) until operations ceased in May 2022.

2.4 REDEVELOPMENT PLANS

Although the future development plans are in preliminary design phases, the proposed development will consist of constructing a new 9-story mixed-use (residential and commercial), mixed-income building with one cellar level requiring excavation extending up to approximately 12 ft bgs. About 100 dwelling units are proposed, of which about 33 units will be designated as affordable housing pursuant to the 421-a program.

The proposed development will include a commercial retail space, outdoor recreational space, a trash compactor, and utility rooms in the cellar, and an indoor recreation/ co-working space, commercial retail spaces, a residential lobby, a package storage room, and two residential apartments on the 1st floor. The 2nd floor will include a fitness center, laundry room bicycle storage and a parking garage. Floors 3 through 6 will include additional residential apartments, outdoor recreational spaces, a refuse room and utility closets. Floors 7 through 9 will include a refuse room, and utility closet, and additional residential apartments, come of which will have private terraces. The roof will include an outdoor recreation space and mechanical areas. Redevelopment plans are included in Appendix M.

3. Summary of Previous Investigations

The following reports were prepared for the Site prior to submission of the RIR:

1. July 2002 Subsurface Investigation Report, prepared by EnviroTrac
2. October 2006 Closure Request and Third Quarterly 2006 Update Report, prepared by EnviroTrac
3. October 2021 Phase I Environmental Site Assessment, prepared by Haley & Aldrich
4. November 2021 Limited Phase II Environmental Site Investigation Report, prepared by Haley & Aldrich

Copies of previous reports are included in Appendix A.

Subsurface Investigation Report (EnviroTrac, Ltd., July 2002)

In this report, EnviroTrac. summarizes the data and findings of a subsurface investigation performed at the Site in May 2002. Six soil samples were collected from approximately 8 to 12 ft bgs. Laboratory analytical results for the soil samples indicate that VOCs were not detected above the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 Soil Cleanup Objectives (SCOs) to protect groundwater quality.

Groundwater samples were collected from all six borings installed and analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) and methyl tert-butyl ether (MTBE). Laboratory analytical results indicate that five of the six groundwater samples exceed the NYSDEC Groundwater Standards for BTEX and MTBE compounds.

This report concludes with the following recommendations: submitting a Remedial Action Plan (RAP) to address the elevated concentrations of BTEX and MTBE in groundwater; continuing monthly product recovery events and quarterly groundwater sampling; and continuing soil vapor extraction (SVE) system operations[1]. Based on conversations with Ed Russo at Envirotrac, the SVE system was installed in the kiosk building in 1998 and active until August 2006. The SVE system was installed due to the presence of vapors in the kiosk building. EnviroTrac did not have any further information related to the system and performance.

Closure Request Report and Third Quarterly 2006 Update Report (EnviroTrac, Ltd., October 2006)

This report was submitted to summarize the findings from one additional groundwater sampling event that was conducted at the subject Site, in response to a sensitive receptor survey submitted to the NYSDEC in July 2006, as well as to reiterate the property owner's (Hess) request to close Spill #93-03243.

Eight groundwater wells were gauged for the presence of light non-aqueous phase liquid (LNAPL) and sampled for the analysis of BTEX and MTBE compounds. The maximum concentrations detected for the

[1] Regulatory records reviewed for the Site indicate the installation of a soil vapor extraction system in January 1998. Based on this information and the information provided in the Subsurface Investigation Report (EnviroTrac, Ltd., July 2002) regarding SVE system operations, it can be assumed that reports were generated for the Site (prior to 2002) in connection with Spill #93-03243 that were not available to Haley & Aldrich.

aforementioned compounds were detected in MW-3 and include: 172.3 parts per billion (ppb) for BTEX; and 338 ppb for MTBE.

October 2021 Phase I Environmental Site Assessment Prepared by Haley & Aldrich

Haley & Aldrich prepared a Phase I ESA in October 2021 for the property located at 210 Greenpoint Avenue, Brooklyn, New York (Block 2576, Lot 7) for the purpose of identifying Recognized Environmental Conditions (RECs) in connection with the Site. As identified in the Phase I ESA, the Site was developed as early as the late 1880s. In the late 1880s, the Site was divided into multiple lots that were either vacant or developed with multiple residential or commercial-use buildings. In 1916, the south and east portions of the Site are identified as a barrel storage facility; the residential structures present in this portion of the Site were identified as storage. By the early 1940s, the majority of the Site was redeveloped into an auto repair garage with two gasoline tanks. By the late 1970s, the entire Site is identified as a filling station with a one-story commercial structure located in the southwest corner. Records indicate tanks have been present on the Site since the early 1970s.

The Phase I ESA revealed the following RECs and Historic RECS (HRECs) in connection with the Site:

- REC #1: Current and Former use of Subject Site as a Petroleum Filling Station/Auto-Related Facility

  Historical records indicated current and former use of the subject Site as a petroleum filling station/auto-related facility since the early 1940s. Impacts to soil and groundwater at the subject Site were determined to be likely due to the subject Site's history of petroleum-related operations and petroleum bulk storage.

- HREC #1: Closed Spill Cases Associated with Former Leaking USTs

  Regulatory records and previous reports identified the presence of petroleum-related contamination at the subject Site associated with leaking USTs. Investigative activities commenced in 1993 when petroleum-impacted soil was identified during a tank upgrade project. After that time, additional spills were reported due to petroleum releases impacting soil, groundwater, and soil vapor at the subject Site. In 1998, a SVE system was installed to mitigate indoor vapors identified in the building located on the subject Site. The most recent data provided for the subject Site, collected in 2006, indicated concentrations of MTBE in groundwater that exceeded the regulatory limit; however, all spill cases had received regulatory closure.

November 2021 Limited Phase II Environmental Site Investigation Report Prepared by Haley & Aldrich

Haley & Aldrich completed a limited sampling event at the Site to investigate soil and soil vapor beneath the Site. The investigation was performed between 01 and 02 November 2021 and included installation of eight soil borings to depths up to 5.5 ft bgs, and two sub-slab vapor points to a depth of 1 ft bgs. Groundwater was not encountered during the investigation. The investigation also included the collection of soil and soil vapor samples. A total of five soil samples and two soil vapor samples were collected. Data validation was performed on the soil data.

Field observations and laboratory analytical results are summarized below:

Limited Phase II ESI – Soil

- Historical fill generally consisting of dark brown to black medium silty sand with varying amounts of gravel, concrete, wood, and brick to depths up to 5.5 ft bgs was observed throughout the Site.
- Elevated PID readings above background levels and petroleum-like odors were encountered at the 0 to 4 ft bgs interval (boring terminus) at B-1, with a maximum detection of 399 ppm; and, at the 4.0 to 4.5 ft bgs interval (boring terminus) at B-6, with a maximum detection of 136 ppm. Petroleum-like odors and PID readings above background levels were encountered at B-3 at the 0 to 1 ft bgs interval (boring terminus); and B-5 at the 0.5 to 2.5 ft bgs interval.
- Soil samples were analyzed for volatile organic compounds (VOCs), SVOCs, and total metals. Results are summarized as follows:
    - Six SVOCs, including benzo(a)anthracene (maximum concentration 3.1 milligrams per kilogram [mg/kg]), benzo(a)pyrene (maximum concentration 2.5 mg/kg), benzo(b)fluoranthene (maximum concentration 3.2 mg/kg), dibenzo(a,h)anthracene (maximum concentration 0.65 mg/kg), and indeno(1,2,3-cd)pyrene (maximum concentration 1.7 mg/kg), were identified above NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Restricted-Residential Soil Cleanup Objectives (RRSCOs) in multiple shallow soil samples. Additionally, benzo(k)fluoranthene (maximum concentration 1.0 mg/kg) was detected above NYSDEC Part 375 UUSCOs, but below RRSCOs, in multiple shallow soil samples.
    - No VOCs were detected in soil samples at concentrations exceeding the applicable soil cleanup objectives.
    - Two metals, lead (maximum concentration 522 mg/kg) and mercury (maximum concentration 0.92 mg/kg), were identified above RRSCOs, in one sample and two samples, respectively. Additionally, zinc (maximum concentration 273 mg/kg) was identified above UUSCOs, but below RRSCOs in multiple shallow soil samples.

Limited Phase II ESI – Soil Vapor

- No standard currently exists for soil vapor samples in New York State. Soil vapor analytical results were compared to the New York State Department of Health (NYSDOH) Air Guidance Values (AGV) specified in the NYSDOH guidance document; however, it is noted that this was for reference only and that a complete SVI analysis conforming to the guidance was not performed. Soil vapor results collected during the Limited Phase II showed:
    - Total VOC concentrations in soil vapor samples ranged from 909.71 micrograms per cubic meter (µg/m^3) in sample SV-1 to 226,600 µg/m^3 in SV-2. Total benzene, toluene, ethylbenzene, and xylene (BTEX) concentrations ranged between 0 µg/m^3 in SV-2 to 190.7 µg/m^3 in SV-1.
    - Tetrachloroethene (PCE) was detected in soil vapor sample SV-1 at a concentration of 51.1 µg/m^3. No other VOCs exceeded the NYSDOH AGVs.

4. Remedial Investigation Approach

4.1 PROJECT TEAM

A project team for the Site was created based on qualifications and experience with personnel suited for successfully completion of the project.

James Bellew was the Qualified Environmental Professional (QEP) and Principal in Charge for this work. In this role, Mr. Bellew was responsible for the overall completion of each task as per the requirements outlined in the RIWP and in accordance with the DER-10 guidance.

Matthew Levy was the Haley & Aldrich Project Manager for this work. In this role, Mr. Levy managed the day-to-day tasks, including coordination and supervision of field engineers and scientists, adherence to the RIWP and oversight of project schedule.

Sebastian Sotomayor was the lead field engineer responsible for implementing the field effort for this work. Mr. Sotomayor's responsibilities included implementing the RIWP activities and directing the subcontractors to ensure successful completion of field activities.

The drilling subcontractor utilized for this investigation was Eastern Environmental Solutions (Eastern). Eastern provided a track-mounted Sonic Geoprobe® and track-mounted direct push Geoprobe® and operators to implement the RI scope of work, including advancement of soil borings, installation of groundwater monitoring wells and installation of sub-slab/soil vapor probes.

Soil and groundwater samples were collected into laboratory prepared sample bottles (pre-preserved when appropriate), placed in ice-packed coolers maintained at approximately 4 degrees Celsius under standard chain of custody procedures and transported to Alpha Analytical Laboratories, Inc. of Westborough, Massachusetts (Certification No. 07010T) (Alpha). Soil vapor samples were collected in laboratory-supplied batch certified-clean 2.7-liter SUMMA canisters with 2-hour flow controllers and transported under standard chain of custody to Alpha. Alpha is a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified laboratory (ELAP No. 11148) and was responsible for analyzing the samples as per the analyses and methods identified in this RIR.

4.2 GEOPHYSICAL INVESTIGATION

On 13 October 2021, a geophysical survey was completed by GPRS, Inc. (GPRS). Haley & Aldrich field personnel oversaw GPRS and documented field observations. GPRS used ground penetrating radar (GPR) and electromagnetic detection equipment to delineate anomalies and identify subsurface structures. A series of utility lines were identified throughout the Site: electrical utility lines servicing the on-site buildings and the petroleum pump islands; watermain utility lines servicing the on-site structures; gasoline utility lines servicing the USTs on the Site; a stormwater utility line fed by a catch basin located in the northeast portion of the Site; a sanitary sewer line located along the southern boundary of the Site; and a series of unknown underground utility lines. The findings report, provided by GPRS, dated 15 October 2021, is provided as Appendix B.

4.3 SOIL BORING INSTALLATION AND SOIL SAMPLING

Soil samples were collected to meet NYSDEC DER-10 requirements for RIs, as well as to investigate and delineate the nature and extent of contamination identified at the Site during the previous subsurface investigations.

Ten soil borings were advanced to depths of between 15 to 50 ft bgs using a track-mounted direct-push drill rig (7822DT Geoprobe®) or track-mounted sonic drill rig (8140LS Geoprobe®) operated by a licensed operator provided by Eastern, the drilling subcontractor. Soil samples were collected from dedicated acetate liners using a stainless-steel trowel or sampling spoon. Samples were collected using laboratory provided clean bottle ware. VOC grab samples were collected using encores. Soil sampling locations are displayed in Figure 3.

Soils were logged continuously by an engineer using the Modified Burmeister Classification System. Sampling methods are described in the RIWP and provided as Appendix C. A Quality Assurance Project Plan (QAPP) is provided as Appendix D. The presence of staining, odors, and PID response was noted. Soil boring logs are provided as Appendix E.

Soil samples representative of Site conditions were collected at ten locations widely distributed across the Site, as shown in Figure 3. Samples were collected from the top six inches immediately beneath the impervious site cover (i.e., concrete slab) and from variable intervals within the historical fill interval exhibiting the greatest impacts (if identified). Samples were also collected from native material at the groundwater interface, and from the proposed development depth of 12-14 ft, or if field evidence of contamination was noted, to document the vertical extent of impacted soil.

Haley & Aldrich collected 37 soil samples (plus quality assurance/quality control [QA/QC] samples) for laboratory analysis. Soil samples were collected in laboratory-supplied containers, which were relinquished under standard chain-of-custody protocol and delivered via courier to Alpha for analysis.

Alpha is a NYSDOH ELAP-certified laboratory. As detailed in Table 1, soil samples were analyzed for the following:

- Target Compound List (TCL) VOCs by EPA Method 8260C/5035
- TCL SVOCs using EPA Method by 8270C
- Total Analyte List (TAL) Metals by EPA Method 6010D/7471B
- TCL PCBs by EPA Method 8082A
- Per- and polyfluoroalkyl substances (PFAS) by EPA Method 537.1
- 1,4-dioxane by EPA Method 8270 SIM

All soil samples were analyzed for emerging contaminants. Soil samples collected for PFAS and 1,4-dioxane were collected in accordance with the protocols established in NYSDEC's "Guidance for Sampling, Analysis, and Assessment of PFAS Under NYSDEC's Part 375 Remedial Programs" (June 2021).

Table 1 provides a summary of all soil samples collected as part of this RI, including sample locations, sample depths and analyses performed on each sample. Tables 2A provides the soil analytical results

from the November 2021 Phase II ESI. Tables 3A through 3E provide all soil analytical results collected as part of this RI, including sample locations, sample depths and analyses performed.

4.4 PERMANENT MONITORING WELL INSTALLATION AND GROUNDWATER SAMPLING

The purpose of the groundwater sampling was to obtain current groundwater data and analyze for additional parameters (i.e., PFAS and 1,4-dioxane) to meet NYSDEC DER-10 requirements for RIs.

Five, two-inch diameter permanent monitoring wells were installed to depths of between 15 to 20 ft bgs. Monitoring wells installed to fifteen feet were constructed using 2-inch diameter polyvinyl chloride (PVC) riser pipe and were screened from 5 to 15 ft bgs. Monitoring wells installed to twenty feet were constructed using 2-inch diameter polyvinyl chloride (PVC) riser pipe and were screened from 5 to 20 ft. bgs. A clean sand fill pack (No. 2 sand) was placed around each monitoring well screen, followed by bentonite plug, then soil cuttings to grade, and sealed at grade with an approximately 1 ft thick layer of concrete. The monitoring wells were installed to surface grade with steel flush-mount covers. Monitoring well screens were installed to straddle the water table. During a monitoring well gauging event concurrent with the well survey on 13 May 2022, groundwater was encountered at depths ranging from approximately 4.21 to 8.95 ft bgs. Well construction diagrams are provided in Appendix F.

Following installation, monitoring wells were developed by surging a pump in the well several times to pull fine-grained material from the well. Development was completed until the water turbidity was 50 nephelometric turbidity units (NTU) or less or ten well volumes were purged.

Haley & Aldrich collected five groundwater samples (plus QA/QC samples) for laboratory analysis including the following:

- TCL VOCs by EPA Method 8260C
- TCL SVOCs by EPA Method 8270D
- Dissolved/Total Metals (filtered and unfiltered) by EPA Methods 6020B/7470A;
- PCBs using USEPA method 8082A
- PFAS by EPA Method 537.1
- 1,4-dioxane by EPA Method 8270D-SIM isotope dilution

Groundwater samples collected PFAS and 1,4-dioxane analysis were collected in accordance with the protocols established in NYSDEC's "Guidance for Sampling, Analysis, and Assessment of PFAS Under NYSDEC's Part 375 Remedial Programs" (June 2021).

Table 1 provides a summary of all groundwater samples collected as part of this RI, including sample locations, sample depths and analyses performed on each sample. Tables 4A through 4E provide summary analytical results of all groundwater samples collected as part of this RI.

Groundwater monitoring wells were sampled utilizing low-flow sampling procedures for groundwater sampling. Prior to sampling, the water level was measured from each monitoring well using an electronic water level meter. Groundwater from each well was purged using low pumping rates (less than 500 milliliters per minute) to limit drawdown of the water level. Dedicated disposable field

equipment used at each well included high density polyethylene and silicon tubing. Wells were purged until turbidity, pH, temperature, dissolved oxygen, and specific conductivity stabilized. Field measurements collected from the flow cell were logged and are included in Appendix G.

DPK Consulting, LLC (DPK), a New York State licensed surveyor, completed a monitoring well survey on 31 May 2022. During surveying, Haley & Aldrich performed a synoptic monitoring well gauging event. Groundwater flows from the east-southeast to the west-northwest. A groundwater contour map is provided in Figure 4 and a summary of the synoptic monitoring well gauging results is provided in Table 5. A survey map summarizing the data collected by the licensed surveyor is provided as Appendix H.

4.5 SOIL VAPOR PROBE INSTALLATION AND SOIL VAPOR SAMPLING

Soil vapor samples were collected in accordance with the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH October 2006). Six soil vapor points were installed on 05 and 06 May 2022 by Eastern below the roughly 6-inch-thick composite cover system (asphalt and subbase material) to depths of between 2 to 4 ft bgs due to the elevated groundwater measurements. The soil vapor points were installed with a direct-push drill rig (e.g., Geoprobe®) to advance a stainless-steel probe to the desired sample depth by Eastern personnel.

To ensure the stainless-steel soil vapor and sub-slab vapor probes were sealed completely to the surface using bentonite, a tracer gas was used in accordance with NYSDOH protocols to serve as a QA/QC to verify the integrity of the soil vapor probe seal. In addition, one to three implant volumes were purged prior to the collection of the soil vapor samples. Sampling occurred for the duration of two hours. At the conclusion of the sampling round, tracer monitoring was performed a second time to confirm the continued integrity of the soil vapor probe seals.

Haley & Aldrich collected six soil vapor samples. Samples were collected in appropriately sized Summa canisters that were certified clean by the laboratory. Samples were analyzed for VOCs using USEPA Method TO-15. Flow rate for both purging and sampling did exceed 0.2 liters per minute (L/min). The soil vapor purge log is included as Appendix I. Additional details regarding the sampling methods are described in the RIWP provided in Appendix C.

Table 1 provides a summary of all soil vapor samples collected as part of this RI, including sample locations and analyses performed on each sample. Table 6 summarizes vapor results.

4.6 QUALITY ASSURANCE/QUALITY CONTROL

The RI was conducted in accordance with Haley & Aldrich's QAPP provided in Appendix D. Haley & Aldrich's sampling program included several types of QA/QC samples and measures to ensure the usability of the data, as described in the RIWP. QA/QC samples included equipment rinsate/field blanks, trip blanks, sample duplicates, and matrix spike/matrix spike duplicates (MS/MSDs). Table 1 provides a summary of QA/QC samples collected during the RI.

When applicable, the sample result summary tables list the laboratory method detection limit (MDL) at which a compound was non-detectable. The laboratory results were reported to the sample-specific practical quantitation limit (PQL), equal to the sample-specific MDL, supported by the instrument calibrations.

The reliability of laboratory data is supported by compliance with sample holding times and laboratory MDLs below cleanup criteria. The accuracy and precision of the laboratory analytical methods were maintained by using calibration and calibration verification procedures, laboratory control samples, and surrogate, matrix, and analytical spikes. A review of the laboratory data packages indicates that holding times were met and no significant non-conformance issues were reported. Details of the laboratory reports are provided in Appendix J. Data validation is ongoing as detailed in Section 6.6 and will be summarized in Data Usability Summary Reports (DUSRs) to be included in Appendix K as part of the finalized RIR.

4.7 FIELD EQUIPMENT DECONTAMINATION

Downhole drilling equipment was decontaminated between each boring by washing with an Alconox-based solution. Decontamination wastewater was contained in a wash pan and containerized in 55-gallon drums for disposal. Handheld sampling equipment was decontaminated by hand in an Alconox-based solution and triple rinsed with deionized water. Decontamination liquids were temporarily contained in 5-gallon buckets and then added to drums at the end of each workday.

4.8 INVESTIGATION DERIVED WASTE

Following sample collection, boreholes that were not converted to monitoring wells were backfilled with non-impacted soil cuttings and an upper bentonite plug. Boreholes were restored to grade with the surrounding area. If excess soil could not be backfilled, it was separated and placed into a sealed and labeled Department of Transportation (DOT) approved 55-gallon drum pending off-site disposal. Groundwater purged from the monitoring wells during development and sample collected was placed into a DOT approved 55-gallon drum pending off-site disposal. During the RI, a total of one drum containing purged groundwater and two drums containing soil cuttings were produced. The drums are currently labeled and staged on-site in a manner that prevents leakage, deterioration or release of waste. The drums will be transferred to an approved facility for disposal at a later date during implementation of the remedy.

4.9 REPORTING

During implementation of the NYSDEC-approved RIWP, daily field summary reports were provided to NYSDEC and NYSDOH. Daily field reports included a summary of sampling and field activities, a photo log, results of community air monitoring, including formatted data, and a Site plan. Copies of the daily field reports and community air monitoring data are provided in Appendix L.

5. Health and Safety

The work outlined above was completed under a Site-specific Health and Safety Plan (HASP) in accordance with Occupational Safety and Health Administration Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations. Work was completed in Modified Level D personal protective equipment (PPE). A copy of the HASP is included in Appendix E of the NYSDEC-approved RIWP.

6. Contaminants of Concern and Nature and Extent of Contamination

6.1 APPLICABLE STANDARDS

Soil analytical results were compared to NYSDEC 6 NYCRR Part 375 UUSCOs, Protection of Groundwater SCOs (PGWSCOs) and RRSCOs. Note that no standards for PFAS in soil currently exist in New York State; however, NYSDEC published soil guidance values for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) in October 2020 (latest revision June 2021). PFOA and PFOS soil sample results are compared to the UU and RR soil guidance values outlined in the Part 375 Remedial Programs Guidelines for Sampling and Analysis of Per- and Polyfluoroalkyl Substances (PFAS) guidance.

Groundwater analytical results were compared to 6 NYCRR Part 703.5 NYSDEC Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA Water (herein referred to as SGVs) and Part 375 Remedial Programs Guidelines for Sampling and Analysis of PFAS NYSDEC June 2021 guidance value. Currently, a groundwater cleanup regulatory criterion does not exist for 1,4-dioxane in New York State. Concentrations of 1,4-dioxane were compared to New York State's drinking water maximum contaminant level (MCL) of 1 microgram per liter (µg/L).

No standard currently exists for soil vapor samples in New York State. Soil vapor analytical results were compared to the NYSDOH AGV specified in the NYSDOH guidance document. The soil vapor sample results were also evaluated using the NYSDOH Decision Matrices A, B and C (updated May 2017) as referenced in the 2006 NYSDOH Soil Vapor Intrusion Guidance document.

6.2 FIELD OBSERVATIONS

Based on field observations during the RI, the Site is underlain by historical fill (immediately below impervious site cover and concrete foundations), generally consisting of light to dark brown, medium to fine silty sand. Varying amounts of gravel, brick, concrete, wood, and asphalt was observed from surface grade to depths extending approximately 1 to 10 ft bgs in each soil boring. The historical fill interval is deepest in the central portion of the Site, as identified in RI soil borings SB-01 and SB-02, where historical fill was observed up to 9-10 ft bgs (historical fill was observed up to 13 ft bgs in SB-3). The historical fill layer was underlain by a potential native layer consisting of light brown to black medium to fine silty sand and sand with varying amounts of silt and gravel. The native interval was observed up to the terminus depth of each soil boring, ranging from 15 to 50 feet bgs.

Groundwater was encountered at depths ranging from approximately 4.21 to 8.95 ft bgs. Groundwater beneath the Site generally flows from the east-southeast to the west-northwest, with elevations ranging from 4.89 ft at MW-1 to 8.63 ft at MW-2 (NAVD88). A slight sheen, which dissipated after the first 15 minutes of low-flow purging, was observed during groundwater sampling of MW-5. A groundwater contour map is provided in Figure 4.

6.3 SOIL SAMPLING RESULTS

Tables 3A through 3E summarize the analytical results from the RI soil sampling scope. Figure 5 provide the soil boring locations as well as a summary of soil data from the sampling event. Details of the soil boring logs are provided in Appendix E.

Volatile Organic Compounds

Eleven VOCs were detected at concentrations exceeding both the UUSCOs, RRSCOs, and/or PGWSCOs in up to 10 soil samples collected from historical fill and native material at depths ranging from immediately below the impervious site cover (0-0.5 interval) up to 28 to30 ft bgs (SB-1).

Acetone was detected in four soil samples collected from historical fill material (0 to 10 ft bgs) at concentrations exceeding UUSCOs; concentrations ranged from 0.058 mg/kg in sample SB-4 (8-10') to 0.09 mg/kg in sample SB-1 (0-0.5') (UUSCO of 0.05 mg/kg).

Benzene was detected in five soil samples collected from historical fill and native fill material (0 to 30 ft bgs) at concentrations exceeding both UUSCOs and PGWSCOs; concentrations ranged from 0.3 mg/kg in sample SB-5 (8-10') to 1.4 mg/kg in sample SB-1 (3-5') (UUSCO and PGWSCO of 0.06 mg/kg).

Ethylbenzene was detected in four soil samples collected from historical fill and native fill material (0 to 30 ft bgs) at concentrations exceeding UUSCOs, PGWSCOs, and RRSCOs; concentrations ranged from 20 mg/kg in sample DUP-2 (28-30') to 74 mg/kg in sample SB-5 (8-10') (UUSCO of 1 mg/kg, PGWSCO of 5.5 mg/kg, RRCSO of 41 mg/kg).

Isopropyl benzene was detected in four soil samples collected from historical fill material and native material (0 to 30 ft bgs) at a concentration exceeding PGWSCOs; Concentrations ranged from 3.8 mg/kg in sample DUP-2 (28-30') to 16 mg/kg in sample SB-5 (8-10') (PGWSCO of 2.3 mg/kg).

Naphthalene was detected in two soil samples collected from historical fill material (3 to 10 ft bgs) at concentrations exceeding UUSCOs and PGWSCOs; concentrations ranged from 22 mg/kg in sample SB-5 (8-10') to 69 mg/kg in sample SB-1 (3-5') (UUSCO of 12 mg/kg, PGWSCO of 13 mg/kg).

n-Butylbenzene was detected in one soil sample collected from historical fill material (3 to 5 ft bgs) at a concentration exceeding UUSCOs and PGWSCOs; SB-1 (3-5') had a concentration of 13 mg/kg (UUSCO and PGWSCO of 12 mg/kg).

n-Propyl benzene was detected in four soil samples collected from historical fill and native fill material (3 to 30 ft bgs) at concentrations exceeding UUSCOs and PGWSCOs; concentrations ranged from 7.7 mg/kg in sample DUP-2 (28-30') to 40 mg/kg in sample SB-5 (8-10') (UUSCO of 3.9 mg/kg, PGWSCO of 3.7 mg/kg).

Toluene was detected in three soil samples collected from historical fill and native fill material (0 to 30 ft bgs) at concentrations exceeding both UUSCOs and PGWSCOs; concentrations ranged from 0.82 mg/kg in sample DUP-2 (28-30') to 12 mg/kg in sample SB-5 (8-10') (UUSCO of 0.7 mg/kg, PGWSCO of 1.5 mg/kg).

1,3,5-Trimethylbenzene was detected in four soil samples collected from historical fill and native fill material (3 to 30 ft bgs) at concentrations exceeding UUSCOs, PGWSCOs, and RRSCOs; concentrations ranged from 12 mg/kg in sample DUP-2 (28-30') to 140 mg/kg in sample SB-1 (3-5') (UUSCO of 8.4 mg/kg, PGWSCO of 3.3 mg/kg, RRSCO of 52 mg/kg).

1,2,4-Trimethylbenzene was detected in five soil samples collected from historical fill and native fill material (0 to 30 ft bgs) at concentrations exceeding UUSCOs, PGWSCOs, and RRSCOs; concentrations ranged from 6.6 mg/kg in sample SB-6 (0-0.5') to 340 mg/kg in sample SB-1 (3-5') (UUSCO of 3.6 mg/kg, PGWSCO of 13 mg/kg, RRSCO of 52 mg/kg).

Xylenes were detected in five soil samples collected from historical fill and native fill material (0 to 30 ft bgs) at concentrations exceeding UUSCOs, PGWSCOs, and RRSCOs; concentrations ranged from 2.2 mg/kg in sample SB-6 (0-0.5') to 320 mg/kg in sample SB-5 (8-10') (UUSCO of 0.26 mg/kg, PGWSCO of 1.2 mg/kg, RRCSO of 100 mg/kg).

No additional VOCs were detected above RRSCOs, PGWSCOs, or UUSCOs in the remaining soil samples collected during the RI or during the Phase II conducted in November 2021.

Semi-Volatile Organic Compounds

Eight SVOCs, primarily PAHs, were detected at concentrations exceeding both the UUSCOs, RRSCOs, and/or PGWSCOs in up to 13 soil samples collected from historical fill material at depths ranging from immediately below the impervious site cover up to 10 ft bgs.

Benzo(a)anthracene was detected in 12 soil samples collected from historical fill material (0 to 10 ft bgs) at concentrations exceeding UUSCOs, PGWSCOs, and RRSCOs; concentrations ranged from 1.4 mg/kg in samples SB-2 (3-5'), SB-4 (0-0.5'), and SB-5 (0-0.5') to 7.5 mg/kg in sample SB-7 (3-5') (UUSCO of 1, PGWSCO of 3 mg/kg, RRSCO of 1 mg/kg).

Benzo(a)pyrene was detected in 11 soil samples collected from historical fill material (0 to 10 ft bgs) at concentrations exceeding UUSCOs and RRSCOs; concentrations ranged from 1.2 mg/kg in sample SB-4 (0-0.5') to 6.2 mg/kg in sample SB-7 (3-5') (UUSCO and RRSCO of 1 mg/kg).

Benzo(b)fluoranthene was detected in 12 soil samples collected from historical fill material (0 to 10 ft bgs) at concentrations exceeding UUSCOs, PGWSCOs, and RRSCOs; concentrations ranged from 1.1 mg/kg in sample SB-2 (3-5') to 6.3 mg/kg in sample SB-3 (3-5') (UUSCO and RRSCO of 1 mg/kg, PGWSCO of 1.1 mg/kg).

Benzo(k)fluoranthene was detected in seven soil samples collected from historical fill material (0 to 10 ft bgs) at concentrations exceeding UUSCOs and PGWSCOs; concentrations ranged from 0.83 mg/kg in samples SB-4 (8-10') and SB-9 (0-0.5') to 1.6 mg/kg in sample SB-7 (3-5') (UUSCO of 0.8 mg/kg, PGWSCO of 1.1 mg/kg).

Chrysene was detected in 13 soil samples collected from historical fill material (0 to 10 ft bgs) at concentrations exceeding UUSCOs, PGWSCOs, and RRSCOs; concentrations ranged from 0.43 mg/kg in

sample SB-1 (0-0.5') to 5.8 mg/kg in sample SB-7 (3-5') (UUSCO of 1 mg/kg, PGWSCO of 0.4 mg/kg, RRSCO of 3.9 mg/kg).

Dibenzo(a,h)anthracene was detected in seven soil samples collected from historical fill material (0 to 10 ft bgs) at concentrations exceeding UUSCOs and RRSCOs; concentrations ranged from 0.36 mg/kg in sample SB-9 (0-0.5') to 0.76 mg/kg in sample SB-7 (3-5') (UUSCO and RRSCO of 0.33 mg/kg).

Indeno(1,2,3-cd)pyrene was detected in 12 soil samples collected from historical fill material (0 to 10 ft bgs) at concentrations exceeding UUSCOs, PGWSCOs, and RRSCOs; concentrations ranged from 0.6 mg/kg in sample SB-2 (3-5') to 3.8 mg/kg in sample SB-7 (3-5') (UUSCO and RRSCO of 0.5 mg/kg, PGWSCO of 3.2 mg/kg).

Naphthalene was detected in two soil samples collected from historical fill material (3 to 9 ft bgs) at concentrations exceeding UUSCOs and PGWSCOs; concentrations ranged from 15 mg/kg in sample SB-1 (3-5') to 21 mg/kg in sample SB-7 (7-9') (UUSCO of 12 mg/kg, PGWSCO of 13 mg/kg).

No additional SVOCs were detected above RRSCOs, PGWSCOs, or UUSCOs in the remaining soil samples collected during the RI.

During the Phase II conducted in November 2021, seven SVOCs including benzo(a)anthracene (maximum concentration 3.1 mg/kg), benzo(a)pyrene (maximum concentration 2.5 mg/kg), benzo(b)fluoranthene (maximum concentration 3.2 mg/kg), benzo(k)fluoranthene (maximum concentration 0.95 mg/kg), chrysene (maximum concentration 4.3 mg/kg), dibenzo(a,h)anthracene (maximum concentration 0.65 mg/kg), and indeno(1,2,3-cd)pyrene (maximum concentration 1.7 mg/kg) were identified above UUSCOs in multiple shallow soil samples collected from the historical fill interval of 0 to 4.5 ft bgs. The PAH-impacted soils identified in the historical fill interval will be excavated and removed from the Site during remedial action.

Metals

Ten metals were detected at concentrations exceeding the UUSCOs, RRSCOs, and/or PGWSCOs in up to 18 soil samples collected from historical fill and native material at depths ranging from immediately below the impervious site cover (0-6" interval) up to 7 to 10 ft bgs in historical fill material (from SB-01, SB-03, SB-04, SB-05, SB-07, and SB-09) and between about 12-15 ft bgs in native material (AB-1, AB-04) deeper native material from 28-30 ft bgs (SB-05).

Arsenic was detected in one soil sample collected from shallow historical fill material in SB-4 (3-5') at a concentration of 13.2 mg/kg, exceeding the UUSCO of 13 mg/kg.

Copper was detected in two soil samples collected from shallow historical fill material (3 to 9 ft bgs) at concentrations exceeding the UUSCOs; concentrations ranged from 51.6 mg/kg in SB-7 (7-9') to 77.2 mg/kg in SB-3 (3-5') (UUSCO of 50 mg/kg).

Lead was identified in 16 soil samples collected from historical fill and native material (0 to 30 ft bgs) at concentrations exceeding the UUSCOs and RRSCOs; concentrations ranged from 64.4 mg/kg in SB-2 (0-0.5') to 590 mg/kg in SB-7 (7-9') (UUSCO of 63, RRSCO of 400 mg/kg).

Mercury was identified in 17 soil samples collected from historical fill and native material (0 to 30 ft bgs) at concentrations exceeding the UUSCOs and RRSCOs; concentrations ranged from 0.194 mg/kg in SB-10 (0-0.5') to 2.67 mg/kg in SB-4 (3-5') (UUSCO of 0.18 mg/kg, RRSCO of 0.81 mg/kg).

Zinc was detected in 12 soil samples collected from historical fill and native material (0 to 30 ft bgs) above the UUSCO; concentrations ranged from 112 mg/kg in SB-1 (3-5') to 1,230 mg/kg in SB-7 (0-0.5') (UUSCO of 109 mg/kg).

No additional metals were detected above UUSCOs or RRSCOs in the remaining soil samples collected during the RI.

During the Phase II conducted in November 2021, three metals including lead (maximum concentration 522 mg/kg), mercury (maximum concentration 0.92 mg/kg), and zinc (maximum concentration 273 mg/kg) were identified above UUSCOs in multiple shallow soil samples collected from the historical fill interval of 0 to 4.5 bgs. The metal-impacted soils identified in the historical fill and native intervals will be excavated and removed from the Site during remedial action.

Polychlorinated Biphenyls

PCBs were not detected above UUSCOs, RRSCOs, or PGWSCOs in soil samples analyzed.

Emerging Contaminants

1,4-dioxane was not detected above laboratory detection limits in soil samples analyzed. Concentrations of PFOS did not exceed the UU guidance values in historical fill material. PFOS was identified in eight soil samples, collected from immediately below the impervious site cover to a maximum depth of 30 ft bgs; however, detected concentrations were below the UU and/or protection of groundwater guidance values.

Concentrations of PFOA exceeded the UU guidance value in one sample collected from SB-4 from (3-5') (0.695 micrograms per kilogram [ug/kg], exceeding the UU guidance value of 0.66 ug/kg) in historical fill material. PFOA was also identified in nine additional soil samples, collected from immediately below the impervious site cover to a maximum depth of 15 ft bgs; however detected concentrations were below the UU and/or protection of groundwater guidance values.

One or more of the following PFAS compounds were detected in soil samples collected as part of the RI:

- Perfluorobutanoic Acid (PFBA)
- Perfluoropentanoic Acid (PFPeA)
- Perfluorohexanoic Acid (PFHxA)
- Perfluoroheptanoic Acid (PFHpA)
- Perfluorohexanesulfonic Acid (PFHxS)
- Perfluorononanoic Acid (PFNA)

Total PFOA/PFAS compounds detected ranged from 0.067 µg/kg in SB-9 (8-10') to 0.695 µg/kg SB-4 (3-5').

6.4 GROUNDWATER SAMPLING RESULTS

Tables 4A through 4E summarize the analytical results from the groundwater sampling event. Figure 6 provides the groundwater monitoring well locations as well as a summary of the groundwater data from the sampling event. Figure 7 provides a summary of the emerging contaminants detected in groundwater data from the sampling event. Groundwater sampling logs are provided in Appendix G. The following sections provide a summary of groundwater analytical results in exceedance of NYSDEC AWQS and guidance values for emerging contaminants (latest update June 2021).

Volatile Organic Compounds

Thirteen VOCs were identified in six groundwater samples at a concentration above the NYSDEC AWQS.

Benzene was identified above its NYSDEC AWQS in two groundwater samples from MW-1 and MW-5 at concentrations ranging from 26 µg/L in MW-1 to 240 µg/L in MW-5 (NYSDEC AWQS of 1 µg/L). In addition, benzene was identified below its NYSDEC AWQS in one groundwater sample at concentrations of 0.95 µg/L in MW-4 (NYSDEC AWQS of 1 µg/L).

Ethylbenzene was identified above its NYSDEC AWQS in three groundwater samples from MW-1, MW-4, and MW-5 at concentrations ranging from 6.7 µg/L in MW-4 to 5,100 µg/L in MW-5 (NYSDEC SGV of 5 µg/L).

Isopropyl benzene was identified above its NYSDEC AWQS in three groundwater samples from MW-3, DUP-X, and MW-5 at concentrations ranging from 6 µg/L in DUP-X to 320 µg/L in MW-5 (NYSDEC AWQS of 5 µg/L). Isopropyl benzene was detected in in the duplicate parent sample (MW-3) analyzed. In addition, isopropyl benzene was identified below its NYSDEC AWQS in one groundwater sample at a concentration of 2.1 µg/L in MW-1 (NYSDEC AWQS of 5 µg/L).

Naphthalene was identified above its NYSDEC AWQS in two groundwater samples from MW-4 and MW-5 at concentrations ranging from 140 µg/L in MW-4 to 660 µg/L in MW-5 (NYSDEC AWQS of 10 µg/L). In addition, naphthalene was identified below its NYSDEC AWQS in one groundwater sample at a concentration of 5.8 µg/L in MW-1 (NYSDEC AWQS of 10 µg/L).

n-Propyl benzene was identified above its NYSDEC AWQS in one groundwater sample from MW-5 at a concentration of 540 µg/L (NYSDEC AWQS of 5 µg/L). In addition, n-Propyl benzene was identified below its NYSDEC AWQS in four groundwater samples from MW-1, MW-3, DUP-X, and MW-4 at concentrations ranging from 1.2 µg/L in MW-4 to 2.7 µg/L in MW-1 (NYSDEC AWQS of 5 µg/L). n-Propyl benzene was detected in in the parent sample (MW-3) analyzed.

o-Xylene was identified above its NYSDEC AWQS in three groundwater samples from MW-1, MW-4, and MW-5 at concentrations ranging from 6.5 µg/L in MW-4 to 6,800 µg/L in MW-5 (NYSDEC AWQS of 5 µg/L).

p/m-Xylene was identified above its NYSDEC AWQS in three groundwater samples from MW-1, MW-4, and MW-5 at concentrations ranging from 16 µg/L in MW-4 to 18,000 µg/L in MW-5 (NYSDEC AWQS of 5 µg/L).

sec-Butylbenzene was identified above its NYSDEC AWQS in two groundwater samples from MW-3 and DUP-X at a concentration of 11 µg/L (NYSDEC AWQS of 5 µg/L). Sec-Butylbenzene was detected in in the parent sample (MW-3) analyzed.

tert-Butylbenzene was identified above its NYSDEC AWQS in two groundwater samples from MW-3 and DUP-X at concentrations ranging from 6 µg/L in DUP-X to 6.3 µg/L in MW-3 (NYSDEC AWQS of 5 µg/L). Tert-Butylbenzene was detected in in the parent sample (MW-3) analyzed. In addition, tert-Butylbenzene was identified below its NYSDEC AWQS in one groundwater sample at a concentration of 0.76 µg/L in MW-4 (NYSDEC AWQS of 5 µg/L).

Toluene was identified above its NYSDEC AWQS in two groundwater samples from MW-4 and MW-5 at concentrations ranging from 5.1 µg/L in MW-4 to 9,100 µg/L in MW-5 (NYSDEC AWQS of 5 µg/L). In addition, toluene was identified below its NYSDEC AWQS in one groundwater sample at a concentration of 3.4 µg/L in MW-1 (NYSDEC AWQS of 5 µg/L).

1,2,4,5-Tetramethylbenzene was identified above its NYSDEC AWQS in one groundwater sample from MW-5 at a concentration of 140 µg/L (NYSDEC AWQS of 5 µg/L). In addition, 1,2,4,5-Tetramethylbenzene was identified below its NYSDEC AWQS in four groundwater samples from MW-1, MW-3, DUP-X, and MW-4 at concentrations ranging from 1.2 µg/L in MW-4 to 2.7 µg/L in MW-3 and DUP-X (NYSDEC AWQS of 5 µg/L). 1,2,4,5-Tetramethylbenzene was detected in in the parent sample (MW-3) analyzed.

1,2,4-Trimethylbenzene was identified above its NYSDEC AWQS in five groundwater samples from MW-1, MW-3, DUP-X, MW-4, and MW-5 at concentrations ranging from 8 µg/L in MW-4 to 3,300 in MW-5 µg/L (NYSDEC AWQS of 5 µg/L). 1,2,4-Trimethylbenzene was detected in in the parent sample (MW-3) analyzed.

1,3,5-Trimethylbenzene was identified above its NYSDEC AWQS in one groundwater sample from MW-5 at a concentration of 790 µg/L (NYSDEC AWQS of 5 µg/L). In addition, 1,3,5-Trimethylbenzene was identified below its NYSDEC AWQS in two groundwater samples from MW-1 and MW-4 at concentrations ranging from 2.9 µg/L in MW-4 to 4 µg/L in MW-1 (NYSDEC AWQS of 5 µg/L).

Semi-Volatile Organic Compounds

Eight SVOCs, specifically PAHs, were identified in five groundwater samples at concentrations exceeding NYSDEC AWQS.

Acenaphthene was identified above its NYSDEC AWQS in one groundwater sample from MW-4 at a concentration of 110 µg/L (NYSDEC AWQS of 20 µg/L). In addition, acenaphthene was identified below its NYSDEC AWQS in five groundwater samples from MW-1, MW-2, MW-3, DUP-X, and MW-5 at concentrations ranging from 0.03 µg/L in MW-2 to 2.8 in MW-5 µg/L (NYSDEC AWQS of 20 µg/L).

Benzo(a)anthracene was identified above its NYSDEC AWQS in five groundwater samples from MW-2, MW-3, DUP-X, MW-4 and MW-5 at concentrations ranging from 0.02 µg/L in MW-2 to 0.27 in MW-4

µg/L (NYSDEC AWQS of 0.002 µg/L). Benzo(a)anthracene was detected in in the parent sample (MW-3) analyzed.

Benzo(a)pyrene was identified above its NYSDEC AWQS in two groundwater samples from MW-4 and MW-5 at concentrations ranging from 0.07 µg/L in MW-5 to 0.13 in MW-4 µg/L (NYSDEC AWQS of 0 µg/L).

Benzo(b)fluoranthene was identified above its NYSDEC AWQS in five groundwater samples from MW-2, MW-3, DUP-X, MW-4, and MW-5 at concentrations ranging from 0.01 µg/L in MW-3 to 0.19 in MW-4 µg/L (NYSDEC AWQS of 0.002 µg/L). Benzo(b)fluoranthene was detected in in the parent sample (MW-3) analyzed.

Benzo(k)fluoranthene was identified above its NYSDEC SGV in two groundwater samples from MW-4 and MW-5 at concentrations ranging from 0.04 µg/L in MW-5 to 0.06 in MW-4 µg/L (NYSDEC SGV of 0.002 µg/L).

Chrysene was identified above its NYSDEC AWQS in five groundwater samples from MW-2, MW-3, DUP-X, MW-4, and MW-5 at concentrations ranging from 0.02 µg/L in MW-2 and MW-3 to 0.15 in MW-4 and MW-5 µg/L (NYSDEC AWQS of 0.002 µg/L). Chrysene was detected in in the parent sample (MW-3) analyzed.

Indeno(1,2,3-cd)pyrene was identified above its NYSDEC AWQS in two groundwater samples from MW-4 and MW-5 at concentrations ranging from 0.04 µg/L in MW-5 to 0.09 in MW-4 µg/L (NYSDEC AWQS of 0.002 µg/L).

Naphthalene was identified above its NYSDEC AWQS in two groundwater samples from MW-4 and MW-5 at concentrations ranging from 84 µg/L in MW-4 to 470 in MW-5 µg/L (NYSDEC AWQS of 10 µg/L). In addition, 1,3,5-Trimethylbenzene was identified below its NYSDEC AWQS in two groundwater samples from MW-1 and MW-4 at concentrations ranging from 2.9 µg/L in MW-4 to 4 µg/L in MW-1 (NYSDEC SG AWQS of 5 µg/L).

Six SVOCs, specifically PAHs, were detected in the field blank (FIELD BLANK_20220513) at concentrations exceeding RRSCOs. Due to the presence of hexachlorobenzene at a concentration above its RRSCO in the field blank but not detected in any of the groundwater samples, the concentrations detected within the field blank are likely due to a laboratory contaminant.

Total Metals

Five total metals were identified in groundwater samples at concentrations exceeding the NYSDEC AWQS. Total antimony concentrations exceeded the NYSDEC AWQS in one groundwater sample from MW-2 (concentration of 4.3 µg/L, NYSDEC AWQS of 3 µg/L); total iron concentrations exceeded the NYSDEC AWQS in three groundwater samples from MW-3, MW-4, and MW-5 plus the duplicate sample from MW-3 (maximum concentration 27,600 µg/L in MW-5, NYSDEC AWQS of 300 µg/L); total manganese concentrations exceeded the NYSDEC AWQS in four groundwater samples from MW-1, MW-3, MW-4, and MW-5 plus the duplicate sample from MW-3 (maximum concentration 4,462 µg/L in DUP-X, NYSDEC AWQS of 300 µg/L); total selenium concentrations exceeded the NYSDEC AWQS in one

groundwater sample from MW-1 (concentration of 10.8 µg/L, NYSDEC AWQS of 10 µg/L); and total sodium concentrations exceeded the NYSDEC AWQS in four groundwater samples from MW-1, MW-2, MW-4, and MW-5 (maximum concentration 650,000 µg/L in MW-5, NYSDEC AWQS of 20,000 µg/L).

Dissolved Metals

Five dissolved metals were identified in groundwater samples at concentrations exceeding the NYSDEC AWQS. Dissolved antimony exceeded the NYSDEC AWQS in one groundwater sample from MW-2 (concentration of 4.41 µg/L, NYSDEC AWQS of 3 µg/L). Dissolved iron exceeded the NYSDEC AWQS in two groundwater samples from MW-3 and MW-5 plus the duplicate sample from MW-3 (maximum concentration 16,000 µg/L in DUP-X, NYSDEC AWQS of 300 µg/L). Dissolved manganese exceeded the NYSDEC AWQS in four groundwater samples from MW-1, MW-3, MW-4, and MW-5 plus the duplicate sample from MW-3 (maximum concentration 4,423 µg/L in DUP-X, NYSDEC AWQS of 300 µg/L). Dissolved selenium exceeded the NYSDEC SGV in one groundwater sample from MW-1 (concentration 10.9 µg/L, NYSDEC AWQS of 10 µg/L). Dissolved sodium exceeded the NYSDEC AWQS in four groundwater samples from MW-1, MW-2, MW-4, and MW-5 (maximum concentration 616,000 µg/L in MW-5, NYSDEC AWQS of 20,000 µg/L).

Emerging Contaminants

A groundwater cleanup regulatory criterion does not exist for 1,4-dioxane in New York State. Concentrations of 1,4-dioxane were compared to New York State's drinking water MCL of 1 µg/L. 1,4-dioxane was detected in one groundwater sample analyzed from MW-4 at a concentration of 0.0732 µg/L (below the MCL of 1 µg/L).

PFAS compounds in groundwater are compared to the NYSDEC June 2021 guidance values. PFOS was detected at concentrations exceeding the NYSDEC June 2021 guidance value of 10 ng/L in four groundwater samples collected (MW-1, MW-2, MW-4, and MW-5). PFOA was detected at concentrations exceeding the NYSDEC June 2021 guidance value of 10 ng/L in all five groundwater samples collected, including the duplicate sample from MW-3. The maximum concentration of PFOS was identified at a concentration of 55 ng/L in MW-1, and the maximum concentration of PFOA was identified at concentration of 92.2 ng/L in MW-3. Total PFOA/PFAS concentrations in groundwater samples ranged from 45.1 ng/L in MW-5 to 260 ng/L in MW-4 below the NYSDEC June 2021 guidance value of 500 ng/L.

PCBs

PCBs were not detected in groundwater samples collected during the RI.

6.5 SOIL VAPOR SAMPLING RESULTS

Table 6 provides a summary of the analytical results from the soil vapor sampling event. Figure 8 provides the soil vapor sampling locations as well as a summary of soil vapor data from the sampling event. The soil vapor purge log is provided in Appendix I and includes details on each soil vapor sample collected.

Total VOC concentrations in soil vapor samples ranged from 1,374 µg/m^3 in sample SG-4 to 2,956,400 µg/m^3 in sample SG-1. Total BTEX concentrations ranged from 37.7 µg/m^3 in sample SG-2 to 45,400 µg/m^3 in sample SG-1.

No standard currently exists for soil vapor samples in New York State.

Total VOC concentrations in the November Phase II soil vapor samples ranged from 909.71 µg/m^3 in sample SV-1 to 226,600 µg/m^3 in sample SV-2. Total benzene, toluene, ethylbenzene, and xylenes (BTEX) concentrations ranged from non-detect in SV-2 to 190.7 µg/m^3 in SV-1. PCE was detected in soil vapor sample SV-1 at a concentration of 51.1 µg/m^3.

6.6 DATA VALIDATION

Category B laboratory reports for RI soil, groundwater, and soil vapor samples were provided by Alpha Data validation is ongoing and DUSRs will be created to confirm the compliance of methods with the protocols described in the NYSDEC ASP. DUSRs will be provided in Appendix H in the final RIR.

6.7 DATA USE

Validated analytical data, supplied in ASP Category B Data Packages in Appendix J, will be submitted to the NYSDEC EQuIS database in an Electronic Data Deliverable package upon finalization of the DUSRs and this RIR.

7. Conceptual Site Model

7.1 AREAS OF CONCERN

The following areas of concern (AOCs) were identified at the Site:

AOC 1 – Site-Wide Contaminated Historical Fill

During the RI, a historical fill layer of unknown origin was identified immediately below impervious site cover extending to approximately 1.5 to 12 ft bgs across the Site (SB-6 and SB-3, respectively). Fill material predominantly consists of light to dark brown, medium to fine silty sand with varying amounts of gravel, brick, concrete, wood, and asphalt. Based on soil sampling performed during the RI, the historical fill interval from surface grade to 10 ft bgs is contaminated with VOCs, SVOCs (specifically PAHs), and heavy metals including arsenic, copper, lead, mercury, and zinc which are present at concentrations above NYSDEC Part 375 UUSCOs, PGWSCOs and/or RRSCOs. RRSCO and PGWSCO exceedances were observed up to 10 ft bgs in historical fill material; it should be noted that additional exceedances were observed in SB-1 from 28 to 30 ft bgs. In addition, data reported in the November 2021 Phase II identified PAH and metals contamination in soil samples collected from immediately below the impervious surface up to 4.5 ft bgs within the historical fill interval. The highest VOC concentrations in soil were primarily identified in the northern and western regions of the Site near the existing UST area and filling area. The highest SVOC and metals concentrations detected in soil were primarily identified throughout the central region and southwestern region of the Site near the existing UST area and filling area.

AOC 2 – Petroleum VOCs and Metal Impacted Deeper Soil

BTEX compounds were detected in one deeper soil samples within the vicinity of the gasoline tanks. Benzene, ethylbenzene and total xylenes were detected above UUSCOs and PGWSCOs in one deeper soil sample, SB-1 (28-30'), at concentrations of 0.99 mg/kg, 20 mg/kg, and 71 mg/kg, respectively. Toluene was also detected above UUSCOs in SB-1 (28-30') at a concentration of 0.82 mg/kg.

Three additional petroleum-related VOCs were detected above both UUSCOs and PGWSCOs in SB-1(28-30'). n-propylbenzene was detected at a concentration of 8.5 mg/kg. 1,3,5-trimethylbenzene was detected at a concentration of 16 mg/kg. 1,2,4-trimeythylbenzene was detected at a concentration of 45 mg/kg.

Total lead, mercury and zinc were also detected above UUSCOs in SB-1(28-30') at concentrations of 67.7 mg/kg, 0.246 mg/kg, and 185 mg/kg, respectively.

AOC 3 – Petroleum Impacted Groundwater

During the RI, VOC contamination exceeding AWQS standards was identified throughout four of the five monitoring wells installed on-site. A slight sheen, which dissipated after the first 15 minutes of low-flow purging, was observed during groundwater sampling of MW-5. No visual impacts or product was identified during groundwater sampling of the remaining monitoring wells.

Multiple SVOCs, specifically PAHs were also detected slightly above AWQS in monitoring wells: MW-2, MW-4, and MW-5.

AOC 4 – Soil Vapor Impacts

Total VOCs in SG-1 (2,956,400 grams per cubic meter [g/m^3]) and SG-6 (642,000 g/m^3) indicate soil and groundwater contamination in the vicinity of the vapor samples. The VOCs in SG-1 and SG-6 are primarily made up of BTEX and BTEX-derivative compounds that are typically associated with petroleum products. Additionally, the November 2021 Phase II identified PCE in one soil vapor sample (SV-1) at a concentration of 51.1 $\mu g/m^3$.

7.2 POTENTIAL ON-SITE AND OFF-SITE SOURCES

Based on the analytical results of the RI and November 2021 Limited Phase II ESI, the primary contaminants of concern for the Site are VOCs, SVOCs (specifically PAHs), and heavy metals in soil; VOCs, SVOCs, PFAS, and metals in groundwater; and BTEX compounds in soil vapor.

Historical fill material was encountered beneath the impervious surface cover to depths ranging from about 1.5 to 12 ft bgs. Historical fill material, consisting of various distributions of medium to fine silty sand with varying amounts of gravel, brick, concrete, wood, and asphalt were observed and material was found to be contaminated with SVOCs and heavy metals in samples collected up to 10 ft bgs. The source of the elevated concentrations of SVOCs and metals is unknown but likely historical fill placed prior to the current development configuration of the Site.

The source of elevated VOCs in soil, groundwater and soil vapor are indicative of petroleum impacts and likely attributed to the former operations of the filling station.

8. Human Health and Environmental Risk Evaluation

8.1 HUMAN HEALTH RISK EVALUATION

A qualitative exposure assessment consists of characterizing the exposure setting (including the physical environment and potentially exposed human populations), identifying exposure pathways, and evaluating chemical fate and transport. An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has the following five elements:

1. Receptor population;
2. Contaminant source;
3. Contaminant release and transport mechanism;
4. Point of exposure; and
5. Route of exposure.

An exposure pathway is complete when all five elements of an exposure pathway are documented; a potential exposure pathway exists when any one or more of the five elements comprising an exposure pathway is not documented but could reasonably occur. An exposure pathway may be eliminated from further evaluation when any one of the five elements comprising an exposure pathway does not exist in the present and will not exist in the future.

8.1.1 Receptor Population

The receptor population includes the people who are or may be exposed to contaminants at a point of exposure. The identification of potential human receptors is based on the characteristics of the Site, the surrounding land uses, and the probable future land uses. The Site is currently vacant, covered with an impervious surface (concrete building foundations and/or asphalt), and secured with locked fencing at Site entrances. Since the Site is currently a vacant former gas filling station, individual receptors would currently only include construction/maintenance workers that may be employed to perform work on the property, including future demolition work.

The Site owner plans to redevelop the property for residential and commercial purposes, consistent with surrounding property use and zoning. Potential receptors under the future use scenario may comprise residents of the future building, indoor employees, outdoor employees (e.g., groundskeepers or maintenance staff), and construction workers who may be employed at or perform work on the property. Site visitors may also be considered receptors; however, their exposure would be similar to that of the indoor employees but at a lesser frequency and duration. In addition, residents or employees in off-site adjoining buildings have the potential to be exposed to vapors.

8.1.2 Contaminant Sources

The source of contamination is defined as either the source of contaminant release to the environment (such as a waste disposal area or point of discharge) or the impacted environmental medium (soil, air, water) at the point of exposure. Sections 6.0 and 7.0 discuss the COCs present in the Site media at elevated concentrations above background levels. In general, these are VOCs, SVOCs (specifically PAHs), and heavy metals in soil; SVOCs, PFAS and metals in groundwater; and VOCs in soil vapor.

8.1.3 Exposure Routes and Mechanisms

The point of exposure is a location where actual or potential human contact with a contaminated medium may occur. Based on the exceedances of RRSCOs for VOCs, PAHs, and heavy metals in soil, Total VOC concentrations in soil vapor, and exceedances of SGVs for VOCs, SVOCs, PFAS, and metals in groundwater, the point of exposure is defined as the entire Site.

The route of exposure is the manner in which a contaminant actually enters or contacts the human body (e.g., ingestion, inhalation, dermal absorption). Based on the types of receptors and points of exposure identified above, potential routes of exposure are listed below:

Current Use Scenario

The Site is currently a vacant former gas filling station, covered with an impervious surface (concrete building foundations and/or asphalt), and secured with locked gates at Site entrances. The risk of exposure to contaminated soil and contaminated groundwater is therefore very low, other than during subsurface investigations or other activities that disturb the impervious site cover and reach the subsurface. Release and transport mechanisms include contaminated surface soil transported as dust, contaminated groundwater flow, and volatilization of contaminants from soil and/or groundwater into vapor phase. Persons at risk of exposure, via the indicated exposure routes, are noted below.

- Visitor – skin contact, inhalation, and incidental ingestion
- Construction/Utility Worker – skin contact, inhalation, and incidental ingestion

Construction/Remediation Scenario

In the continued absence of institutional controls, there will be continued exposure pathways during construction/remediation specifically related to surface soil. Planned construction/remedial activities include removal of the impervious site cover, excavation and off-site disposal of soil and dewatering of impacted groundwater (if required) to facilitate the installation of the foundation elements. Release and transport mechanisms include disturbed and exposed soil during excavation, contaminated soil transported as dust, contaminated groundwater flow (dewatering, if required), and volatilization of contaminants from soil and/or groundwater into vapor phase. Persons at risk of exposure, via the indicated exposure routes, are noted below.

- Construction/Utility Worker – skin contact, inhalation, and incidental ingestion
- Public Adjacent to the Site/Community Passerby - inhalation

Future Use Scenario

The anticipated future use as a redeveloped mixed use building will include engineering and institutional controls, that will prevent most release and transport mechanisms. In the absence of remedial removal of impacted material these include migration of contaminated groundwater and volatilization of contaminants from soil and/or groundwater into the vapor phase. Routes of future exposure include cracks in the foundation or slab or emergency repairs to the foundation walls or slab. Persons at risk of exposure, via the indicated exposure routes, are noted below.

- Construction/Utility Worker – skin contact, inhalation, and incidental ingestion
- Occupant/Employee/Visitor – inhalation
- Public Adjacent to the Site – inhalation

Contaminant release and transport mechanisms carry contaminants from the source to points where people may be exposed and are specific to the type of contaminant and Site use. For the VOCs (including CVOCs) present in soil vapor and groundwater, the potential exists for exposure through pathways associated with soil vapor migration. This would include the indoor vapor intrusion pathway also referred to as “soil vapor intrusion”). Additional pathways could include skin contact, inhalation, and incidental ingestion of VOCs present in soil and groundwater when and where construction workers are involved in subsurface activities where volatiles are present at elevated concentrations.

Concerning the indoor air pathway, the NYSDOH has issued a guidance document for assessing potential impacts to indoor air via soil vapor intrusion. The soil vapor samples collected during the RI were assessed by the NYSDOH Soil Vapor Intrusion Guidance document. Soil vapor intrusion is a relevant transport mechanism under the current and future use scenario. Concerning skin contact, inhalation, and incidental ingestion of volatile organics present in soil and groundwater, the potential is low for exposure to VOCs for construction workers involved in subsurface activities where volatiles are present at elevated concentrations, given the results of the RI.

8.1.4 Exposure Assessment

Based on the above assessment, the potential exposure pathways for the current and future use conditions are listed below.

Current Use Scenario

Impacted media include soil, groundwater, and soil vapor. Analytical data indicate that historical fill contains VOCs, SVOCs, and metals at concentrations greater than the UUSCOs and/or RRSCOs. Groundwater impacts include SVOCs and metals. PFOA and PFOS compounds were identified in groundwater above SGVs and in soil above guidance values for unrestricted use, however the concentrations are consistent with regional groundwater/ historical ill quality in New York City; an on-site source of PFAS was not identified. Soil vapor in the central region and southeast corner of the Site is impacted with VOCs. Under current conditions, the likelihood of exposure to soil or groundwater is limited. The Site is currently a vacant former gas filling station and covered with an impervious surface (concrete building foundations and/or asphalt) that prevents a complete exposure pathway. Potable water for Brooklyn will continue to be sourced from reservoirs in the Catskill and Delaware Watersheds.

Intrusive work on the Site is done in accordance with a Site-Specific Health and Safety Plan and donning of PPE.

Construction/Remediation Scenario:

The exposure element exists for each element during the construction/remediation phase. The overall risk will be minimized by the implementation of a Site-Specific Construction Health and Safety Plan (CHASP), localized monitoring of organic vapors, community air monitoring on the Site perimeter for particulates and VOCs, vapor and dust suppression techniques, installation of a stabilized entrance, cleaning truck tires and undercarriages, and donning of appropriate PPE. Additionally, the Site will be remediated under a Remedial Action Work Plan (RAWP) which will include a Soil Materials Management Plan that will highlight measures for PPE, covering of stockpiles, housekeeping, suppression techniques (particulates and vapor), and measures to prevent off-site migration of contaminates. In addition, the Site will be secured and inaccessible to the public during remedial construction.

Future Use Scenario

Under the proposed future condition (after construction/remediation), residual contaminants may remain on-site depending on the remedy achieved. The remaining contaminants would include those listed in the current conditions. If contaminants remain on-site after construction/remediation, the route of exposure will be mitigated by proper installation of engineering controls such as Site capping system foundation and implementation of institutional controls such as land use and groundwater use restrictions.

8.2 FISH AND WILDLIFE IMPACT ANALYSIS

NYSDEC DER-10 requires an on-site and off-site Fish and Wildlife Resource Impact Analysis if the stipulated criteria are met. The Site, which was developed as early as the late 1880s, operated as a gas filling station with auto-related activities, and documented as having bulk petroleum storage since the 1970s, is located within a developed dense urban commercial/industrial/residential area of Brooklyn, New York. The Site provides little or no wildlife habitat or food value and/or access to the detected subsurface contamination. No natural waterways are present on or adjacent to the Site. The proposed future use of the Site is for residential and commercial purposes. As such, no ecological risks are expected under the current and future use scenario.

9. Conclusions and Recommendations

9.1 CONCLUSIONS

Based on the results of this RI, the following conclusions have been identified:

- Historical fill material was encountered beneath surface cover to depths of between about 12 ft bgs across the Site (SB-6 and SB-3, respectively) was placed as backfill at an unspecified time, prior to the development of the Site.
- Contaminants of concern for the Site include VOCs, SVOCs, and heavy metals in soil samples collected from historical fill material up to 10 ft bgs and one deeper sample from 28-30 ft bgs; VOCs, SVOCs, PFAS, and metals in groundwater; and VOCs in soil vapor.
- Contaminated historical fill was encountered up to about 8 to 10 ft bgs Site-wide.
- Based on the identified contaminants, the source of VOC contamination to soil, groundwater and soil vapor is likely the result of both the former historical gas filling and auto-related operations.

9.2 RECOMMENDATIONS

Based on the results of the RI, remedial action will be necessary to proceed with the anticipated redevelopment plan. Combined with previous subsurface investigations performed at the Site, sufficient analytical data were gathered during this RI to establish soil cleanup levels and develop a remedy protective of human health and the environment.

To address the AOCs, Haley & Aldrich is evaluating utilization of a combination of remedial techniques. Applicable strategies and technologies may include, but are not limited to, source removal, in-situ remediation of groundwater and soil vapor, and installation engineering controls. The remedy will be outlined in a RAWP prepared with New York State BCP guidelines.

10. References

1. Subsurface Investigation Report - 210 Green Avenue, Brooklyn, New York. Prepared by EnviroTrac Ltd. for submission to the New York State Department of Environmental Conservation. Submitted in July 2002.

2. Closure Request and Third Quarterly 2006 Update Report - 210 Greenpoint Avenue, Brooklyn, New York. Prepared by EnviroTrac Ltd. for submission to the New York State Department of Environmental Conservation. Submitted in October 2006.

3. Phase I Environmental Site Assessment – 210 Greenpoint Avenue, Tax Lot 30, Tax Block 2576, Brooklyn, New York. Prepared by Haley & Aldrich of New York, prepared for 210 Greenpoint Realty LLC. October 2021.

4. Limited Phase II Subsurface Investigation - 210 Greenpoint Avenue, Brooklyn, New York. Prepared by Haley & Aldrich of New York, prepared for 210 Greenpoint Realty LLC. 16 November 2021.

5. Brownfield Cleanup Program Application - 210 Greenpoint Avenue, Brooklyn, New York. Prepared for 210 Greenpoint Realty LLC by Haley & Aldrich of New York for submission to the New York State Department of Environmental Conservation. Submitted in December 2021.

6. Remedial Investigation Work Plan – 210 Greenpoint Avenue, Tax Lot 30, Tax Block 2576, Brooklyn, New York. BCP Site No. C224348. Prepared by Haley & Aldrich. April 2022.

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

8. New York State Department of Health, Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006.

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

10. Program Policy DER-10, “Technical Guidance for Site Investigation and Remediation,” May 2010, Prepared by New York State Department of Environmental Conservation

11. United States Environmental Protection Agency, Low Flow Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells, EQASOP-GW 001, September 19, 2017.

12. New York State Department of Environmental Conservation, Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS), dated June 2021.

TABLES

FIGURES

APPENDIX A

Previous Reports

APPENDIX B

Geophysical Survey

APPENDIX C

RIWP

APPENDIX D

Quality Assurance Project Plan

APPENDIX E

Soil Boring Logs

APPENDIX F

Well Construction Diagrams

APPENDIX G

Groundwater Sampling Logs

APPENDIX H

Survey Map

APPENDIX I

Soil Vapor Purge Log

APPENDIX J

Analytical Laboratory Reports

(Separate Attachment)

APPENDIX K

Data Usability Summary Reports

APPENDIX L

Daily Field Reports and Photographs

APPENDIX M

Proposed Development Plans