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REMEDIAL ACTION WORK PLAN
8 WALWORTH STREET
BROOKLYN, NEW YORK
NYSDEC BCP SITE C224239

PREPARED FOR
TOLDOS YEHUDAH LLC
BROOKLYN, NY

PREPARED BY:

Mari C. Conlon, P.G.
Project Manager
Haley & Aldrich of New York

REVIEWED AND APPROVED BY:

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14 February 2022
File No. 133156-005

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

Attention: Mr. Aaron Fisher

Subject: Remedial Action Work Plan
8 Walworth Street, Brooklyn, New York
NYSDEC BCP Site C224239

Ladies and Gentlemen:

On behalf of Toldos Yehudah LLC, Haley & Aldrich of New York ("Haley & Aldrich") is pleased to submit this Remedial Action Work Plan for the above referenced subject site ("Site"). This document is being submitted under a Brownfield Cleanup Program (BCP) Agreement (Site C224239), which was executed on 1 March 2018 between the New York State Department of Environmental Conservation (NYSDEC) and Toldos Yehudah LLC.

This report has been 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.

Haley & Aldrich is also pleased to provide responses to the comments to the RAWP provided by the NYSDEC on 26 October 2021 and discussed via conference call with NYDSEC on 10 November 2021. It should be noted that the foundation plans have changed such that the construction of a basement will result in more soil being excavated. The proposed elevation of the basement floor slab will only be a few feet above the water table, therefore, in Alternative II, the soil vapor extraction (SVE) in this area is not feasible and the SVE remedy element has been replaced with a sub-slab depressurization (SSDS) element. Revisions based on this change are included herein. Additional comments have been incorporated in the attached work plan and addressed in the manner described below.

<u>General Comments</u>

1. The Executive Summary has been moved to after the Table of Contents.
2. The text has been updated to Section 3 to state that a Soil Vapor Intrusion Work Plan (SVI WP) will be presented to the NYSDEC and NYSDOH following remedial excavation and prior to occupancy. The frequency of samples will be presented to the NYSDEC in the SVI WP.

3. A Site Specific Community Air Monitoring Program (CAMP) included in Section 4.1.6 is now a standalone document in Appendix C. CAMP will be logistically biased towards nearby sensitive receptors and occupied structures within 20 feet to prevent potential exposure to the surrounding community.

Section 1.3 Description of Surrounding Property

4. The text updated to reference Figure 2B, which has been included in this revised report to identify adjacent properties and sensitive receptors outlined in the Community Participation Plan.

Section 2.1 Remedial Action Objectives

5. The text has been updated to reflect provided Remedial Action Objectives (RAOs).

Section 2.9.4 Human Health Exposure Assessment Conclusions

6. Language added to include "and adjacent community."
7. The text has been updated to replace soil with contamination.

Section 3.0 Summary of Remedial Action

8. Application of Zero Valent Iron (ZVI) onsite will continue to treat contamination entering the Site. In addition, reapplication of ZVI will be evaluated as part of long-term operations and will be included in the Site Management Plan (SMP).
9. A ZVI permeable reactive barrier (PRB) will be installed from 15 to 45 feet below ground surface (bgs) along the south-southeastern boundary of the Site and injection of ZVI will extend from 15 to 45 feet bgs in the center of the Site to treat saturated zone in the source area.
10. Offsite wells MW-06 and MW-07 and newly proposed offsite wells to the northeast of the Site and southeast of the Site on Warsoff Street will be included in post remedial groundwater monitoring as part of the SMP. These wells will be monitored for natural attenuation.

Section 3.1 Alternative 1 – Technical Description

11. Alternative I has been changed to a Track 2 Remedy throughout.
12. The vapor barrier is an important component of the composite cover for this Site. Further to this it is understood that the vapor barrier is not part of the remedy and that it is a requirement as per New York City Department of Buildings code, subsequently updated in 2020. Text has been amended to reflect and acknowledge that it is part of NYC Building Code.
13. The text has been updated to reflect a total of five monitoring wells, which include installation of two post remediation wells on site in addition to preserving MW-01, MW-02 and MW-04 during construction. If wells cannot be preserved during construction, they will be reinstalled once intrusive work is completed and prior to occupancy. Additionally, MW-06 and MW-07, located outside the building to the southeast, will also be utilized as a post remediation monitoring well along with newly proposed offsite monitoring wells to the northeast and

southeast of the Site. Figure 14 shows proposed areas for post remedial monitoring well locations.

14. The text has been updated to reflect that a SVI WP will be provided to the NYSDEC/NYSDOH for review/approval after completion of the remedial excavation and prior to occupancy.
15. Language has been added to reflect off site SVI evaluation. Request for access will be re-transmitted to the adjacent tenants (previously provided prior to commencing the Offsite Investigation Work). Details of this work will be provided in the SVI WP to be submitted to the NYSDEC and NYSDOH for approval.

Section 3.2 Alternative II – Technical Description

16. Text has been updated to reflect Commercial Soil Cleanup Objectives (CSCOs).
17. Section 3.2 and Section 4.3.10 have been revised to detail the SSDS including piping layout and penetrations through the vapor barrier along with vapor monitoring point locations and construction details. Figures 11 and 12 have been added to show system plan and details. The proposed location of the soil vapor monitoring points has been included in Figure 11. A detail showing the proposed soil vapor monitoring points has been included in Figure 12.
18. Text has been updated to reflect a total of five monitoring wells which include installation of two post remediation wells on site in addition to preserving MW-01, MW-02 and MW-04 during construction. If wells cannot be preserved during construction, they will be reinstalled once intrusive work is completed and prior to occupancy. Additionally, MW-06 and MW-07, located outside the building to the southeast, will also be utilized as a post remediation monitoring well. Figure 14 shows proposed areas for post remedial monitoring well locations.
19. Section has been updated to reflect a Track 4 Remedy with discussion of the SVI evaluation.
20. Text has been updated to reflect that a SVI WP will be provided to the NYSDEC/NYSDOH for review/approval after completion of the remedial excavation and prior to occupancy.
21. Language has been added to reflect offsite SVI evaluation. Request for access will be re-transmitted to the adjacent tenants (previously provided prior to commencing the Offsite Investigation Work). Details of this work will be provided in the SVI WP to be submitted to the NYSDEC and NYSDOH for approval.

Section 3.2 Reduction of Toxicity, Mobility, or Volume of Contaminated Materials

22. The volatile organic compounds (VOCs) removed from the subsurface via the vapor pathway will be treated with granular activated carbon (GAC) through adsorption. The adsorption of the VOCs onto the GAC would reduce the mobility of the contaminated material.
23. Details of the ZVI design have been added to Section 4.
24. Details of the SSDS design have been added to Section 4 including piping layout and penetrations through the vapor barrier along with vapor monitoring point locations and construction details.
25. Procedures and timeframes for confirmation sampling, on-site groundwater monitoring and the reapplication of ZVI will be presented in the SMP. Language has been included to reflect this in Section 4.4.

Section 4.3.1 Pre-Design Investigation

26. The offsite plume evaluation was presented in the Offsite Investigation Report submitted on 11 June 2021 and approved by the NYSDEC on 05 August 2021. MW-06 is located directly southeast of the property and demonstrates significantly lower concentrations of chlorinated VOCs (CVOCs) in soil and groundwater. The proposed remedy is designed to directly treat groundwater exiting the Site. MW-07 is located approximately 50 feet southeast of MW-06 (in close proximity to the structures on the easterly side of Walworth) with lower levels of CVOCs. Further delineation is not feasible without access to the southern property located at 20 Walworth Street (also 17 Spencer Street). As part of planned SVI access request, we will include a request to install a monitoring well in the building located at 20 Walworth Street.

Section 4.4.1 Daily Reports

27. Text has been updated to state that daily reports will be emailed to the NYSDEC and NYSDOH project managers directly.

Section 4.4.1 Soil Cleanup Objectives

28. The text and Table 3 have been revised to be based on the NYSDEC Part 375 CSCOs. In terms of source material – the top two feet of all soil site wide will be removed, in addition to the source material within the site that can be safely removed without impacting the stability of the foundation. Any source material remaining in the soil will be treated with the SVE system (unsaturated soils) or with ZVI injections (saturated soils).

Section 5.4.11 Community Air Monitoring Plan

29. VOCs and particulates will be monitored at stationary position at the egress of the work zone. Where feasible, from a security standpoint, additional monitors will be biased towards nearby sensitive receptors and occupied structures within 20 feet to prevent potential exposure to the surrounding community.
30. Any exceedances will be reported to the NYSDEC and NYSDOH via email.
31. A site specific CAMP plan has been provided as a separate document in Appendix C.

Section 7.3 Sub-slab Depressurization System

32. Language has been added stating that the SSDS system will mitigate potential exposures related to soil vapor intrusion.

Section 9.0 Schedule/Appendix I – Project Schedule

33. Schedule has been updated and Remedial Design/Permitting has been removed since this has already been completed.

Figures – Note that figures have been renumbered based on previous comment responses.

34. Figures 3 and 4 has been provided to show the soil results of the previous investigations performed by others.
35. Figure 5 has been updated to remove MW-08. MW-08 was a proposed offsite well to be installed for post remedial monitoring. Offsite wells for post remedial monitoring are now shown on Figure 14. Well identification labels will be determined prior to installation.
36. Figure 6 has been updated to clarify and reflect the accurate remedial excavation based on the updated foundation plans.
37. Figure 11 has been updated due to inclusion of the SSDS detailed in section 3.2.
38. Figure 14 has been updated due to inclusion of the SSDS detailed in section 3.2.
39. Figures 2B and 2C have been provided which shows surrounding land use and sensitive receptors.
40. Figure 14 has been added to show the proposed (source area and downgradient) monitoring wells to be included.

Haley & Aldrich has also addressed the following comments provided via conference call and email from NYSDEC in February 2022.

1. The soil vapor extraction system has been reintroduced to the remedy. Sections 3.2, 3.3, 4.3.11 and 7.4 and Figure 11 have been updated to detail the proposed action.
2. Section 2.10.3 Soil Vapor Remedial Action Objective has been updated as requested.
3. Section 4.3.1 Pre-Design Investigation has been updated to reference Figure 14.
4. The Community Air Monitoring Appendix has been updated to reference special requirements language.
5. The proposed use of the Site is confirmed as commercial community facility and has been included throughout the RAWP as such.

Sincerely yours,
HALEY & ALDRICH OF NEW YORK

Mari C. Conlon, P.G.
Senior Project Manager

Scott A. Underhill, P.E.
Senior Engineer

James M. Bellew
Principal

Enclosures

cc: Fischel Miller, Toldos Yehudah LLC
Angela Martin, NYSDOH, Project Manager
Scarlett McLaughlin, NYSDOH, Region 2 Chief
Heide Dudek, NYSDEC, Section Chief
Jane O'Connell, NYSDEC, RHWR

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Certification

I, Scott A. Underhill, certify that I am currently a NYS registered Professional Engineer and that this Remedial Action Work Plan was prepared in accordance with the applicable statues and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

14 February 2022

Scott A. Underhill — *Date*
NYS Professional Engineer # 075332

I, Mari C. Conlon, certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that that this Remedial Action Work Plan was prepared in accordance with the applicable statues and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Mari Cate Conlon

14 February 2022

Mari C. Conlon — *Date*
NYS Professional Geologist #000769

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List of Abbreviations and Acronyms

Abbreviation	Definition
AOC	Area of Concern
ASP	Analytical Services Protocol
AWQS	Ambient Water Quality Standards
BCP	Brownfield Cleanup Program
bgs	Below Ground Surface
CAMP	Community Air Monitoring Plan
cfm	Cubic Feet per Minute
CFR	Code of Federal Regulations
CHASP	Construction Health & Safety Plan
cis-1,2-DCE	cis-1,2-Dichloroethene
Coastal	Coastal Environmental Solutions, Inc.
CPP	Citizen Participation Plan
CP	Community Participation
CP-51	Commissioners Policy-51 *(specifically "October 2010 NYSDEC Commissioners Policy 51")*
CVOC	Chlorinated Volatile Organic Compound
1,1-DCA	1,1-Dichloroethane
DCE	Dichloroethene
DER	Division of Environmental Remediation
DER-10	Division of Environmental Remediation-10 *(specifically "May 2010 NYSDEC Technical Guidance for Site Investigation and Remediation")*
DUSR	Data Usability Summary Report
DustTrak	TSI DustTrak Environmental Monitor
Eastern	Eastern Environmental Solutions
EBC	Environmental Business Consultants
ELAP	Environmental Laboratory Approval Program
EPA	Environmental Protection Agency
FER	Final Engineering Report
GWQS	NYSDEC 6 NYCRR Part 703.5 Class GA groundwater standards
Haley & Aldrich	Haley & Aldrich of New York
HASP	Health and Safety Plan
LQG	Large Quantity Generator
µg/kg	Micrograms per Kilogram
µg/L	Micrograms per Liter
µg//m^3	Micrograms per Cubic Meter
mg/kg	Milligrams per Kilogram
NYCDOB	New York City Department of Buildings
NYCDOT	New York City Department of Transportation
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

List of Abbreviations and Acronyms (continued)

Abbreviation	Definition
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbon
PBS	Petroleum Bulk Storage
PCB	Polychlorinated Biphenyl
PCE	Perchloroethene/Tetrachloroethene
PFAS	Per- and Polyfluoroalkyl Substances
PID	Photoionization Detector
PPE	Personal Protective Equipment
ppm	Parts per Million
PRB	Permeable Reactive Barrier
PVC	Polyvinyl Chloride
PWG	P.W. Grosser Consulting
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RA	Remedial Action
RAO	Remedial Action Objectives
RAWP	Remedial Action Work Plan
RCA	Recycled Concrete Aggregate
RCRA	Resource Conservation and Recovery Act
RE	Resident Engineer
RI	Remedial Investigation
RIR	Remedial Investigation Report
ROI	Radius of Influence
RRSCO	Restricted Use Soil Cleanup Objectives
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SMMP	Soil/Materials Management Plan
SOE	Support-of-Excavation
SPDES	State Pollutant Discharge Elimination System
SRI	Supplemental Remedial Investigation
SRIR	Supplemental Remedial Investigation Report
SVE	Soil Vapor Extraction
SVI	Soil Vapor Intrusion
SVOC	Semi-Volatile Organic Compound
TCA	1,1,1-Trichloroethane
TCE	Trichloroethene
TCL	Target Compound List
Techtronics	Techtronics Ecological Corporation
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")*
Toldos Yehudah	Toldos Yehudah LLC

List of Abbreviations and Acronyms (continued)

Abbreviation	Definition
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
UUSCO	Unrestricted Use Soil Cleanup Objectives
VEP	Vapor Extraction Point
VOC	Volatile Organic Compound
WQCA	Wastewater Quality Control Application
ZVI	Zero Valent Iron

Executive Summary

Haley & Aldrich of New York (Haley & Aldrich) developed this Remedial Action Work Plan (RAWP) on behalf of Toldos Yehudah LLC (Toldos Yehudah) for the proposed development located at 8 Walworth Street, Brooklyn, New York (the Site). The Site is currently in the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) with Toldos Yehudah listed as a participant. The Site is also identified in the Resource Conservation and Recovery Act database as a large quantity generator.

This RAWP summarizes the nature and extent of contamination on the Site as determined from data gathered during the Supplemental Remedial Investigation (SRI) performed from 15 June through 15 July 2020. It also provides an evaluation of a Track 2 Cleanup and other applicable remedial action alternatives, their associated costs, and the recommended and preferred remedy. The remedy described in this document is consistent with the procedures defined in NYSDEC Division of Environmental Remediation (DER) Program Policy: Technical Guidance for Site Investigation and Remediation (DER-10) and complies with applicable federal, state, and local laws, regulation, and requirements.

Site Description/Physical Setting/Site History

The Site is located at 8 Walworth Street in the Bedford Stuyvesant neighborhood of Brooklyn, New York, and is identified as Block 1716 Lot 33 on the New York City Tax Map. The Site encompasses an area of 3,910-square feet and is bounded by a vacant lot to the north, a warehouse to the south, Walworth Street to the east, and a vacant lot to the west. The Site is currently a vacant one-story warehouse encompassing the entire lot and the land is currently zoned as manufacturing M1-2, which allows for industrial use. The Site is in an urban area surrounded by light industrial, commercial, and residential properties served by municipal water. The redevelopment plan includes construction of a four-story mixed-use commercial community facility.

The Site was developed as early as 1887 with a one-story residence and shed on the south side of the property, a two-story storefront building with a single-story garage in the middle of the Site along Walworth Street, and a three-story residence on the north side of the Site. The surrounding properties were primarily developed with residences, commercial buildings, and industrial/manufacturing use facilities. The Site remained largely unchanged through the early 1900s.

By 1918, the adjoining property to the west was occupied by a junk yard and developed into an indoor parking garage by 1935. The Site remained developed with residences until 1950 when only the two-story residential structure and sheds remained present on the south side of the property. A one-story warehouse used for chemical drum storage was erected on the north side of the Site by 1965 and the northern and southern adjacent properties were used for paint storage and mixing in the mid-1960s. By 1977, the two-story residence to the north was no longer present, but the chemical drum warehouse remained. In 1982, the Site was redeveloped with the existing one-story warehouse building, occupied by Techtronics Ecological Corporation (Techtronics), and utilized for the mixing and storage of paints and other coatings. The adjoining property to the north was partially included in the Techtronics facility and labeled as “Techtronics A” with the 8 Walworth Site reported as “Techtronics B”.

Techtronics ceased operations in the 1990s. The Site and neighboring properties have remained largely unchanged through the present.

Summary of Supplemental Remedial Investigation Findings

The SRI was completed in accordance with Title 6 of the New York Codes, Rules, and Regulations (6 NYCRR) Part 375, DER-10, the NYSDEC Draft BCP Guide (May 2004), and the New York State Department of Health Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006 and subsequent updates). The SRI was completed from 15 June through 15 July 2020 to determine the nature and extent of contamination in soil and groundwater.

A summary of the environmental findings of the SRI includes the following:

1. Depth to groundwater ranges from 14 to 16 feet below ground surface (bgs).
2. Groundwater flow was observed to be generally from the north-northwest to the south-southeast.
3. Soil samples were compared to NYSDEC 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Restricted Use Soil Cleanup Objectives (RRSCOs). Soil samples collected (shown on Figure 3) during the SRI showed:
   - One VOC, PCE was detected at concentrations 1.8 milligrams per kilogram (mg/kg) and 2.2 mg/kg, respectively, above the UUSCOs in the soil samples collected from boring B02 at 30 to 35 feet bgs and B05 at 30 to 35 feet bgs. VOCs were not detected in remaining soil samples above the UUSCOs or RRSCOs.
   - PBCs were not detected in soil samples above the UUSCOs or RRSCOs.
   - The emerging contaminant, 1,4-dioxane, was detected at 1.4 mg/kg above the UUSCOs in the soil sample collected from boring B02 at 10 to 12 feet bgs. 1,4-dioxane was not detected at concentrations above the laboratory detection limit in any other soil samples.
   - PFOA/PFAS were not detected above the laboratory detection limits in soil samples.
   - Metals, specifically trivalent chromium was detected at 37 mg/kg above the UUSCOs in the soil sample collected from boring B03 at 40 to 45 feet bgs. Trivalent chromium and hexavalent chromium were not detected in remaining soil samples above the UUSCOs or RRSCOs. Nickel was detected in B03 (40 to 45 feet) at 41.9 mg/kg and in B05 (30 to 35 feet) at 38.8 mg/kg, respectively. Metals were not detected in remaining soil samples above the UUSCOs or RRSCOs.
4. Groundwater analytical results were compared to NYSDEC 6 NYCRR Part 703.5 Class GA groundwater standards (GWQS) and NYSDEC guidance set forth in 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") (TOGS 1.1.1). Groundwater samples collected (shown on Figure 5) during the Phase 2 showed:
   - Multiple CVOCs, including PCE, TCE, and their daughter products; cis-1,2-dichloroethene (cis-1,2-DCE), 1,1-Dichloroethane (1,1-DCA), vinyl chloride, and 1,1,1-trichloroethane (1,1,1-TCA), were detected above the NYSDEC AWQS in multiple groundwater samples collected during the RI. PCE and TCE were detected above their respective AWQS in all groundwater samples at concentrations ranging from 190 µg/L to 58,000 µg/L and 52 µg/L to 69,000 µg/L, respectively. The highest concentrations of CVOCs were found in

shallow groundwater with the maximum CVOCs concentrations detected in monitoring well MW02-S, located adjacent to the western Site boundary abutting 11 Spencer Street. In MW02-S PCE was detected at 58,000 µg/L and TCE at 69,000 µg/L. 1,2,4-Trichlorobenzene was also detected in MW02-S at 640 µg/L. Daughter products of PCE and TCE were found elevated in MW04-S and MW05-S, located on the southern portion of the Site, with cis-1,2-DCE at 120,000 µg/L, 1,1-DCA at 2,200 µg/L, and 1,1,1-TCA at 15,000 µg/L in MW05-S. Vinyl chloride was identified above the AWQS in shallow, intermediate, and deep groundwater at locations MW04 and MW05 with a maximum concentration of 66 µg/L in MW04-S.

- Other VOCs detected above the AWQS include benzene, toluene, ethylbenzene, and xylenes (collectively BTEX) found at maximum concentrations in MW05-S (total concentration of 17,500 µg/L), MW05-I (total concentration of 11,312 µg/L) and in MW04-S (total concentration of 5,260 µg/L). 1,2-dichlorobenzene and 1,4-dichlorobenzene were detected at maximum concentrations in MW03-S at 710 µg/L and 130 µg/L, respectively. Naphthalene and 1,2,4,5-tetramethylbenzene were detected at maximum concentrations in MW02-S at 320 µg/L and 36 µg/L, respectively. 1,3,5-Trimethylbenzene and 1,2,4-Trimethylbenzene were detected in MW05-I at 200 µg/L and an estimated concentration of 81 µg/L.
- One PCB, Aroclor 1254, was detected above the AWQS in shallow, intermediate and deep groundwater at locations MW02 with the lowest concertation of 0.486 µg/L in deep groundwater and highest concentration of 0.962 µg/L found in shallow groundwater. Aroclor 1254 was also detected in MW04-S at 0.51 µg/L and at the maximum concentration encountered for the Site, 15.1 µg/L, in MW03-S.
- The emerging contaminants, PFOA/PFAS and 1,4-dioxane were measured in locations MW01 and MW05. 1,4-dioxane was detected at concentrations of 988 µg/L in MW05-S, 286 µg/L in MW05-I, and 288 µg/L detected in MW05-D. 1,4-dioxane was detected at concentrations of 1.86 µg/L in MW01-S and 0.253 µg/L in MW01-I. PFOA/PFAS compounds were detected above the laboratory detection limits in all groundwater samples analyzed for these constituents. The maximum total concentration of PFAS ranged from 11 µg/L in MW05-I to 0.111 µg/L in MW01-I.
- Biogeochemical Parameters and Microbial Array: Declining concentrations of CVOCs including PCE and TCE provide primary evidence of intrinsic biodegradation via reductive dechlorination. If PCE concentrations are high, TCE concentrations can be stable or increasing, because TCE is a degradation product of PCE. Secondary evidence of intrinsic biodegradation includes increases in biodegradation intermediates DCE and vinyl chloride and changes in biogeochemical parameters including elevated genetic markers for dechlorinating bacteria and their enzyme functional genes, low redox potential, neutral pH (6 to 8 in standard units), elevated alkalinity, low oxygen, nitrate, and sulfate concentrations, and elevated concentrations of organic carbon, dissolved iron and manganese, methane, ethane, and ethene. Groundwater samples in the shallow, intermediate, and deep groundwater zones from MW05 were analyzed for biogeochemical parameters and microbial array. Concentrations of target bacterial populations give an overview of the potential for biodegradation of groups of compounds by anaerobic and aerobic pathways. At MW05-S, bacterial populations (e.g., Dehalococcoides and Dehalobacter spp.) capable of reductive dechlorination of TCE, DCE, and vinyl chloride were detected at low to moderate concentrations. At

MW05-I, bacterial populations capable of reductive dechlorination for the abovementioned CVOCs were detected at low concentrations.

Summary of the Remedy

The selected remedy will include the following:

- Development and implementation of a Construction Health and Safety Plan (CHASP) and Community Air Monitoring Program (CAMP) for the protection of on-Site workers, community/residents, and environment during remediation and construction activities.
- Design and construction of a support of excavation (SOE) system to facilitate the Track 4 remediation.
- Implementation of a pre-design investigation (PDI) prior to mobilization for the RAWP.
- Implementation of soil erosion, pollution, and sediment control measures in compliance with applicable laws and regulations.
- Excavation, stockpiling, off-Site transport, and disposal of about 1,100 cubic yards of historic fill, solid waste, and native soil that exceeds Commercial Soil Cleanup Objectives (CSCOs) as defined in Table 3. It is anticipated that excavation will extend to 5 feet bgs sitewide with additional excavation to 13 feet bgs in the source area.
- If encountered, removal of underground storage tanks (USTs) and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) and decommissioning and off-Site disposal during redevelopment in accordance with DER-10, 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements.
- Screening for indications of contamination (by visual means, odor, and monitoring photoionization detectors [PIDs]) of excavated material during intrusive Site work.
- Localized dewatering, characterization, and treatment of water accumulated in excavations prior to discharge to a NYSDEC approved sewer/sanitary line (pending permits), or localized dewatering with containerization, classification and disposal at an approved receiving facility.
- Appropriate off-Site disposal of material removed from the Site in accordance with federal, state, and local rules and regulations for handling, transport, and disposal.
- Backfilling of excavated areas, as necessary for development, with imported material that meets Unrestricted Use Soil Cleanup Objectives (UUSCOs).
- Installation, operation and monitoring of a sub-slab depressurization system (SSDS) to mitigate potential exposures related to soil vapor intrusion.
- Injection of zero valent iron (ZVI) from 15 to 45 feet bgs in the center of the Site to treat saturated zone in the source area.
- Injection of ZVI from 15 to 45 feet bgs to create a permeable reactive barrier (PRB) along the south-southeastern boundary of the Site to mitigate the off-site migration of the dissolved phase shallow groundwater plume.
- Construction of a composite cover system consisting of a minimum of 6 inches of subbase (RCA) overlain by a 16-inch concrete slab and installation of a waterproofing/vapor barrier, which is a requirement of the NYC Building Code.

- Collection and analysis of documentation soil samples in accordance with DER-10 to confirm a Track 4 remedy was achieved; over-excavation will be completed as necessary to meet CSCOs.
- Installation of two additional post-remedy permanent monitoring wells in the source area and at the downgradient Site boundary. This will be in addition to preserving MW-04, MW-02 and MW-01 as well as MW-06, MW-07 and newly proposed offsite wells to the northeast and southeast of the Site.
- Quarterly collection and analysis of groundwater samples for VOCs in accordance with DER-10 for one-year following remedial excavation activities to document groundwater quality beneath the Site. Offsite groundwater monitoring wells will be monitored for monitored natural attenuation.
- Completion of a soil vapor intrusion (SVI) evaluation to assess indoor air quality in accordance with DER-10 and NYSDOH Final Guidance on Soil Vapor Intrusion following remedial excavation activities and prior to occupancy. A Soil Vapor Intrusion Work Plan (SVI WP) will be provided to the NYSDEC and NYSDOH for review and approval prior to commencing the SVI evaluation. Formal request for access letters will be transmitted via certified mail to adjacent offsite properties requesting access to perform a SVI evaluation. Formal request for access letters will be transmitted via certified mail to adjacent offsite properties requesting access to perform a SVI evaluation.

Remedial activities will be performed in accordance with this RAWP and the Department-issued Decision Document under the oversight of a New York State-Licensed Professional Engineer. Deviations from the RAWP and/or Decision Document will be promptly reported to the NYSDEC for approval and explained in the Final Engineering Report (FER).

1. Introduction

This Remedial Action Work Plan (RAWP) was developed by Haley & Aldrich of New York (Haley & Aldrich) on behalf of Toldos Yehudah LLC (Toldos Yehudah) for the proposed development located at 8 Walworth Street (Block 1716 Lot 33) within the Bedford Stuyvesant neighborhood of Brooklyn, New York (the Site).

The Site is currently in the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) identified as NYSDEC Site C224239 with Toldos Yehudah listed as a participant. The Site was operated by Techtronics Ecological Corporation (Techtronics) from 1962 through the 1990s. The Site is also identified in the Resource Conservation and Recovery Act (RCRA) database as a large quantity generator (LQG) under RCRA ID NYD000824334.

This RAWP summarizes the nature and extent of contamination on the Site as determined from data gathered during the Supplemental Remedial Investigation (SRI) performed from 15 June through 15 July 2020. It also provides an evaluation of a Track 2 Cleanup and other applicable remedial action alternatives, their associated costs, and the recommended and preferred remedy. The remedy described in this document is consistent with the procedures defined in NYSDEC Division of Environmental Remediation (DER) Program Policy: Technical Guidance for Site Investigation and Remediation (DER-10) and complies with applicable federal, state, and local laws, regulation, and requirements.

1.1 SITE LOCATION AND DESCRIPTION

The Site is located at 8 Walworth Street in the Bedford Stuyvesant neighborhood of Brooklyn, New York, and is identified as Block 1716 Lot 33 on the New York City Tax Map (Figure 1). The Site encompasses an area of 3,910-square feet and is bounded by a vacant lot to the north, a warehouse to the south, Walworth Street to the east, and a vacant lot to the west (Figure 2). The Site is currently a vacant one-story warehouse encompassing the entire lot and the land is currently zoned as manufacturing M1-2, which allows for industrial use. The Site is in an urban area surrounded by light industrial, commercial, and residential properties served by municipal water.

1.2 REDEVELOPMENT PLAN

The redevelopment plan includes construction of a four-story mixed-use commercial community facility. The existing floor of the first story is to remain with the upper floors reaching 57 feet above grade. A bulkhead will extend above the top of the fourth floor to 67 feet above grade. The first floor will consist of a lobby, worship areas, mechanical and meter rooms, an elevator, and bathrooms. The second through fourth floors will be used for storage and office space totaling 11 storage units and 15 offices. Each floor will be equipped with two bathrooms. The bulkhead will house the elevator and machine rooms. A partial basement will be constructed to on the northwestern side of the building with the slab installed approximately 12 feet below grade. The proposed foundation plans are in Appendix A.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

Adjacent properties and sensitive receptors are shown on Figure 2B.

Direction	Adjoining properties	Surrounding Properties
North	Vacant lot	Flushing Avenue, vacant land, industrial/manufacturing buildings, and Walworth Street
South	Warehouse	Walworth Street, vacant land, and industrial/manufacturing buildings
East	Walworth Street followed by warehouses	Industrial/manufacturing buildings, Flushing Avenue, and mixed residential/commercial buildings
West	Vacant lot	Commercial/office buildings, vacant land, industrial/manufacturing buildings, and Spencer Street

Additionally, there are many sensitive receptors located within ½ mile radius, including schools and day cares, shown in Figure 2C, listed below:

No.	Name (Approximate distance from Site)	Address
1	Talmud Torah Bnei Shimon (0.1 miles)	18 Warsoff Place, Brooklyn, NY
2	Viznitz School for Girls (0.2 miles)	12 Franklin Avenue, Brooklyn, NY
3	Yeled V'Yalda Torah Day Care (0.2 miles)	12 Franklin Avenue, Brooklyn, NY
4	Yeshivas Ahavas Israel (0.2 miles)	12 Franklin Avenue, Brooklyn, NY
5	Bais Ruchel D'Satmar Inc (0.4 miles)	76 Rutledge Street, Brooklyn, NY
6	Eis Laasois (0.2 miles)	22 Middleton Street, Brooklyn, NY
7	Williamsburg Infant & Early Childhood Development Center (0.2 miles)	22 Middleton Street, Brooklyn, NY
8	BWCCS2 Middle School (0.4 miles)	11 Bartlett Street, Brooklyn, NY
9	Success Academy Myrtle Middle School (0.5 miles)	700 Park Ave, Brooklyn, NY
10	Public School 380 (0.4 miles)	370 Marcy Avenue, Brooklyn, NY
11	Brooklyn School District 14 (0.5 miles)	215 Heyward St, Brooklyn, NY

1.4 SITE HISTORY

1.4.1 Past Uses and Ownership

The Site was developed as early as 1887 with a one-story residence and shed on the south side of the property, a two-story storefront building with a single-story garage in the middle of the Site along Walworth Street, and a three-story residence on the north side of the Site. The surrounding properties were primarily developed with residences, commercial buildings, and industrial/manufacturing use facilities. The Site remained largely unchanged through the early 1900s.

By 1918, the adjoining property to the west was occupied by a junk yard and developed into an indoor parking garage by 1935. The Site remained developed with residences until 1950 when only the two-story residential structure and sheds remained present on the south side of the property. A one-story warehouse used for chemical drum storage was erected on the north side of the Site by 1965 and the northern and southern adjacent properties were used for paint storage and mixing in the mid-1960s. By 1977, the two-story residence to the north was no longer present, but the chemical drum warehouse remained. In 1982, the Site was redeveloped with the existing one-story warehouse building, occupied by Techtronics, and utilized for the mixing and storage of paints and other coatings. The adjoining property to the north was partially included in the Techtronics facility and labeled as "Techtronics A" with the 8 Walworth Site reported as "Techtronics B". Techtronics ceased operations in the 1990s. The Site and neighboring properties have remained largely unchanged through the present.

1.4.2 Previous Environmental Reports

The following previous environmental reports and investigations were reviewed as part of this RAWP and are summarized below.

- Phase II Environmental Site Assessment, 26 December 2007, Prepared by P.W. Grosser Consulting (PWG)
- Soil Vapor Intrusion Report, 15 May 2017, Prepared by Environmental Business Consultants (EBC)
- Phase I Environmental Site Assessment Screening, May 2017, Prepared by EBC
- Remedial Investigation Report, 9 September 2019, Prepared by EBC, Prepared for NYSDEC

Phase II Environmental Site Assessment, 26 December 2007, Prepared by PWG

PWG performed a Phase II Environmental Site Assessment at the Site in December 2007. Investigation activities included collection of four soil samples, two groundwater samples from temporary groundwater sampling points, and two groundwater samples from existing onsite monitoring wells. Analytical results indicated that soil and groundwater beneath the Site have been impacted with volatile organic compounds (VOCs), including trichloroethylene (TCE), tetrachloroethylene (PCE), 1,1-dichloroethene (1,1-DCE), and cis-1,2-dichloroethene (cis-1,2-DCE), and polycyclic aromatic hydrocarbons, including benzo(a)anthracene, benzo(b)fluoroanthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, and phenanthrene.

Soil Vapor Intrusion Report, 15 May 2017, Prepared by EBC

In accordance with the Soil Vapor Intrusion Work Plan submitted in March 2017, EBC performed a vapor intrusion sampling event at the Site in order to determine if the chlorinated solvents detected in shallow soil and groundwater on an adjacent property (BCP Site C224204) were off-gassing and migrating into the Site building. In March 2017, EBC installed two sub-slab soil vapor implants and collected one indoor air and one outdoor air sample. Results found chlorinated VOCs (CVOCs) including PCE, TCE, carbon tetrachloride, 1,1-DCE, 1,1 dichloroethane (1,1-DCA), 1,1,1-trichloroethane (1,1,1-TCA), cis-1,2-DCE, and vinyl chloride in both of the sub-slab soil gas samples. PCE and TCE were also detected in indoor air at concentrations above New York State Department of Health (NYSDOH) recommended action levels. Based on elevated concentrations of CVOCs in indoor air and sub-slab vapor, EBC concluded that sub-slab vapors were affecting indoor air quality of the Site. However, the source of the

impact was not determined to be onsite or from the adjacent BCP site(s) where CVOC impacts were reported at concentrations an order of magnitude higher than at the Site.

Phase I Environmental Site Assessment Screening, May 2017, Prepared by EBC

EBC completed a partial Phase I Environmental Site Assessment in May 2017 in which historic Sanborn fire insurance maps, historic aerial photographs, historic topographic maps, and city directory listings were reviewed. According to the review of these sources, the Site was formerly used by Techtronics, a manufacturer of paints and coatings. The Site was listed in the CORRACTS, RCRA, and NY MANIFEST databases for the handling and generation of hazardous materials at the Site dating back as early as 1980. Techtronics was also listed as a LQG for a few years in the early 1980s (RCRA ID NYD000824334). Materials handled at the Site include ignitable waste, CVOCs, chlorinated fluorocarbons, halogenated solvents, acetone, and petroleum-based materials. The Site is also listed on the NYSPILLS database related to one open spill incident (Spill No. 0710116), which was reported on 21 December 2007 when chlorinated solvent contamination was identified in soil and groundwater by PWG during the Phase II Investigation. The contaminants identified were thought to be associated with the historic manufacturing of lacquer and paints at the Site.

Remedial Investigation Report, 9 September 2019, Prepared by EBC, Prepared for NYSDEC

As part of the BCP requirements, EBC performed an RI at the Site from November 2018 through February 2019 and submitted a Remedial Investigation Report (RIR) summarizing the findings to the NYSDEC on 9 September 2019. The RI included the collection of soil, groundwater, and soil vapor samples throughout the Site. A total of eight soil borings were advanced to 15 feet below ground surface (bgs). Four to six soil samples were collected from each boring from depth intervals including 0 to 6 inches, 6 to 12 inches, 0 to 24 inches, and the depth of the soil groundwater interface (approximately 12 feet bgs) for a total of 39 soil samples. Five monitoring wells (MW1701 through MW1705) were installed at the Site to depths of 18 to 21 feet bgs with 10 feet of 0.010-inch polyvinyl chloride (PVC) well screen at the base of the well. Groundwater samples were collected from each well using low-flow groundwater purging techniques in January and February 2019.

The RIR findings reported CVOC contamination in soil, specifically PCE, TCE, and cis-1,2-DCE, across the entire Site with the highest concentrations identified in the borings installed on the northern portion of the property. The highest concentrations were found in SB1708 (located in the northeast corner of the site) with PCE detected at 3,200,000 micrograms per kilogram (µg/kg), TCE detected at 200,000 µg/kg and cis-1,2-DCE at 210,000 µg/kg. Elevated concentrations of CVOCs were also detected in the deeper intervals of SB1705 from 13 to 15 feet bgs (PCE 440,000 µg/kg, TCE 26,000 µg/kg and cis-1,2-DCE 38,000 µg/kg) and in SB1702 from 7 to 9 feet bgs (PCE 680,000 µg/kg, TCE 28,000 µg/kg). With the exception of SB1703, shallow soil samples found slightly elevated CVOC concentrations above Unrestricted Use Soil Cleanup Objectives (SCOs) but below Restricted Commercial SCOs. The soil sample collected from 6 to 12 inches bgs in SB1703 found elevated PCE at 370,000 µg/kg exceeding the Industrial Use SCO.

Elevated CVOCs in groundwater were found above NYSDEC Ambient Water Quality Standards (AWQS) throughout the Site with the areas of greatest impact correlating with the areas of greatest soil impact. PCE, TCE, and cis-1,2-DCE were detected above the AWQS in each monitoring well with the highest concentrations of PCE and TCE found in the MW1702, located on the central western site boundary, and MW1701, located in the southwest corner. In MW1702, PCE was detected at 20,000 micrograms per liter (µg/L), TCE at 11,000 µg/L, and cis-1,2-DCE at 5,700 µg/L. In MW1701, PCE was detected at 11,000 µg/L, TCE at 6,200 µg/L, and cis-1,2-DCE at 270 µg/L. The highest concentrations of cis-1,2-DCE were

detected in MW1703, located in the northwest corner, at 11,000 µg/L, PCE at 9,400 µg/L, and TCE at 4,300 µg/L. CVOC concentrations at MW1704 and MW1705, located in the southeast and northeast corners of the Site respectively, also showed elevated CVOCs in groundwater but at levels lower than observed on the northern and western portions of the Site.
Results of soil vapor sampling found elevated CVOCs in all soil vapor samples with total concentrations ranging from 825 micrograms per cubic meter (µg/m^3) to 1,150,564 µg/m^3. The greatest concentrations were reported in SS1 near the western property line with PCE detected at 590,000 µg/m^3, TCE at 488,000 µg/m^3 and cis-1,2-DCE at 36,400 µg/m^3.

Additional contaminants of concern include metals, specifically copper, lead, zinc, barium, cadmium, selenium, mercury, arsenic, chromium, manganese, and nickel, which were found above Unrestricted Use SCOs in shallow soil samples reaching 2 feet bgs in multiple locations throughout the Site. Mercury, barium, lead, and cadmium were also identified above Restricted Commercial SCOs in several shallow samples as well as arsenic found above Restricted Industrial SCOs in shallow soil at two locations. Semi volatile organic compounds (SVOCs), including polycyclic aromatic hydrocarbons (PAHs) such as benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene were also identified above Unrestricted Use SCOs in shallow soil samples reaching 2 feet bgs in multiple locations throughout the Site. Dibenzo(a,h)anthracene and benzo(a)anthracene were found above Restricted Commercial SCOs in the 0.5 to 1-foot bgs interval in three locations. Benzo(a)pyrene was found exceeding Restricted Industrial SCOs in shallow soils extending to 2 feet bgs in multiple locations. Evidence of metals and PAHs in shallow soils is consistent with urban fill found throughout the area.

2. Description of Remedial Investigation Findings

2.1 REMEDIAL INVESTIGATION

As part of the BCP requirements, EBC performed a Remedial Investigation (RI) at the Site from November 2018 through February 2019 and submitted an RIR summarizing the findings to NYSDEC on 9 September 2019. The RI included collection of soil, groundwater and soil vapor samples throughout the Site. A total of eight soil borings were advanced to 15 feet bgs. Four to six soil samples were collected from each boring from depth intervals including 0 to 6 inches, 6 to 12 inches, 0 to 24 inches and the depth of the soil groundwater interface (approximately 12 feet bgs) for a total of 39 soil samples. Five monitoring wells (MW1701 through MW1705) were installed at the Site to depths of 18 to 21 feet bgs with 10 feet of 0.010-inch PVC well screen at the base of the well. Groundwater samples were collected from each well using low-flow groundwater purging techniques in January and February 2019.

The RIR findings reported CVOC contamination in soil, specifically PCE, TCE and cis-1,2-DCE, across the Site with the highest concentrations identified in the borings installed on the northern portion of the property. The highest concentrations were found in SB1708 (located in the northeast corner of the site) with PCE detected at 3,200,000 µg/kg, TCE detected at 200,000 µg/kg and cis-1,2-DCE at 210,000 µg/kg. Elevated concentrations of CVOCs were also detected in the deeper intervals of SB1705 from 13 to 15 feet bgs (PCE 440,000 µg/kg, TCE 26,000 µg/kg and cis-1,2-DCE 38,000 µg/kg) and in SB1702 from 7 to 9 feet bgs (PCE 680,000 µg/kg, TCE 28,000 µg/kg). With the exception of SB1703, shallow soil samples found slightly elevated CVOC concentrations above Unrestricted Use SCOs but below Restricted Commercial SCOs. The soil sample collected from 6 to 12 inches bgs in SB1703 found elevated PCE at 370,000 µg/kg exceeding the Industrial Use SCO. The soil data is provided in Figure 4.

Elevated CVOCs in groundwater were found above NYSDEC AWQS throughout the Site with the areas of greatest impact correlating with the areas of greatest soil impact. PCE, TCE and cis-1,2-DCE were detected above the AWQS in each monitoring well with the highest concentrations of PCE and TCE found in the MW1702, located on the central western site boundary, and MW1701, located in the southwest corner. In MW1702, PCE was detected at 20,000 µg/L, TCE at 11,000 µg/L, and cis-1,2-DCE at 5,700 µg/L. In MW1701, PCE was detected at 11,000 µg/L, TCE at 6,200 µg/L and cis-1,2-DCE at 270 µg/L. The highest concentrations of cis-1,2-DCE were detected in MW1703, located in the northwest corner, at 11,000 µg/L and PCE at 9,400 µg/L and TCE at 4,300 µg/L. CVOC concentrations at MW1704 and MW1705, located in the southeast and northeast corners of the Site respectively, also showed elevated CVOCs in groundwater but at levels lower than observed on the northern and western portions of the Site. The groundwater data is provided on Figure 5.

Results of soil vapor sampling found elevated CVOCs in all soil vapor samples with total concentrations ranging from 825 µg/m^3 to 1,150,564 µg/m^3. The greatest concentrations were reported in SS1 near the western property line with PCE detected at 590,000 µg/m^3, TCE at 488,000 µg/m^3 and cis-1,2-DCE at 36,400 µg/m^3.

Additional contaminants of concern include metals, specifically copper, lead, zinc, barium, cadmium, selenium, mercury arsenic, chromium, manganese and nickel, which were found above Unrestricted Use SCOs in shallow soil samples reaching 2 feet bgs in multiple locations throughout the Site. Mercury, barium, lead and cadmium were also identified above Restricted Commercial SCOs in several shallow

samples as well as arsenic found above Restricted Industrial SCOs in shallow soil at two locations. SVOCs, including PAHs such as benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene were also identified above Unrestricted Use SCOs in shallow soil samples reaching 2 feet bgs in multiple locations throughout the Site. Dibenzo(a,h)anthracene and benzo(a)anthracene were found above Restricted Commercial SCOs in the 0.5 to 1-foot bgs interval in three locations. Benzo(a)pyrene was found exceeding Restricted Industrial SCOs in shallow soils extending to 2 feet bgs in multiple locations. Evidence of metals and PAHs in shallow soils is consistent with urban fill found throughout the area.

2.2 SUPPLEMENTAL REMEDIAL INVESTIGATION

The SRI was completed in accordance with Title 6 of the New York Codes, Rules, and Regulations (6 NYCRR) Part 375, DER-10, the NYSDEC Draft BCP Guide (May 2004), and the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006 and subsequent updates). The SRI was completed from 15 June through 15 July 2020 to determine the nature and extent of contamination in soil and groundwater.

The SRI consisted of the following:

- The advancement of five soil borings to a depth of 45 feet bgs with a total of 22 samples taken from depths of 10 to 12 feet bgs, 30 to 35 feet bgs, and 40 to 45 feet bgs.
- The installation of two-inch clustered permanent monitoring wells in five locations onsite, with clusters including a shallow well to 17 to 20 feet bgs, an intermediate well to 31 to 35 feet bgs, and a deep well to 45 feet bgs. A total of 17 groundwater samples were collected.
- An offsite investigation consisting of the advancement of two soil borings to a depth of 45 feet bgs with a total of two samples collected from 13 to 15 feet bgs.
- An offsite investigation consisting of the installation of two-inch clustered permanent monitoring wells in two locations downgradient offsite.

2.2.1 Soil Investigation

Five soil borings (B-01 through B-05) were installed across the entire Site during the SRI by Coastal Environmental Solutions, Inc. (Coastal) and Eastern Environmental Solutions (Eastern). Soil borings were advanced by a track-mounted direct push drill rig (Geoprobe®) operated by Coastal and Eastern, to a depth of 45 feet bgs. Samples were collected from acetate liners using a stainless-steel trowel or sampling spoon. The soil was screened for visual, olfactory, and instrumental evidence of environmental impacts and was visually classified for soil type, grain size, texture, and moisture content. Soils were logged continuously by an engineer. The presence of staining, odors, and photoionization detector (PID) response was noted.

2.2.2 Elevated VOC and SVOC Impacted Soil Delineation

The on-Site CVOC contamination has been both horizontally and vertically delineated. CVOC concentrations dissipate in groundwater with depth throughout the Site indicating contamination is highest at the groundwater interface and smear zone. Concentrations of CVOCs indicated a one to two order of magnitude reduction in the intermediate and deep wells at MW-02 with TCE detected at

130 µg/L in intermediate groundwater and 53 µg/L in deep groundwater, and PCE detected at 2,300 µg/L in intermediate groundwater and 1,400 µg/L in deep groundwater.

Based on the vertical distribution of CVOC related contamination, the highest concentrations were detected in the shallow groundwater interface (12 to 17 feet bgs) in the suspected source area located in the northern half of the Site. The highest concentrations of PCE and TCE were detected in samples from location MW02 located on the western boundary of the Site abutting 11 Spencer Street. The highest concentrations of daughter products including cis-1,2-DCE, 1,1-DCA, and 1,1,1-TCA were detected at elevated concentrations in MW05 indicating the presumed source area is potentially located on the northwestern boundary of the Site.

2.2.3 Groundwater Investigation

Two-inch clustered permanent groundwater monitoring wells (MW-01 to MW-05) were installed in five locations onsite. Monitoring well clusters included a shallow well to 17 to 20 feet bgs, an intermediate well to 31 to 35 feet bgs, and a deep well to 45 feet bgs. Monitoring wells were installed with 2-inch annular space, with flush mount manhole covers and concrete pads, and were screened with 5 to 7 feet of 0.010-inch slotted PVC. Wells were installed with #00 Morie or equivalent placed to a minimum of 2 feet above the screen with a bentonite seal placed directly above the filter pack. Monitoring wells were developed by surging a pump. Development was not completed until the water turbidity was 50 nephelometric turbidity units or less, or 10 well volumes were removed, if possible. The well casings were surveyed by a New York State licensed surveyor on 23 July 2020. During surveying, Haley & Aldrich personnel performed a synoptic monitoring well gauging event.

2.3 SAMPLES COLLECTED

During the SRI, a total of 22 soil samples and 4 duplicate samples were collected from soil borings to depths of 10 to 12 feet bgs, 30 to 35 feet bgs and 40 to 45 feet bgs for laboratory analysis. Samples were collected using laboratory provided clean bottle ware and VOC grab samples were collected using terra cores.

A total of seventeen groundwater samples were collected for laboratory analysis from the five clusters of wells at shallow, intermediate, and deep zones. A field blank, a trip blank, and a duplicate sample were also collected. Groundwater monitoring wells were sampled using low-flow sampling methods as described in the SRI.

2.4 CHEMICAL ANALYSIS

The laboratory analyses performed on the soil and groundwater samples are summarized below.

Soil Samples were analyzed for the following parameters:

- Target Compound List (TCL) VOCs using Environmental Protection Agency (EPA) method 8260B
- Polychlorinated biphenyls (PCBs) using EPA method 8082
- Target Analyte List/Part 375 List metals (including cyanide and hexavalent chromium) by United States EPA (USEPA) Method 6010C/7471B/9010C/7196A

As per NYSDEC DER-10 requirements, soil samples were collected for emerging contaminants. Soil collected from 10 to 12 feet bgs in soil borings B-01 (located outside of source area) and B-05 (located within the source area) were also sampled and analyzed for:

- NYSDEC and Per- and Polyfluoroalkyl Substances (PFAS) List (21 compounds) by USEPA Method 537.1; and
- 1,4-dioxane by USEPA Method 8270

Samples analyzed for PFAS and 1,4-dioxane were collected and analyzed in accordance with the NYSDEC issued January 2020 "Guidelines for sampling and Analysis of PFAS" and the June 2019 Sampling for "1,4-dioxane and Per- and Polyfluoroalkyl Substances (PFAS) Under DECs Part 375 Remedial Programs," respectively.

Groundwater samples were analyzed for the following parameters:

Monitoring wells MW-01, MW-02, MW-03, MW-04, and MW-05 from shallow, intermediate, and deep zones were sampled and analyzed for:

- TCL VOCs using EPA method 8260; and
- PCBs using EPA method 8082A

Groundwater samples in the shallow, intermediate, and deep groundwater zones from MW-01 (source zone) and MW-05 (within source area) were also analyzed for the following emerging contaminants:

- NYSDEC and PFAS List (21 compounds) by USEPA Method 537; and
- 1,4-dioxane by USEPA Method 8270

Samples analyzed for PFAS and 1,4-dioxane were collected and analyzed in accordance with the NYSDEC issued January 2020 "Guidelines for sampling and Analysis of PFAS" and the June 2019 Sampling for "1,4-dioxane and Per- and Polyfluoroalkyl Substances (PFAS) Under DECs Part 375 Remedial Programs," respectively.

Groundwater samples in the shallow, intermediate, and deep groundwater zones from MW-05 (within source area) were also analyzed for the following parameters:

- Biogeochemical parameters; and
- Microbial array

2.5 SUPPLEMENTAL REMEDIAL INVESTIGATION FINDINGS SUMMARY

A summary of environmental findings of the SRI includes the following:

1. Depth to groundwater ranges from 14 to 16 feet bgs.
2. Groundwater flow was observed to be generally from the north-northwest to the south-southeast.

3. Soil samples were compared to NYSDEC 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Restricted Use Soil Cleanup Objectives (RRSCOs). Soil samples collected (shown on Figure 3) during the SRI showed:
    - One VOC, PCE was detected at concentrations 1.8 milligrams per kilogram (mg/kg) and 2.2 mg/kg, respectively, above the UUSCOs in the soil samples collected from boring B02 at 30 to 35 feet bgs and B05 at 30 to 35 feet bgs. VOCs were not detected in remaining soil samples above the UUSCOs or RRSCOs.
    - PBCs were not detected in soil samples above the UUSCOs or RRSCOs.
    - The emerging contaminant, 1,4-dioxane, was detected at 1.4 mg/kg above the UUSCOs in the soil sample collected from boring B02 at 10 to 12 feet bgs. 1,4-dioxane was not detected at concentrations above the laboratory detection limit in any other soil samples.
    - PFOA/PFAS were not detected above the laboratory detection limits in soil samples.
    - Metals, specifically trivalent chromium was detected at 37 mg/kg above the UUSCOs in the soil sample collected from boring B03 at 40 to 45 feet bgs. Trivalent chromium and hexavalent chromium were not detected in remaining soil samples above the UUSCOs or RRSCOs. Nickel was detected in B03 (40 to 45 feet) at 41.9 mg/kg and in B05 (30 to 35 feet) at 38.8 mg/kg, respectively. Metals were not detected in remaining soil samples above the UUSCOs or RRSCOs.
4. Groundwater analytical results were compared to NYSDEC 6 NYCRR Part 703.5 Class GA groundwater standards (GWQS) and NYSDEC guidance set forth in 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") (TOGS 1.1.1). Groundwater samples collected (shown on Figure 5) during the Phase 2 showed:
    - Multiple CVOCs, including PCE, TCE, and their daughter products; cis-1,2-dichloroethene (cis-1,2-DCE), 1,1-Dichloroethane (1,1-DCA), vinyl chloride, and 1,1,1-trichloroethane (1,1,1-TCA), were detected above the NYSDEC AWQS in multiple groundwater samples collected during the RI. PCE and TCE were detected above their respective AWQS in all groundwater samples at concentrations ranging from 190 µg/L to 58,000 µg/L and 52 µg/L to 69,000 µg/L, respectively. The highest concentrations of CVOCs were found in shallow groundwater with the maximum CVOCs concentrations detected in monitoring well MW02-S, located adjacent to the western Site boundary abutting 11 Spencer Street. In MW02-S PCE was detected at 58,000 µg/L and TCE at 69,000 µg/L. 1,2,4-Trichlorobenzene was also detected in MW02-S at 640 µg/L. Daughter products of PCE and TCE were found elevated in MW04-S and MW05-S, located on the southern portion of the Site, with cis-1,2-DCE at 120,000 µg/L, 1,1-DCA at 2,200 µg/L, and 1,1,1-TCA at 15,000 µg/L in MW05-S. Vinyl chloride was identified above the AWQS in shallow, intermediate, and deep groundwater at locations MW04 and MW05 with a maximum concentration of 66 µg/L in MW04-S.
    - Other VOCs detected above the AWQS include benzene, toluene, ethylbenzene, and xylenes (collectively BTEX) found at maximum concentrations in MW05-S (total concentration of 17,500 µg/L), MW05-I (total concentration of 11,312 µg/L) and in MW04-S (total concentration of 5,260 µg/L). 1,2-dichlorobenzene and 1,4-dichlorobenzene were detected at maximum concentrations in MW03-S at 710 µg/L and 130 µg/L, respectively. Naphthalene and 1,2,4,5-tetramethylbenzene were detected at

maximum concentrations in MW02-S at 320 µg/L and 36 µg/L, respectively. 1,3,5-Trimethylbenzene and 1,2,4-Trimethylbenzene were detected in MW05-I at 200 µg/L and an estimated concentration of 81 µg/L.

- One PCB, Aroclor 1254, was detected above the AWQS in shallow, intermediate and deep groundwater at locations MW02 with the lowest concertation of 0.486 µg/L in deep groundwater and highest concentration of 0.962 µg/L found in shallow groundwater. Aroclor 1254 was also detected in MW04-S at 0.51 µg/L and at the maximum concentration encountered for the Site, 15.1 µg/L, in MW03-S.
- The emerging contaminants, PFOA/PFAS and 1,4-dioxane were measured in locations MW01 and MW05. 1,4-dioxane was detected at a concentrations of 988 µg/L in MW05-S, 286 µg/L in MW05-I, and 288 µg/L detected in MW05-D. 1,4-dioxane was detected at concentrations of 1.86 µg/L in MW01-S and 0.253 µg/L in MW01-I. PFOA/PFAS compounds were detected above the laboratory detection limits in all groundwater samples analyzed for these constituents. The maximum total concentration of PFAS ranged from 11 µg/L in MW05-I to 0.111 µg/L in MW01-I.
- Biogeochemical Parameters and Microbial Array: Declining concentrations of CVOCs including PCE and TCE provide primary evidence of intrinsic biodegradation via reductive dechlorination. If PCE concentrations are high, TCE concentrations can be stable or increasing, because TCE is a degradation product of PCE. Secondary evidence of intrinsic biodegradation includes increases in biodegradation intermediates DCE and vinyl chloride and changes in biogeochemical parameters including elevated genetic markers for dechlorinating bacteria and their enzyme functional genes, low redox potential, neutral pH (6 to 8 in standard units), elevated alkalinity, low oxygen, nitrate, and sulfate concentrations, and elevated concentrations of organic carbon, dissolved iron and manganese, methane, ethane, and ethene. Groundwater samples in the shallow, intermediate, and deep groundwater zones from MW05 were analyzed for biogeochemical parameters and microbial array. Concentrations of target bacterial populations give an overview of the potential for biodegradation of groups of compounds by anaerobic and aerobic pathways. At MW05-S, bacterial populations (e.g., Dehalococcoides and Dehalobacter spp.) capable of reductive dechlorination of TCE, DCE, and vinyl chloride were detected at low to moderate concentrations. At MW05-I, bacterial populations capable of reductive dechlorination for the abovementioned CVOCs were detected at low concentrations.

2.5.1 Offsite Investigation

The Offsite Investigation was completed in April 2021 as per requests made by NYSDEC and NYSDOH. The Offsite Investigation Report was submitted in addendum to the Supplemental Remedial Investigation Report (SRIR). Offsite investigation activities included installation of two soil borings to 45 feet bgs as well as installation of two monitoring well clusters including a shallow well screened from 10 to 20 feet bgs, an intermediate well screened from 30 to 35 feet bgs and a deep well screened from 40 to 45 feet bgs. Soil borings and monitoring wells were installed to the southeast of the Site.

2.5.1.1 Soil Sampling Results

Soil analytical results were compared to NYSDEC 6 NYCRR Part 375 UUSCOs and RRSCOs.

Volatile Organic Compounds

No VOCs were detected in soil samples above the UUSCOs or RRSCOs. Tetrachloroethene was detected above method detection limits in sample B06 (13 to 15 feet) at 0.0028 mg/kg but not exceeding standards. No other VOCs were detected in any soil sample above method detection limits.

Polychlorinated Biphenyls

PCBs were not detected in soil samples above method detection limits.

Emerging Contaminants

1,4-dioxane was not detected above method detection limits in any soil sample.

Perfluorooctanesulfonic Acid (PFOS) was detected in B06 (13 to 15 feet) above the method detection limit at 0.00121 mg/kg. No other perfluorinated alkyl acids (PFOA/PFAS) were detected above method detection limits in any soil sample.

Metals

Trivalent chromium was detected in both samples above method detection limits, but not exceeding UUSCOs or RRSCOs. Hexavalent chromium was not detected above method detection limits in any soil sample. Several other metals including arsenic, barium, copper, lead, manganese, nickel, and zinc were detected in both borings above method detection limits but not exceeding UUSCOs or RRSCOs.

2.5.1.2 Groundwater Sampling Results

Groundwater analytical results were compared to 6 NYCRR Part 703.5 NYSDEC AWQS.

Volatile Organic Compounds

CVOCs, including PCE and TCE and daughter products were detected in both groundwater monitoring well clusters. PCE and was detected at a maximum concentration of 210 µg/L in MW06-I and TCE was detected at a maximum concentration of 140 µg/L in MW06-S. Cis-1,2-dichloroethene was detected at a maximum concentration of 530 µg/L in MW06-S and chloroform was detected at a maximum concentration of 10 µg/L in MW06-I. Several other daughter products were found specifically in MW06-S, including 1,1-DCA (13 µg/L), 1,1,1-trichloroethane (9.2 µg/L), vinyl chloride (210 µg/L), and 1,1-DCE (7.4 µg/L). PCE and TCE were also detected in the MW07 well cluster with maximum concentrations of both in MW07-D at 110 µg/L and 13 µg/L respectively.

Additionally, several petroleum related VOCs were detected above AWQS in the MW07 well cluster only, with the greatest concentrations detected in MW07-D. Toluene (6.4 µg/L), ethylbenzene (8 µg/L), naphthalene (15 µg/L), o-xylene (20 µg/L), 1,3,5-trimethylbenzene (7.8 µg/L) were detected in MW07-D only. 1,2,4-trimethylbenzene was detected in both MW07-I and MW07-D at a maximum concentration of 7.8 µg/L in MW07-D and p/m-xylene was also detected in both wells at a maximum concentration of 35 µg/L in MW07-D.

Polychlorinated Biphenyls

No PCBs were detected above the method detection limit in any groundwater sample.

Emerging Contaminants

Emerging contaminants 1,4-dioxane and PFOA/PFAS were compared to the New York Maximum Concentrations Limit (NY-MCL) for drinking water, adopted by NYSDOH in July 2020.

1,4-dioxane was detected above method detection limits in MW06-S at 0.534 µg/L below the NY-MCL. 1,4-dioxane was not detected above method detection limits in any other sample.

PFOA/PFAS compounds were detected above the NY-MCL for drinking water of 0.01 µg/L in each groundwater sample analyzed for these contaminants. Elevated PFOA/PFAS compounds include Perfluorobutanoic acid (PFBA), Perfluoropentanoic Acid (PFPeA), Perfluorobutanesulfonic Acid (PFBS), Perfluorohexanoic Acid (PFHxA), Perfluoroheptanoic Acid (PFHpA), Perfluorooctanoic Acid (PFOA), and Perfluorooctanesulfonic Acid (PFOS). The total concentration of PFAS compounds ranged from 0.0528 µg/L in MW07-I to a maximum concentration of 0.551 µg/L in MW06-S.

2.5.1.3 Conclusions

Based on the analytical results of the Offsite Investigation, CVOC contamination is present offsite with concentrations decreasing with distance from the Site. CVOC contamination is greater in the MW06 cluster closer to the site and appears to decrease in MW07. Additionally, petroleum related VOCs present in the MW07 well cluster indicates that there is likely an offsite source of petroleum related impacts possibly from the other historical industrial and manufacturing facilities currently and formerly operating in the area.

2.6 SIGNIFICANT THREAT

The NYSDEC and NYSDOH have determined that this Site poses a significant threat to human health and the environment.

2.7 GEOLOGY AND HYDROGEOLOGY

Geologic and hydrogeologic observations are described below.

2.7.1 Historic Fill Material

Historic fill material is present to depths as great as 4 to 5 feet bgs and contains asphalt, concrete, brick, and wood fragments.

2.7.2 Native Soil

The historic fill material is underlain by 14 to 15 feet of brown fine to coarse grained sand with silt. A brown silty clay layer was encountered at approximately 30 feet bgs, below which stratigraphy changes to a light brown to brown, medium to coarse grained sand with cobbles extending to at least 45 feet bgs.

2.7.3 Bedrock

Bedrock geology beneath the Site is unknown but generally consists of unconsolidated glacial and alluvial sediments.

2.7.4 Hydrogeology

Depth to groundwater ranges from 14 to 16 feet bgs and groundwater beneath the Site generally flows to the south-southeast.

2.8 CONTAMINANT CONDITIONS

2.8.1 Conceptual Site Model

A conceptual site model has been developed based on the findings of the SRI.

2.8.2 Potential Sources of Contamination

VOC contamination at the Site consists of CVOC related contaminants with elevated concentrations exhibited in the groundwater at different depth intervals. Based on the vertical distribution of CVOC related contamination, the highest concentrations were detected in the shallow groundwater (12 to 17 feet bgs) in the suspected source area located in the northern half of the Site. The highest concentrations of PCE and TCE were detected in samples from location MW02 located on the western boundary of the Site abutting 11 Spencer Street. The highest concentrations of daughter products including cis-1,2-DCE, 1,1-DCA and 1,1,1-TCA were detected at elevated concentrations in MW05 indicating the presumed source area is potentially located on the northwestern boundary of the Site.

Analytical results indicate that as depth increases, CVOCs concentrations generally dissipate as evidenced by decreasing concentrations identified in the intermediate and deep interface zones. Concentrations of CVOCs indicated a one to two order of magnitude reduction in the intermediate and deep wells at MW-02 with TCE detected at 130 µg/L in intermediate groundwater and 52 µg/L in deep groundwater and PCE detected at 2,300 µg/L in intermediate groundwater and 1,400 µg/L in deep groundwater.

Due to the determination of groundwater flow direction to the south-southeast it is probable that impacts on the Site are comingled with impacts from the upgradient properties including 11 Spencer Street, BCP Project Sites C224204, and 480 Flushing Avenue, BCP Project Site C224259. Groundwater samples collected at MW01, located in the southern portion of the Site and not in the suspected source area, contain much lower CVOC concentrations further indicating impacts from upgradient.

Based on the elevated CVOC concentrations in soil and groundwater in the northwestern portion of the Site, it is likely chemicals were released to the surface in this area during historic paint and coating manufacturing operations conducted by Techtronics.

2.8.3 Considerations for Offsite Contamination

While an onsite source area was identified through the RI activities, it should be noted that the surrounding area was formerly used for manufacturing which could indicate additional source areas with migrating impacts. Of note, the vacant lot to the north, 480 Flushing Avenue, and the vacant lot to the west, 11 Spencer Street, are both located upgradient from the Site and currently enrolled in the NYSDEC BCP due to similar contaminants of concern. Groundwater flows to the south-southeast towards properties such as adhesive manufacturer (still in operation), a tannery, a foundry, and a casting cleaning and grinding operation. An Offsite Investigation was completed as an addendum to the

SRI which confirmed aspects of the conceptual site model developed in the SRIR including considerations regarding offsite sources.

Based on the analytical results of the Offsite Investigation, CVOC contamination is present in groundwater offsite with concentrations decreasing with distance from the Site. Results from the monitoring well cluster MW06, located on the western sidewalk most proximal to the Site, show lower concentrations of CVOCs than concentrations present at the Site. At MW06 the highest concentrations of CVOCs and daughter products are observed at the shallow and intermediate depths. Concentrations of CVOCs are decreased in MW07 resulting in only PCE and TCE present above AWQS with all daughter products absent.

Additionally, several petroleum related VOCs are present at concentrations above the AWQS in the MW07 well cluster. Since petroleum related VOCs are present in MW07 but not MW06 or on the Site in significant measure this indicates that there is likely an offsite source of petroleum related impacts possibly from the other historical industrial and manufacturing facilities currently and formerly operating in the area.

2.8.4 Description of Areas of Concern (AOCs)

This section evaluates the nature and extent of soil, groundwater, and soil vapor contamination. The nature and extent of the contamination is derived from both field observations and analytical data.

2.8.4.1 AOC 1 – Groundwater

Shallow:

VOC contamination at the Site consists of CVOC-related contaminants with elevated concentrations exhibited in the groundwater at different depth intervals. Based on the vertical distribution of CVOC-related contamination, the highest concentrations were detected in the shallow groundwater interface (12 to 17 feet bgs) in the suspected source area located in the northern half of the Site. The highest concentrations of PCE and TCE were detected in samples from location MW02 located on the western boundary of the Site abutting 11 Spencer Street. The highest concentrations of daughter products, including cis-1,2-DCE, 1,1-DCA and 1,1,1-TCA, were detected at elevated concentrations in MW05, indicating the presumed source area is potentially located on the northwestern boundary of the Site.

Intermediate Groundwater:

Analytical results indicate that as depth increases, CVOCs concentrations generally dissipate with the exception of CVOC contamination in groundwater increases at MW05-I, located on the northern central portion of the Site. The intermediate groundwater sample detected PCE at 7,500 µg/L and TCE at 2,500 µg/L, both of which are an order of magnitude greater than concentrations found in MW05-S.

2.8.4.2 AOC 2 – Soil Source Area Impacts

Based on a review of analytical data collected during this SRI as well as historical analytical data collected at the Site in the past three years, there is a source area of CVOC impacts in soils located on the northern portion of the Site. Impacted soils extend to the groundwater interface at approximately 14 to 15 feet bgs.

2.8.4.3 Soil Vapor Impacts

Based on a review of analytical data collected during this SRI as well as historical analytical data collected at the Site in the past three years, CVOCs have also partitioned to the vapor phase from impacted soil and groundwater.

2.9 QUALITATIVE HUMAN EXPOSURE ASSESSMENT

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
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.

2.9.1 Potential Exposure Pathways – On-Site

Current Conditions

Based on the exceedances of RRSCOs for CVOCs in soil and the exceedances of AWQS for VOCs in groundwater, the whole Site provides a potential point of exposure. Access from the street is restricted by fences and locked entrances to the Site, with no other points of entrance. The receptor population in the community would not have any access to the Site. Only visiting construction/utility workers would have the potential to be exposed by skin contact, inhalation, or incidental ingestion.

Groundwater in this area of New York City is not used as a potable water source. There is a potential exposure pathway during groundwater sampling associated with Site investigation. The potential pathway is through skin contact, inhalation, and incidental ingestion.

Construction/Remediation Condition

Construction and remediation may result in potential exposures to Site contaminants in the absence of a Health and Safety Plan (HASP) and a Community Air Monitoring Plan (CAMP). Construction and remedial activities will likely include excavation, off-Site disposal of impacted soil, installation of engineering controls, and construction of foundation components. In the absence of a HASP and CAMP, this situation presents the potential for exposure of soil contaminants to construction and remediation workers via skin contact, inhalation of vapors and particulates, and incidental ingestion. This exposure pathway will be greatly minimized through the execution of a HASP and CAMP.

Proposed Future Conditions

The proposed development includes the construction of a new four-story mixed-use commercial community facility. There is no pathway for ingesting groundwater contaminants of concern since the Site and surrounding areas do not obtain drinking water from the groundwater in this area. For CVOCs present in soil and groundwater, the potential exists for exposure through pathways associated with soil gas migration. This would include the indoor vapor intrusion pathway (also referred to as "soil vapor intrusion"). However, the maintenance and implementation of engineering controls can serve to further alleviate this potential future exposure condition if necessary.

2.9.2 Potential Exposure Pathways – Off-Site

Soil vapor has the potential to migrate off-Site vertically through the subsurface and mix with ambient air, especially during Site construction and remediation. However, the potential for the off-Site migration of Site soil contaminants is not expected to result in a complete exposure pathway for current, construction and remediation, or future conditions because during these phases the following protective measures will be implemented:

- A site-specific HASP and CAMP will be implemented to protect on-Site personnel and to mitigate off-Site migration of particulates and VOCs during construction.
- Air monitoring will be conducted for particulates or dust, and VOCs during intrusive activities as part of the CAMP.
- Vehicles will be inspected as necessary prior to leaving the Site to prevent tracking of material off-Site.

2.9.3 Evaluation of Human Health Exposure

In reviewing environmental data, partial on-Site exposure pathways appear to be present under current conditions. In the absence of institutional and engineering controls, complete on-Site exposure pathways could potentially exist in construction/remediation and future conditions.

Current Conditions

Contaminant sources include CVOCs in soil, groundwater, and soil vapor.

Contaminant release and transport mechanisms include contaminated soil transported as dust (skin contact, ingestion, inhalation), and existing soil vapor contaminants (inhalation). Contact with groundwater is limited to sampling involved with Site investigation. Under current conditions, the likelihood of human exposure is limited, as Site access is restricted to ownership and authorized visitors.

Construction/Remediation Activities

During construction and remediation, the contaminant sources are the same as for current conditions. Points of exposure include disturbed and exposed soil during excavation, dust and vapors generated during excavation, and contaminated groundwater that may be encountered during excavation. Routes of exposure include ingestion and skin contact of contaminated soil and groundwater, inhalation of vapors from contaminated soil and groundwater, and inhalation of dust from contaminated soil. The receptor population includes construction and remediation workers and, to a much lesser extent, the public nearby the Site.

The potential for completed exposure pathways is present since all five elements exist; however, the risk will be minimized by the implementation of appropriate health and safety measures including, monitoring the air for vapors and dust or conducting CAMP, following the Site-specific HASP, making sure vehicles are clean before leaving the Site to prevent the tracking of contaminated soil off-Site, maintaining Site security, and wearing the appropriate personal protective equipment (PPE).

Proposed Future Conditions

For the proposed future conditions, if residual contaminants remain on-Site, depending on the selected remedy, would include the sources listed under current conditions, but to a much lesser extent. If institutional and/or engineering controls are not implemented, points of exposure could include potential cracks in the foundation of the proposed development leading to an indoor air pathway for soil vapor, and the potential for inhalation of contaminants. The possible routes of exposure can be avoided or mitigated by the installation of engineering controls, including soil vapor extraction, placement of asphalt, and construction of vapor barriers or sub-slab depressurization systems.

2.9.4 Human Health Exposure Assessment Conclusions

- Under current conditions, there is a minimal risk for exposure. The primary exposure pathways are direct contact, ingestion, and inhalation of volatile contaminants present in soil, soil vapor, or groundwater by Site visitors and adjacent community. The exposure risks can be avoided or minimized by following the appropriate HASP and CAMP during any intrusive activities.
- During construction and remediation activities there is a moderate risk of exposure in the absence of institutional and engineering controls. The primary exposure pathways are:
  - Skin contact, ingestion, and inhalation of contaminated soil, groundwater, or soil vapor by construction workers.
  - Skin contact, ingestion, and inhalation of dust from soil and inhalation of soil vapor by the community adjacent to the Site.
- Under future conditions, the existence of a complete exposure pathway for Site contaminants to human receptors is unlikely, as contaminant sources will likely be removed during Site development, and if any residual contamination remains, engineering controls can be implemented. Regional groundwater is not used as a potable water source in New York City, so exposure to regional groundwater contaminants is unlikely.
- It is unlikely that a complete exposure pathway exists for the migration of Site contaminants to off-Site human receptors for current, construction/remediation phase, or future conditions. Monitoring and control measures would be used during investigation and construction to prevent completion of this pathway. Under future conditions, the Site will be remediated, and engineering controls may be implemented.

2.10 REMEDIAL ACTION OBJECTIVES

The following Remedial Action Objectives (RAO) have been identified for the Site.

2.10.1 Soil

RAOs for Public Health Protection:

- Prevent ingestion/direct contact with contaminated soil
- Prevent inhalation exposure to contaminates volatilizing from soil

RAOs for Environmental Protection:

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

2.10.2 Groundwater

RAOs for Public Health Protection:

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

RAOs for Environmental Protection:

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

2.10.3 Soil Vapor

RAOs for Public Health Protection:

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

3. Summary of Remedial Action

3.1 ALTERNATIVE I – TECHNICAL DESCRIPTION

Alternative I, a Conditional Track 2 remedy, will include the following tasks:

- Development and implementation of a Construction Health & Safety Plan (CHASP) and CAMP for the protection of on-Site workers, community/residents, and environment during remediation and construction activities.
- Design and construction of a support-of-excavation (SOE) system to facilitate the Track 2 remediation.
- Implementation of a Pre-Design Investigation (PDI) prior to mobilization for the RAWP.
- Implementation of soil erosion, pollution, and sediment control measures in compliance with applicable laws and regulations.
- Excavation, stockpiling, off-Site transport, and disposal of about 5,500 cubic yards of historic fill, solid waste, and native soil that exceeds RRSCOs as defined by 6 NYCRR Part 375-6.8. It is anticipated that excavation will extend to 35 feet bgs sitewide with additional hot spot excavation to approximately 45 to 50 feet bgs to be completed as necessary to achieve RRSCOs.
- If encountered, removal of underground storage tanks (USTs) and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) and decommissioning and off-Site disposal during redevelopment in accordance with DER-10, 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements.
- Screening for indications of contamination (by visual means, odor, and monitoring PIDs) of excavated material during intrusive Site work.
- Dewatering, characterization, and treatment of water accumulated in excavations prior to discharge to a NYSDEC approved sewer/sanitary line (pending permits), or localized dewatering with containerization, classification and disposal at an approved receiving facility.
- Appropriate off-Site disposal of material removed from the Site in accordance with federal, state, and local rules and regulations for handling, transport, and disposal.
- Backfilling of excavated areas, as necessary for development, with imported material that meets UUSCOs.
- Construction of a composite cover system consisting of minimum of 6 inches of subbase (recycled concrete aggregate [RCA]) overlain by a 16-inch concrete slab and installation of a waterproofing/vapor barrier that will exceed the expectations of a 20-mil vapor barrier (as per NYC Building Code) and will reduce the potential for a soil vapor exposure pathway.
- Collection and analysis of documentation soil samples in accordance with DER-10 to confirm a Track 2 remedy was achieved; over-excavation will be completed as necessary to meet RRSCOs.
- Installation of two additional post-remedy permanent monitoring wells in the source area and at the downgradient Site boundary. This will be in addition to preserving MW-04 and MW-01 and the two wells currently offsite. If wells cannot be preserved, then they will be reinstalled.

- Quarterly collection and analysis of groundwater samples for VOCs in accordance with DER-10 for one-year following remedial excavation activities to document groundwater quality beneath the Site.
- Completion of a SVI evaluation to assess indoor air quality in accordance with DER-10 and NYSDOH Final Guidance on Soil Vapor Intrusion following remedial excavation activities and prior to occupancy. A SVI WP will be provided to the NYSDEC and NYSDOH for review and approval prior to commencing the SVI evaluation. Formal request for access letters will be transmitted via certified mail to adjacent offsite properties requesting access to perform a SVI evaluation.

The Alternative I remediation extent is shown on Figure 6. The requirements for each of the Alternative I tasks are described below.

On-Site Worker, Public Health, and Environmental Protection

A site-specific CHASP is appended to this RAWP (Appendix B) and will be implemented during excavation and foundation construction to protect Site workers from accidents and acute and chronic exposures to the identified contaminants of concern. Public health will be protected by implementing and enforcing dust, odor, and organic vapor control and monitoring procedures included in the CAMP (Appendix C). The CAMP will include continuous perimeter monitoring of dust and organic vapor using TSI DustTrak Environmental Monitor (DustTrak) aerosol monitors and PIDs capable of recording data and calculating 15-minute averages. Field personnel will monitor site perimeters for visible dust and odors.

Fill and Soil Removal

VOCs, PAHs, PCBs metals, and pesticides were detected in historic fill and impacted material at concentrations that exceed the RRSCOs. To achieve Track 2, soil removal and disposal will extend from surface grade to 35 feet bgs sitewide with additional source area excavation to approximately 45 to 50 feet bgs to be completed as necessary to achieve RRSCOs.

The estimated volume of material requiring removal and off-Site disposal for a Track 2 cleanup is about 5,500 cubic yards. The soil will be screened for visual, olfactory, and instrumental evidence of environmental impacts. Excavation is expected to extend below the water table during remedial excavation or construction; therefore, installation of a dewatering system or localized dewatering is anticipated.

UST Removal

If encountered, USTs and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) would be decommissioned in accordance with applicable NYSDEC tank closure requirements, including DER-10 Section 5.5 and 6 NYCRR Part 613.9, and NYSDEC CP-51. USTs and/or associated appurtenances would be registered and administratively closed with the NYSDEC Petroleum Bulk Storage (PBS) unit. Petroleum-impacted soil would be excavated and disposed of off-site at a permitted disposal facility in accordance with applicable regulations. Closure documentation, such as Contractor affidavits, bills of lading for sludge disposal, and tank disposal receipts, would be provided as appendices in the Final Engineering Report (FER).

Backfill

As required for construction purposes, the excavation will be backfilled with imported material meeting UUSCOs.

Fluids Management

Chlorinated VOCs were detected in groundwater at concentrations above the NYSDEC GWQS. The water table is encountered between 14 to 16 feet bgs across the Site. During excavation and installation of the foundation, groundwater management would be required to facilitate construction. The excavation will extend below the water table; therefore, the Contractor will implement appropriate measures to ensure that dewatering activities do not result in settling that may damage adjacent structures. An on-Site dewatering system may be installed to collect the groundwater seepage during the excavation, if required. Groundwater will be collected from within the active work area using sumps or trenches. Pumps will be used to convey collected groundwater from the collection point(s) to a temporary on-Site treatment and/or collection system. Groundwater discharge/disposal will be evaluated further and will be conducted by one of the below options.

NYCDEP Storm or Sanitary Line Discharge

Prior to mobilization to the Site, a representative groundwater sample will be collected from an existing on-Site groundwater observation well. The sample will be submitted to a NYSDOH Environmental Laboratory Approval Program (ELAP) accredited analytical laboratory, under proper chain of custody protocol, for analysis of the requirements set forth by the NYCDEP, Bureau of Wastewater Treatment, Wastewater Quality Control Application (WQCA). Samples will be submitted for the required analytical criteria for discharge above 10,000 gallons per day. Analytical results will be compared to the WQCA Table A – *Limitations for Effluent to Sanitary or Combined Sewers* criteria.

This data will be included in a detailed dewatering scheme, which will be submitted to the NYSDEC for approval, in order to apply for a groundwater discharge permit from the Lefrak Central Office of the Division of Permitting and Connections. No dewatering discharge will commence prior to city approval. Applicable permits will be obtained, and applicable rules and regulations will be followed to conduct dewatering and treatment.

The primary treatment will consist of a temporary holding tank for the settling of fines prior to additional water quality treatment. The system's treatment processes may include equalization, oil/water separation, filtration, and carbon adsorption as required by the permit prior to discharge. At the start-up of the system, the effluent water will be sampled for analysis of the NYCDEP sewer discharge parameters, if discharging to a NYCDEP sewer or sanitary line, in order to assess if the system is working. If there are exceedances of the NYCDEP criteria, the system will be taken off-line and adjusted to meet the discharge requirements. Once it is determined that the system meets the NYCDEP criteria, the system will be restarted, and effluent samples will be collected and analyzed as stipulated in the dewatering permit. Effluent waters will be containerized in the interim while awaiting analytical results.

Containerization and Disposal

Prior to mobilization, analytical data will be distributed to facilities capable of handling, treating, and/or disposing of groundwater representative of the Site. If supplemental data is needed, a representative groundwater sample will be collected from an existing on-Site groundwater observation well. The primary treatment will consist of a temporary holding tank for the settling of fines prior to offloading, transportation, and disposal.

Zero Valent Iron Permeable Reactive Barrier

A ZVI permeable reactive barrier (PRB) will be installed from 15 to 45 feet bgs along the south-southeastern boundary of the Site (Figure 7). This Task 2 remedy will treat approximately 1,600 square feet along the boundary of the Site. The injections will be conducted via direct push injection and will include the introduction of ZVI and an electron donor. Using an approximately 7.5-foot radius of influence (ROI), 10 injection points will be needed for the PRB construction. The remedy will include the injection of up to 6,000 pounds of ZVI and 2,000 pounds of an electron donor such as sodium lactate or emulsified vegetable oil.

The ZVI amount is calculated based on an estimated rate constant 0.1 day^{-1}, or approximately 0.01 L/g*day based on a microscale ZVI particle[1]. Studies of various ZVI particle size and contaminants have been conducted over the last several decades to estimate rate constants and can be used to approximate reductant demand. Based on the present contaminants, the groundwater flow, and the particle size of ZVI, a dosing of approximately 25 g/L has been calculated to complete the injected ZVI barrier. The ZVI proposed for this project is a small particle size, micron ranged ZVI in the range of 25 microns in diameter. Radius of influence is estimated at 7.5 feet to create the PRB, with overlapping, offset injection points. A larger than 7.5 feet ROI is expected at the Site, however, the points are structured to allow for overlap and the creation of the barrier.

The remedy will address contamination from 15-45 feet bgs through the reaction of ZVI and the contaminant via surface area mediated reactions. The redox stoichiometry with PCE is shown in the equation below:

$$4Fe^0 + C_2Cl_4 + 4H^+ + 8e^- \rightarrow 4Fe^{2+} + 8e^- + C_2H_4 + 4Cl^-$$

The target treatment zone will treat impacted groundwater that flows through the barrier. Offsite monitoring will be pending installation of two post remediation wells on site in addition to preserving MW-01 and MW-04 during construction. If wells cannot be preserved during construction, they will be reinstalled once intrusive work is completed and prior to occupancy. Additionally, MW-06, located outside the building to the southeast, will also be utilized as a post remediation monitoring well.

Composite Cover System

A composite cover system will be installed, consisting of 4 inches of subbase (RCA) overlain by a 4-inch concrete slab and a waterproofing/vapor barrier system, which is a requirement of NYC Building Code) to reduce the potential for soil vapor intrusion (Appendix D).

Confirmation Soil Sampling

Per NYSDEC DER-10, confirmation soil samples will be collected from the excavation base at a frequency of one per 900 square feet. An estimated 6 base confirmation soil samples, plus quality assurance/ quality control (QA/QC) samples, would be collected and analyzed for the Part 375 list of VOCs, SVOCs, PCBs, pesticides, metals, PFAS, and 1,4-dioxane.

[1] Fan, D. et al. Sulfidation of Iron-Based Materials: A Review of Processes and Implications for Water Treatment and Remediation. *Environ. Sci. Technol.* 51, 13070–13085 (**2017**).

Post-Remedy Groundwater Sampling

Concentrations of chlorinated VOCs above the NYSDEC GWQS were identified in groundwater samples collected from all monitoring wells installed at the Site during the 2020 RI. These concentrations are likely attributed to historic operations formerly conducted at the Site. Following construction, two post-remedy permanent monitoring well clusters will be installed including one permanent monitoring well to be within the source area and one permanent monitoring well in the southeastern corner of the Site. Groundwater samples will be collected from each well as well as the two offsite well clusters for VOC analyses to document residual groundwater quality at the Site. An estimated four groundwater samples, plus QA/QC samples, would be collected and analyzed for on a quarterly basis after completion of the remedial action. Pending analytical results achieving NYSDEC GWQS, a Track 2 remedy would be achieved.

Post-Remedy Soil Vapor Intrusion Evaluation

Following remedial actions and prior to occupancy, a SVI evaluation to assess indoor air quality in accordance with DER-10 and NYSDOH Final Guidance on Soil Vapor Intrusion will be conducted at the site and submitted to NYSDEC and NYSDOH. A SVI WP will be provided to the NYSDEC and NYSDOH for review and approval prior to commencing the SVI evaluation.

Formal request for access letters will be transmitted via certified mail to adjacent offsite properties requesting access to perform a SVI evaluation. The following properties will be l sent letters:

- Block 1716, Lot 18
- Block 1717, Lot 26
- Block 1717, Lot 29
- Block 177, Lot 6
- Block 1717, Lot 31
- Block 1717, Lot 34

3.2 ALTERNATIVE II – TECHNICAL DESCRIPTION

Alternative II, a Conditional Track 4 remedy, will include the following tasks:

- Development and implementation of a CHASP and CAMP for the protection of on-Site workers, community/residents, and environment during remediation and construction activities.
- Design and construction of a SOE system to facilitate the Track 4 remediation.
- Implementation of a PDI prior to mobilization for the RAWP.
- Implementation of soil erosion, pollution, and sediment control measures in compliance with applicable laws and regulations.
- Excavation, stockpiling, off-Site transport, and disposal of about 1,100 cubic yards of historic fill, solid waste, and native soil that exceeds CSCOs as defined in Table 3. It is anticipated that excavation will extend to 5 feet bgs sitewide with additional excavation to 13 feet bgs in the source area.
- If encountered, removal of USTs and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) and decommissioning and off-Site disposal during redevelopment in

accordance with DER-10, 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements.

- Screening for indications of contamination (by visual means, odor, and monitoring PIDs) of excavated material during intrusive Site work.
- Localized dewatering, characterization, and treatment of water accumulated in excavations prior to discharge to a NYSDEC approved sewer/sanitary line (pending permits), or localized dewatering with containerization, classification and disposal at an approved receiving facility.
- Appropriate off-Site disposal of material removed from the Site in accordance with federal, state, and local rules and regulations for handling, transport, and disposal.
- Backfilling of excavated areas, as necessary for development, with imported material that meets UUSCOs.
- Installation, operation and monitoring of a SSDS to mitigate potential exposures related to soil vapor intrusion.
- Installation, operation and monitoring of a soil vapor extraction (SVE) system to treat unsaturated zone in the source area.
- Injection of ZVI from 15 to 45 feet bgs in the center of the Site to treat saturated zone in the source area.
- Injection of ZVI from 15 to 45 feet bgs to create a PRB along the south-southeastern boundary of the Site to mitigate the off-site migration of the dissolved phase shallow groundwater plume.
- Construction of a composite cover system consisting of a minimum of 6 inches of subbase (RCA) overlain by a 16-inch concrete slab and installation of a waterproofing/vapor barrier, which is a requirement of the NYC Building Code.
- Collection and analysis of documentation soil samples in accordance with DER-10 to confirm a Track 4 remedy was achieved; over-excavation will be completed as necessary to meet CSCOs.
- Installation of two additional post-remedy permanent monitoring wells in the source area and at the downgradient Site boundary. This will be in addition to preserving MW-04, MW-02 and MW-01 as well as MW-06, MW-07 and newly proposed offsite wells to the northeast and southeast of the Site.
- Quarterly collection and analysis of groundwater samples for VOCs in accordance with DER-10 for one-year following remedial excavation activities to document groundwater quality beneath the Site. Offsite groundwater monitoring wells will be monitored for monitored natural attenuation.
- Completion of a SVI evaluation to assess indoor air quality in accordance with DER-10 and NYSDOH Final Guidance on Soil Vapor Intrusion following remedial excavation activities and prior to occupancy. A SVI WP will be provided to the NYSDEC and NYSDOH for review and approval prior to commencing the SVI evaluation. Formal request for access letters will be transmitted via certified mail to adjacent offsite properties requesting access to perform a SVI evaluation. Formal request for access letters will be transmitted via certified mail to adjacent offsite properties requesting access to perform a SVI evaluation.

The Alternative II remediation extent is shown on Figure 8. The requirements for each of the Alternative II tasks are described below.

On-Site Worker, Public Health, and Environmental Protection

A site-specific CHASP is appended to this RAWP (Appendix B) and will be implemented during excavation and foundation construction to protect Site workers from accidents and acute and chronic exposures to the identified contaminants of concern. Public health will be protected by implementing and enforcing dust, odor, and organic vapor control and monitoring procedures included in the CAMP. The CAMP will include continuous perimeter monitoring of dust and organic vapor using DustTrak aerosol monitors and PIDs capable of recording data and calculating 15-minute averages. Field personnel will monitor site perimeters for visible dust and odors.

Fill and Soil Removal

To achieve Track 4, soil removal and disposal will extend from surface grade to 2 feet bgs sitewide with additional source area excavation to approximately 10 feet bgs as shown on Figure 8.

The estimated volume of material requiring removal and off-Site disposal for a Track 4 cleanup is about 600 cubic yards. The soil will be screened for visual, olfactory, and instrumental evidence of environmental impacts. Excavation is expected to extend below the water table during remedial excavation or construction; therefore, installation of a dewatering system or localized dewatering is anticipated.

UST Removal

If encountered, USTs and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) would be decommissioned in accordance with applicable NYSDEC tank closure requirements, including DER-10 Section 5.5 and 6 NYCRR Part 613.9, and NYSDEC CP-51. USTs and/or associated appurtenances would be registered and administratively closed with the NYSDEC PBS unit. Petroleum-impacted soil would be excavated and disposed of off-site at a permitted disposal facility in accordance with applicable regulations. Closure documentation, such as Contractor affidavits, bills of lading for sludge disposal, and tank disposal receipts, would be provided as appendices in the FER.

Backfill

As required for construction purposes, the excavation will be backfilled with imported material meeting UUSCOs.

Fluids Management

Chlorinated VOCs were detected in groundwater at concentrations above the NYSDEC GWQS. The water table is encountered between 14 to 16 feet bgs across the Site. During excavation and installation of the foundation, groundwater management would not be required to facilitate construction based on proposed excavation depths.

Containerization and Disposal

Prior to mobilization, analytical data will be distributed to facilities capable of handling, treating, and/or disposing of groundwater representative of the Site. If supplemental data is needed, a representative groundwater sample will be collected from an existing on-Site groundwater observation well. The primary treatment will consist of a temporary holding tank for the settling of fines prior to offloading, transportation, and disposal.

Sub-slab Depressurization System

Historical soil vapor data is provided in Figure 10. A SSDS will be installed under the entire foundation of the Site as shown in Figure 11. The SSDS will consist of 3-inch, sock-wrapped, perforated ADS polyethylene piping installed within the gravel subbase to the concrete slab and vapor barrier. There will be SSDS piping will be installed under the first floor concrete slab and under the basement concrete slab. There will be two SSDS fans installed in the basement. Each blower will be connected to the lower and upper piping. The piping under the first floor will enter the basement area through two sealed penetrations in the basement concrete wall. The piping under the basement concrete slab will enter the basement through two sealed penetrations in the concrete slab floor. Details of the pipe penetrations are shown in Figure 12. The piping in the basement will be manifolded together and connected to the fans. The fans will be discharge above the roof line via solid schedule 40 PVC piping.

The estimated volume of sub-slab soil gas is approximately 30,300 cubic feet, assuming a soil gas porosity of 30% with dimension of 2,200 square feet and 12 feet depth for the soil under the first floor and 1,300 square feet and 3 feet depth for the soil under the basement floor. Assuming SSDS blowers will be sized to remove between one to five pore volumes per day, the desired flow rate will be 20 to 100 cubic feet per minute (cfm). Therefore, each of the blowers should be capable of removing at 10 to 50 cfm of soil vapor from the sub-slab. A demonstration test will be performed upon when the installation of the sub-slab piping and concrete floors and walls. The demonstration test will be used to determine the vacuum required to achieve the desired flow rates.

Confirmation of the SSDS system influence will be determined by measuring vacuum in five newly installed vapor monitoring points. The proposed locations of the vapor monitoring points are shown in Figure 11. The vapor monitoring point assembly will be installed in a sealed 2-inch penetration in the concrete floor. The vapor monitoring point assembly will consist of a ¼-inch diameter, 3-inch long stainless steel mesh screen installed within the sub-slab gravel. The stainless steel screen will be connected to a ¼-inch stainless steel tube with a ¼-inch compression fitting/connect installed at the top. The top will be sealed with a 2-inch flush mounted locking cap. The soil vapor monitoring point assembly will fit within the 2-inch penetration with grout, or equivalent system, to seal the sub-slab from the above slab. The details of the soil vapor monitoring point are shown in Figure 12.

Soil Vapor Extraction System

A SVE system (see Figure 11) will be installed throughout the unsaturated soil on Site not included in the excavation element. Using the SVE Pilot Study performed at 11 Spencer Street as guidance, the vapor extraction point (VEP) would have a 22-foot radius of influence (ROI) based on a vacuum of 60 in H20 and a flow rate of 12.5 cubic feet per minute (cfm). Based on an assumed 20-foot ROI, four VEPs will be required to cover the area (Figure 11). VEPs will be installed in the non-excavated area and will be screened from 5 to 10 feet bgs. The VEPs will be 4-inch diameter, schedule 40 PVC and have 0.010-inch slot screens (see Figure 12). Each VEP will be plumed to a four-inch header pipe that will be connected to the SVE blower. The header pipe will be sloped such that any condensate in the lines will drain back to the VEPs.

The SVE blower will be sized to provide an air flow of 113 cfm at an applied vacuum of 69 in H20. The extraction points will be valved independently. An air-water separator will be used to separate

condensate from the vapor stream. The extracted water will be pumped from the separator to a tank. Any collected water will be analyzed for VOCs for disposal.

Off-gas from the SVE blower will be treated with two granular activated carbon in drums.

A process and instrumentation diagram is shown in Figure 12B.

Confirmation of the SVE system influence will be determined by measuring vacuum in existing and newly installed monitoring wells to be installed within the building footprint. There will be a total of four monitoring points (i.e., wells) to measure vacuum induced by the SVE system. The proposed locations of these monitoring points are shown in Figure 11.

Zero Valent Iron Source Treatment

The source area will be treated via direct push ZVI and electron donor injections from 15 to 45 feet bgs, with secondary elevated concentrations being treated via ZVI and an electron donor from 15 to 45 feet bgs as shown in Figure 13. These two treatment areas will address shallow, intermediate, and deeper impacts. The residual source treatment area will treat approximately 1,000 square feet within the area of highest concentration. Using an approximately 10-foot radius of influence, 4 injection points will be needed for the source area treatment that will treat the 15 to 45 feet bgs impacts. The remedy will include the injection of up to 4,000 pounds of ZVI and 2,000 pounds of an electron donor such as sodium lactate or emulsified vegetable oil.

The elevated source treatment area will treat approximately 1,000 square feet within the area of elevated CVOC concentrations. Using an approximately 10-foot radius of influence, 4 injection points will be needed for the elevated source area treatment. The remedy will include the injection of up to 2,000 pounds of ZVI and 2,000 pounds of an electron donor such as sodium lactate or emulsified vegetable oil.

The ZVI amount is calculated based on an estimated rate constant 0.1 day^{-1}, or approximately 0.01 L/g*day based on a microscale ZVI particle[2]. Studies of various ZVI particle size and contaminants have been conducted over the last several decades to estimate rate constants and can be used to approximate reductant demand. Based on the present contaminants, the groundwater flow, and the particle size of ZVI, a dosing of approximately 25 g/L has been calculated to complete the injected ZVI barrier and 15 g/L within the source area treatment zone. The ZVI proposed for this project is a small particle size, micron ranged ZVI in the range of 25 microns in diameter.

The remedy will address contamination from 15 to 45 feet bgs through the reaction of ZVI and the contaminant via surface area mediated reactions. The redox stoichiometry with PCE is shown in the equation below:

$$4Fe^0 + C_2Cl_4 + 4H^+ + 8e^- \rightarrow 4Fe^{2+} + 8e^- + C_2H_4 + 4Cl^-$$

The target treatment zone will treat impacted groundwater that flows through the barrier and within the source area. Offsite monitoring will be pending installation of two post remediation wells on site in addition to preserving MW-01 and MW-04 during construction. If wells cannot be preserved during

[2] Fan, D. et al. Sulfidation of Iron-Based Materials: A Review of Processes and Implications for Water Treatment and Remediation. *Environ. Sci. Technol.* 51, 13070–13085 (**2017**).

construction, they will be reinstalled once intrusive work is completed and prior to occupancy. Additionally, MW-06 and MW-07, located outside the building to the southeast, will also be utilized as a post remediation monitoring well. Figure 14 shows proposed areas for post remedial monitoring well locations. Residual contamination in groundwater will be monitored for natural attenuation.

Zero Valent Iron Permeable Reactive Barrier

A ZVI PRB will be installed from 15 to 45 feet bgs along the south-southeastern boundary of the Site (Figure 7). This remedy will treat approximately 1,600 square feet along the boundary of the Site. The injections will be conducted via direct push injection and will include the introduction of ZVI and an electron donor. Using an approximately 7.5-foot radius of influence, 10 injection points will be needed for the PRB construction. The remedy will include the injection of up to 6,000 pounds of ZVI and 2,000 pounds of an electron donor such as sodium lactate or emulsified vegetable oil.

Composite Cover System

A composite cover system will be installed, consisting of 6 inches of subbase (RCA) overlain by a 16-inch concrete slab and a waterproofing/vapor barrier system or equivalent that will exceed the performance expectations of a 20-mil vapor barrier (which is a requirement of NYC Building Code). The composite cover system will be installed over the entire building footprint.

Documentation Soil Sampling

Per NYSDEC DER-10, documentation soil samples will be collected from the excavation base at a frequency of one per 900 square feet. An estimated 6 base documentation soil samples, plus QA/QC sample and analyzed for the Part 375 list of VOCs, PCBs, metals and PFAS.

Post-Remedy Groundwater Sampling

Concentrations of chlorinated VOCs above the NYSDEC GWQS were identified in groundwater samples collected from all monitoring wells installed at the Site during the 2020 RI. These concentrations are likely attributed to historic operations formerly conducted at the Site. Following construction, two post-remedy permanent monitoring well clusters will be installed including one permanent monitoring well to be within the source area and one permanent monitoring well in the southeastern corner of the Site. Groundwater samples will be collected from each well as well as the two offsite well clusters for VOC analyses to document residual groundwater quality at the Site. An estimated four groundwater samples, plus QA/QC samples, would be collected and analyzed for on a quarterly basis after completion of the remedial action. Pending analytical results achieving NYSDEC GWQS, a Track 4 remedy would be achieved.

Post-Remedy Soil Vapor Intrusion Evaluation

Formal request for access letters will be transmitted via certified mail to adjacent offsite properties requesting access to perform a SVI evaluation. The following properties will be l sent letters:

- Block 1716, Lot 18
- Block 1717, Lot 26
- Block 1717, Lot 29
- Block 177, Lot 6
- Block 1717, Lot 31
- Block 1717, Lot 34

3.3 EVALUATION OF REMEDIAL ALTERNATIVES

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

- Protection of human health and the environment
- Compliance with standards, criteria, and guidance
- Short-term effectiveness and impacts
- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, or volume of contaminated material
- Implementability
- Cost-effectiveness
- Community acceptance
- Land use

3.3.1 Compliance with Standards, Criteria, and Guidance

Both alternatives will be in compliance with applicable standards, criteria, and guidance listed in Section 4.1 by remediating site sources of contamination to achieve the RAOs. While implementing either remedy, protection of public health and the environment will be maintained by enforcing a Site-specific CHASP and CAMP. Occupational Safety and Health Administration (OSHA) requirements for on-site construction safety will be followed by Site contractors performing work.

3.3.2 Short-Term Effectiveness and Impacts

Alternative I – The most significant short-term adverse impacts and risks to the community will be the potential complications and risk involved with designing and constructing SOE and underpinning for the building and structures adjoining the site. Potential impositions on roadway and pedestrian traffic associated with construction may be a result of the remedial excavation to achieve a Track 2 cleanup. Increased truck traffic and construction-related noise levels may be necessary to haul out soil that exceeds RRSCOs to achieve Track 2 standards, relative to Alternative II.

The excavated soil and fill would require about 275, 20-cubic yard truck trips. Implementing the Alternative I concept would require demolition of the existing building and approximately four months of effort (assuming normal work hours). Truck traffic will be routed on the most direct course using major thoroughfares where possible, and flaggers will be used to protect pedestrians at site entrances and exits. Waiting times associated with analysis of confirmation sampling and resampling may delay construction, leaving soil exposed for a longer time resulting in a potential increase in dust, odors, and/or organic vapor from the excavation and construction-related noise. The effects of these potential adverse impacts to the community, workers, and the environment will be minimized by implementing the respective control plans.

Alternative II – Alternative II will result in similar, if not the same, short-term adverse impacts and risks to the community. The excavated soil and fill would require approximately 55, 20-cubic-yard truck trips. Implementing the Alternative II concept would require approximately two months of effort (assuming

normal work hours). Excavation efforts would require Level B personal protective equipment as well as a ventilation system to treat off gassing.

Under both remedial alternatives, dust will be controlled by the on-site application of water spray as needed. Engineering controls, such as slowing the pace of work, applying foam and/or dust suppressant, and/or covering portions of the excavation will be used to suppress odors/dust when required. Work will be modified or stopped according to the action levels defined in the CAMP. Therefore, short-term impacts are similar for both alternatives.

3.3.3 Long-Term Effectiveness and Performance

Both remedial alternatives will remove contaminated media from the site exceeding RRSCOs (Alternative I) or CSCOs (Alternative II) for soil. Post-construction SVI evaluation would be implemented to confirm that vapor intrusion into the on-site building is not a concern for Alternative I and a SSDS would be operational under Alternative II.

For Alternative I, a conditional Track 2 remedy would be achieved pending post remedial action groundwater sampling within the source area and downgradient. The ZVI boundary feature would be installed to address and remediate impacts from upgradient sources migrating with groundwater flow to the south-southeast.

For Alternative II, engineering and institutional controls will be in place for long-term protection of human health and the environment. In addition, groundwater in New York City is not used for drinking water. Therefore, the long-term effectiveness of this remedy would eliminate risks and satisfy the objectives of the Alternative I and II criterion.

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

Alternative I would reduce most, if not all, of the volume of soil and groundwater contamination through removal of contaminated fill and buried solid waste through excavation. The excavated soil toxicity and/or mobility would also be reduced depending on the off-site disposal or treatment method (e.g., landfilling, thermal treatment).

Alternative II would reduce a majority of the volume of soil contamination through removal of contaminated fill and buried solid waste through excavation and off-Site disposal. The excavated soil toxicity and/or mobility would also be reduced depending on the off-site disposal or treatment method (e.g., landfilling, thermal treatment). The saturated soils and groundwater would have a reduction in toxicity and volume through the ZVI injections in the source area and reduce the mobility, toxicity through the ZVI PRB.

3.3.5 Implementability

Alternative I – Implementing a Track 2 remedy will be technically challenging due to development plans requiring the retention of the existing structure. SOE requirements associated with the extensive depth of excavation required and the protection of the neighboring buildings and streets while retaining the existing building would not be practical. It is expected this alternative would require schedule extensions or additional costs associated with the excavation and SOE. Additional coordination between trades may be required. This alternative is not considered feasible.

Alternative II – The technical feasibility of implementing the Alternative II remedy to achieve the Track 4 CSCOs will be technically challenging because of SOE requirements associated with protection of the neighboring buildings and streets; however, the SOE hardship is not significant as it will not extend beyond that which is required for construction. This remedy will consist primarily of excavation with standard bucket excavators as well as installation of engineering controls including the ZVI injections and SSDS/SVE system. The availability of local contractors, personnel, and equipment suitable to working in a structurally challenging environment is high due to the frequency of this type of remediation in the region. It is not expected to require schedule extensions or additional costs associated with the excavation and SOE. However, if deeper contamination above CSCOs is encountered requiring unanticipated over-excavation, the cost is marginal compared to the benefit of achieving an unrestricted use remediation and elimination of long-term engineering and institutional controls. Additional coordination between trades may be required. This alternative is considered feasible.

3.3.6 Cost Effectiveness

Alternative I – Based on the assumptions detailed for Alternative I, the estimated remediation cost of a Track 2 cleanup is approximately $7.0 million. Because the Site will be remediated to achieve a conditional Track 2 Remedy, there will semi long-term monitoring costs associated with the groundwater monitoring program required post remedy. Table 1 details the individual cost components used to arrive at this cost estimate.

Alternative II – Based on the assumptions detailed for Alternative II, the estimated remediation cost to achieve a Track 4 cleanup is approximately $1.9 million. There will be long-term operations, maintenance and monitoring costs associated with engineering control operational at the Site post remedy. Alternative II is more cost-effective as Alternative I requires extensive excavation. Table 2 outlines the individual cost-components used to arrive at this cost estimate.

3.3.7 Community Acceptance

Both remedial alternatives should be acceptable to the community because the potential exposure pathways to on-Site contamination will be addressed upon completion of the respective remedies and the Site will be remediated to allow for a higher-level use. However, Alternative II would be preferable due to less disruption to the neighboring properties when compared with the challenges facing the SOE design associated with Alternative I. The selected remedy will be subject to a 45-day public comment period in accordance with the Citizen Participation Plan (CPP), included as Appendix E. Substantive public comments will be addressed before the remedy is approved.

3.3.8 Land Use

The current, intended, and reasonably anticipated future commercial community facility land use of the Site and its surroundings are compatible with both remedial alternatives. The proposed development will include construction of a four-story mixed-use commercial community facility. Mid-rise mixed-use commercial/residential and light industrial buildings are located at properties surrounding the Site.

3.4 SELECTION OF THE PREFERRED REMEDY

Both alternatives will be protective of human health and the environment and meet the remedy selection criteria. Alternative I is more effective in the long-term because it achieves unrestricted land use that is free of long-term site management, institutional controls, an EE, and associated future costs that would be required under Alternative II. However, excavation depths associated with Alternative I would require disposal of over nine times the amount of fill and soil and will produce much higher remedial costs. Alternative II achieves the remedial action goals established for the redevelopment project and is effective in the short and long term while avoiding excessive disruption to the surrounding properties and receptors that would be associated with such an extensive excavation as included in Alternative I. Alternative II is preferred over Alternative I if it can be feasibly and practically implemented while providing greater overall protection to human health and the environment. Therefore, Alternative II is the recommended remedial alternative for this Site.

3.4.1 Zoning

The land is currently zoned as R7A for "medium-density apartment house districts". The reasonably anticipated future use conforms to applicable zoning laws and maps.

3.4.2 Applicable Comprehensive Community Master Plans or Land Use Plans

According to the New York City Planning Commission, "R7 districts are medium-density apartment house districts mapped in much of the Bronx as well as the Upper West Side in Manhattan and Brighton Beach in Brooklyn. The height factor regulations for R7 districts encourage lower apartment buildings on smaller zoning lots and, on larger lots, taller buildings with less lot coverage." The Site is not located in a special use district. A copy of the zoning map is included in Appendix F.

3.4.3 Surrounding Property Uses

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

3.4.4 Citizen Participation

A CPP was developed for the Site and is provided in Appendix E. In accordance with the CPP, the BCP application was made available for public review and comment. The SRIR and RAWP Factsheets have and will continue to be distributed to the contact list in the approved CPP.

3.4.5 Environmental Justice Concerns

Per the "Potential Environmental Justice Areas in Northern Brooklyn, Kings County, New York". The Site is in a potential Environmental Justice area. NYSDEC's Office of Environmental Justice acts as an advocate on behalf of these areas, which are disproportionately affected by environmental burdens.

3.4.6 Land Use Designations

There are no federal or state land use designations.

3.4.7 Population Growth Patterns

The population growth patterns and projections support the current and anticipated future land use.

3.4.8 Accessibility to Existing Infrastructure

The Site is accessible to existing infrastructure.

3.4.9 Proximity to Cultural Resources

The Site is not in close proximity to a registered landmark.

3.4.10 Proximity to Natural Resources

The Site is not located in close proximity to important federal, state, or local natural resources including waterways, wildlife refuges, wetlands, and critical habitats of endangered or threatened species. The nearest ecological receptor is Newtown Creek, which is located about 1 mile to the east-northeast.

3.4.11 Off-Site Groundwater Impacts

As a participant in the BCP an investigation of offsite impacts was required and conducted in April 2021. Based on the analytical results of the Offsite Investigation, CVOC contamination is present in groundwater offsite with concentrations decreasing with distance from the Site. Results from the monitoring well cluster MW06, located on the western sidewalk most proximal to the Site, show lowered concentrations of CVOCs than concentrations present at the Site. At MW06 the highest concentrations of CVOCs and daughter products are observed at the shallow and intermediate depths. Concentrations of CVOCs are decreased in MW07 resulting in only PCE and TCE present above AWQS with all daughter products absent.

Additionally, several petroleum related VOCs are present at concentrations above the AWQS in the MW07 well cluster. Since petroleum related VOCs are present in MW07 but not MW06 or on the Site in significant measure this indicates that there is likely an offsite source of petroleum related impacts possibly from the other historical industrial and manufacturing facilities currently and formerly operating in the area.

3.4.12 Proximity to Floodplains

According to the Federal Emergency Management Agency Preliminary Flood Insurance Rate Map dated 5 September 2007 (Map Number 3604970204F), the Site is located in Zone X, which is designated for areas of 0.2 percent annual chance of flood; areas of one percent annual chance of flood with average depths of less than one foot or with drainage areas less than one square mile; and areas protected by levees from one percent annual chance of flood.

3.4.13 Geography, Geology and Hydrogeology of the Site

The Site's elevation ranges from 16 to 17 feet above sea level, and the depth to bedrock is greater than 100 feet. The Site's stratigraphy, from the surface down, consists of historical fill material to depths as

great as 4 to 5 feet, underlain by 14 to 15 feet of brown fine- to coarse-grained sand with silt. A brown silty clay layer was encountered at approximately 30 feet bgs, where the stratigraphy changes to a light brown to brown, medium- to coarse-grained sand with cobbles extending to at least 45 feet bgs. Depth to groundwater ranges from 14 to 15 feet bgs, and groundwater beneath the Site is generally to the south-southeast.

3.4.14 Current Institutional Controls

There are currently no institutional controls being implemented at the Site.

3.5 SUMMARY OF THE SELECTED REMEDIAL ACTION

The selected Track 4 (Alternative II) remedy will include the following:

- Development and implementation of a CHASP and CAMP for the protection of on-Site workers, community/residents, and environment during remediation and construction activities.
- Design and construction of a SOE system to facilitate the Track 4 remediation.
- Implementation of a PDI prior to mobilization for the RAWP.
- Implementation of soil erosion, pollution, and sediment control measures in compliance with applicable laws and regulations.
- Excavation, stockpiling, off-Site transport, and disposal of about 1,100 cubic yards of historic fill, solid waste, and native soil that exceeds CSCOs as defined in Table 3. It is anticipated that excavation will extend to 5 feet bgs sitewide with additional excavation to 13 feet bgs in the source area.
- If encountered, removal of USTs and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) and decommissioning and off-Site disposal during redevelopment in accordance with DER-10, 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements.
- Screening for indications of contamination (by visual means, odor, and monitoring PIDs) of excavated material during intrusive Site work.
- Localized dewatering, characterization, and treatment of water accumulated in excavations prior to discharge to a NYSDEC approved sewer/sanitary line (pending permits), or localized dewatering with containerization, classification and disposal at an approved receiving facility.
- Appropriate off-Site disposal of material removed from the Site in accordance with federal, state, and local rules and regulations for handling, transport, and disposal.
- Backfilling of excavated areas, as necessary for development, with imported material that meets UUSCOs. Backfill area shown in Figure 9.
- Installation, operation and monitoring of a SSDS to mitigate potential exposures related to soil vapor intrusion.
- Installation, operation and monitoring of a soil vapor extraction (SVE) system to treat unsaturated zone in the source area.
- Injection of ZVI from 15 to 45 feet bgs in the center of the Site to treat saturated zone in the source area.

- Injection of ZVI from 15 to 45 feet bgs to create a PRB along the south-southeastern boundary of the Site to mitigate the off-site migration of the dissolved phase shallow groundwater plume.
- Construction of a composite cover system consisting of a minimum of 6 inches of subbase (RCA) overlain by a 16-inch concrete slab and installation of a waterproofing/vapor barrier, which is a requirement of the NYC Building Code.
- Collection and analysis of documentation soil samples in accordance with DER-10 to confirm a Track 4 remedy was achieved; over-excavation will be completed as necessary to meet CSCOs.
- Installation of two additional post-remedy permanent monitoring wells in the source area and at the downgradient Site boundary. This will be in addition to preserving MW-04, MW-02 and MW-01 as well as MW-06 and a newly proposed offsite will to the northeast of the Site.
- Quarterly collection and analysis of groundwater samples for VOCs in accordance with DER-10 for one-year following remedial excavation activities to document groundwater quality beneath the Site. Offsite groundwater monitoring wells will be monitored for monitored natural attenuation.
- Completion of a SVI evaluation to assess indoor air quality in accordance with DER-10 and NYSDOH Final Guidance on Soil Vapor Intrusion following remedial excavation activities and prior to occupancy. A SVI WP will be provided to the NYSDEC and NYSDOH for review and approval prior to commencing the SVI evaluation. Formal request for access letters will be transmitted via certified mail to adjacent offsite properties requesting access to perform a SVI evaluation. Formal request for access letters will be transmitted via certified mail to adjacent offsite properties requesting access to perform a SVI evaluation.

Remedial activities will be performed in accordance with this RAWP and the Department-issued Decision Document under the oversight of a New York State-Licensed Professional Engineer. Deviations from the RAWP and/or Decision Document will be promptly reported to the NYSDEC for approval and explained in the FER.

4. Remedial Action Program

4.1 GOVERNING DOCUMENTS

The primary documents governing the remedial action are summarized in this section.

4.1.1 Standards, Criteria and Guidance

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

- 29 Code of Federal Regulations (CFR) Part 1910.120 – Hazardous Waste Operations and Emergency Response
- 6 NYCRR Part 371 – Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 372 – Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities
- 6 NYCRR Subpart 373-4 – Facility Standards for the Collection of Household Hazardous Waste and Hazardous Waste from Conditionally Exempt Small Quantity Generators
- 6 NYCRR Subpart 374-1 – Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
- 6 NYCRR Subpart 374-3 – Standards for Universal Waste
- 6 NYCRR Part 375 – Environmental Remediation Programs
- 6 NYCRR Part 376 – Land Disposal Restrictions
- 6 NYCRR Part 750 – State Pollutant Discharge Elimination System (SPDES) Permits
- CP-43 – Commissioner Policy on Groundwater Monitoring Well Decommissioning (December 2009)
- CP-51 – Soil Cleanup Guidance (2010)
- DER-10 – Technical Guidance for Site Investigation and Remediation (3 May 2010)
- DER-23 – Citizen Participation Handbook for Remedial Programs (March 2010)
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006)
- TOGS 1.1.1 – Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- Screening and Assessment of Contaminated Sediment (Division of Fish, Wildlife and Marine Resources, June 2014)

4.1.2 Site-Specific Construction Health & Safety Plan

A site-specific CHASP has been prepared (Appendix B). The CHASP will apply to remedial and construction-related work on Site. The CHASP provides a mechanism for establishing on-Site safe working conditions, safety organization, procedures, and PPE requirements during implementation of the remedy. The CHASP meets the requirements of 29 CFR 1910 and 29 CFR 1926 (which includes 29 CFR 1910.120 and 29 CFR 1926.65, respectively). The CHASP includes, but is not limited to, the following components:

- Organization and identification of key personnel
- Training requirements
- Medical surveillance requirements

- List of Site hazards
- Excavation safety
- Drill rig safety
- Work zone descriptions and monitoring procedures
- Personal safety equipment and PPE requirements (Level B)
- Decontamination requirements
- Standard operating procedures
- Contingency plan
- CAMP
- Safety data sheets

The Participant and associated parties preparing the remedial documents submitted to the State and those performing the construction work are responsible for the preparation of a CHASP and for performance of the work according to the CHASP and applicable laws. The CHASP and requirements defined in this RAWP pertain to remedial and ground-intrusive work performed at the Site until the issuance of a Certificate of Completion. The Site Safety Coordinator will be Brian Ferguson, a resume for whom is included in Appendix G. If required, confined space entry will comply with OSHA requirements to address the potential risk posed by combustible and toxic gasses.

4.1.3 Quality Assurance Project Plan

A Quality Assurance Project Plan (QAPP) has been prepared that describes the quality control components that will ensure that the proposed remedy accomplishes the remedial goals and RAOs and is completed in accordance with the design specifications. The QAPP is provided as Appendix H and includes:

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

4.1.4 Soil/Materials Management Plan

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

4.1.5 Stormwater Pollution Prevention Plan

Erosion and sediment controls will be implemented as necessary in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control. Best management practices for soil erosion and sediment control will be selected to minimize erosion and sedimentation off-Site from the onset of remediation to the completion of development. Stormwater pollution prevention will be implemented as described below in Section 5.4.9. A Stormwater Pollution Prevention

Plan is not necessary because the project will disturb less than one acre, and stormwater discharge will be to a combined sewer in accordance with the New York City generic SPDES permit.

4.1.6 Community Air Monitoring Program

Details of CAMP are discussed in section 5.4.11.

4.1.7 Contractors Site Operations Plan

The Resident Engineer (RE) will review plans and submittals for this remedial project, and Contractor and subcontractor document submittals, and will confirm that plans and submittals are in compliance with this RAWP. The RE is responsible to ensure that later document submittals for this remedial project, including Contractor and subcontractor document submittals, are in compliance with this RAWP. Remedial documents, including Contractor and subcontractor document submittals, will be submitted to the NYSDEC and NYSDOH in a timely manner and prior to the start of work associated with the remedial document.

4.1.8 Citizen Participation Plan

Document repositories were established at the following locations and contain the applicable project documents:

Brooklyn Public Library – Bushwick Branch
340 Bushwick Avenue
Brooklyn, NY 11206
718-602-1348

Brooklyn 3 Community Board
1360 Fulton Street Rm 202
Brooklyn, NY 11216
718-662-6601

4.2 GENERAL REMEDIAL CONSTRUCTION INFORMATION

4.2.1 Project Organization

A project team for the Site has been created based on qualifications and experience with personnel suited for successful completion of the project.

The following project personnel are anticipated for oversight of the RAWP implementation. Project personnel resumes are provided in Appendix G.

NYSDEC Case Manager	Aaron Fischer
NYSDOH Case Manager	Angela Martin
Remediation Engineer	Scott Underhill, P.E.
Principal	James Bellew
Project Manager/Qualified Environmental Professional	Mari Conlon, P.G.
Haley & Aldrich Health & Safety Director	Brian Fitzpatrick, CHMM
Health & Safety Officer	Brian Ferguson
Field Team Leader/Quality Assurance Officer	Zachary Simmel

Haley & Aldrich personnel, under the direct supervision of the Qualified Environmental Professional and the RE, will be on-Site during implementation of the RAWP to monitor particulates and organic vapor in

accordance with the CAMP. CAMP results that exceed specified action levels will be reported to the NYSDEC and NYSDOH.

Haley & Aldrich personnel will meet with the Construction Superintendent on a daily basis to discuss the plans for that day and schedule upcoming activities. Field personnel will document remedial activities. Field activities will be forwarded to the Field Team Leader and Project Manager on a daily basis and to the Qualified Environmental Professional and the RE on a weekly basis. Daily reports will also be submitted to the NYSDEC and NYSDOH case managers by noon the following business day.

Field personnel will screen excavations with a PID during ground-intrusive work. PID readings, including specifically elevated readings, will be recorded in the project field book (or on separate logs) and reported to the NYSDEC and NYSDOH. Field personnel under the direct supervision of the RE and Qualified Environmental Professional will collect confirmation samples from the base and sidewalls of the excavation in accordance with this RAWP.

Field observations and laboratory tests will be recorded in the project field book or on separate logs. Recorded field observations may take the form of notes, charts, sketches, and/or photographs. A photo log will be kept to document construction activities during remediation.

The Field Team Leader will maintain original field paperwork during performance of the remedy. Remedial activities will be documented in the monthly BCP progress reports. The Project Manager will maintain the field paperwork after completion and will maintain submittal document files.

4.2.2 Resident Engineer

The RE for this project will be Scott Underhill. The RE is a registered professional engineer licensed by the State of New York. The RE will have primary direct responsibility for implementation of the remedial program at the site. The RE will certify in the FER that the remedial activities were observed by qualified environmental professionals under her supervision and that the remediation requirements set forth in this RAWP and other relevant provisions of ECL 27-1419 have been achieved in substantial conformance with the RAWP.

Under direction of the RE, the work of other contractors and subcontractors involved in aspects of the remedial construction will be documented, including soil excavation, stockpiling, confirmation sample collection, air monitoring, emergency spill response services, import of backfill, and management of waste transport and disposal.

The RE will review the pre-remedial plans submitted by contractors and subcontractors for substantial conformance with this RAWP and will provide a certification in the FER. The RE will provide the certifications listed below in Section 8.1.

4.2.3 Remedial Action Construction Schedule

The remedial action construction schedule is discussed below in Section 9 and included in Appendix I. The NYSDEC will be promptly notified of proposed changes, delays, and/or deviations to the schedule.

4.2.4 Work Hours

The hours for operation of remedial construction will either conform to the requirements of the New York City Department of Buildings (NYCDOB) construction code or to a site-specific variance issued by the NYCDOB. The NYSDEC will be notified by the Participant of variances issued by the NYCDOB. The NYSDEC reserves the right to deny alternate remedial construction hours.

4.2.5 Site Security

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

4.2.6 Traffic Control

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

4.2.7 Contingency Plan

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

4.2.8 Discovery of Additional Contaminated Soil

During remediation and construction, soil will be continuously monitored by the RE's field representatives via visual, olfactory, and instrumental field screening techniques to identify additional soil that may not be suitable for disposal at the NYSDEC-approved disposal facility. If such soil is identified, the suspected impacts will be confirmed by collecting and analyzing samples in accordance with the NYSDEC-approved facility's requirements. If the previously approved facility is not permitted to receive the impacted soil, the soil will be excavated and disposed of off-Site at a permitted facility that can receive the material.

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

4.2.9 UST Discovery

Previous investigations did not identify presence of USTs on the Site. In the event a UST is discovered during excavation, it will be decommissioned as per the 6 NYCRR part 612.2 and 613.9 and DER-10 Section 5.5. After removal of the tank and residual contents, confirmatory post-excavation soil samples will be collected as outlined in DER-10 if deemed necessary by the NYSDEC and/or the RE. Post-excavation soil samples is not expected where the proposed excavation would extend below the UST,

unless visual, olfactory, or instrumental field screening techniques indicate the potential for contamination. If petroleum impacted soils are encountered, they will be segregated, characterized, and disposed of at an appropriate offsite facility. Closure documentation including affidavits, bills of lading, and tank disposal receipts will be included in the FER. If necessary, the NYSDEC petroleum bulk storage registration will be updated.

In the event USTs are encountered during ground-intrusive activities, the NYSDEC Project Manager will be promptly notified and pertinent information will be included in the monthly BCP progress report.

4.2.10 Worker Training and Monitoring

Worker training and monitoring will be conducted in accordance with the Site-specific CHASP.

4.2.11 Agency Approvals

Permits or government approvals required for remedial construction have been or will be obtained prior to the start of remedial construction.

4.2.12 Pre-Construction Meeting with the NYSDEC

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

4.2.13 Emergency Contact Information

An emergency contact sheet that states the specific project contacts (with names and phone numbers) for use by NYSDEC and NYSDOH in the case of an emergency is included in the CHASP.

4.2.14 Remedial Action Costs

A detailed summary of the total estimated costs of the Track 2 and Track 4 remedies are included in Tables 1 and 2, respectively.

4.3 DESIGN ELEMENTS

4.3.1 Pre-Design Investigation

To finalize the design work included in this RAWP additional investigation of offsite groundwater and soil vapor will be conducted prior to mobilization for the remediation action. The purpose of the PDI is to further characterize and delineate the offsite CVOC contamination downgradient from the Site. The PDI will include the following:

- Installation of one offsite permanent monitoring well cluster to the northeast of Site on the northern side of Walworth Street and to the southeast of the Site on Warsoff Street (proposed location shown on Figure 14).
- Completion of an offsite vapor intrusion evaluation at the neighboring properties.

Prior to mobilization, a public utility markout will be called in as required in New York State. Confirmation of markout will be obtained during a field check by the Site personnel at the start of the investigation. The NYSDEC will be notified 7-days prior to investigative activities.

Figure 14 shows locations of proposed offsite monitoring to be included in the PDI.

4.3.1.1 Pre-Design Offsite Groundwater Investigation

To evaluate the offsite groundwater impacts, Haley & Aldrich will oversee the installation of two additional permanent groundwater monitoring well clusters located east of the Site.

Two-inch (in.) permanent monitoring well clusters will be installed to the northeast and southeast of the Site as shown on Figure 14. The well cluster will be installed with a flush mount manhole cover and will be screened with 0.010-in. slotted PVC from bisecting the groundwater interface, 30 to 35 feet below grade surface (bgs), and 40 to 45 feet bgs. Annular space surrounding the screen will be filled with #0 or #00 Morie sand or equivalent placed to one foot above the screen interval. A one foot (minimum) of hydrated bentonite seal will be placed directly above the filter pack to isolate the sample interval. The well cluster will be installed with two inches of annular space surrounding the well casing. The remainder of the borehole will be grouted and the monitoring wells completed to grade.

Within 24 hours of installation, wells will be developed or pumped until the column of water in the well is free of visible sediment, and the pH, temperature, turbidity, and specific conductivity have stabilized. Development will be completed until the water turbidity is 50 nephelometric turbidity units (NTU) or less or 10 well volumes are removed, if possible. If 50 NTUs is not achieved and stabilized within the removal of the first 10 well volumes, NTUs must be stabilized for three consecutive readings. The well casings will be surveyed within 0.01-foot accuracy by a New York State licensed surveyor into the previously used datum for the onsite wells installed during the Supplemental Remedial Investigation.

Groundwater samples will be collected from newly installed wells and all the existing on-site and offsite wells under low flow/low stress sampling procedures. Wells will be purged at 100 milliliters per minute (mL/min) to a maximum of 500 mL/min. During purging, the water level will be monitored approximately every five minutes, or as appropriate. A steady flow rate will be maintained that results in drawdown of 0.3 ft or less. The rate of pumping will not exceed the natural flow rate conditions of the well.

During the purging of the well, field indicator parameters (pH, temperature, conductivity, oxidation-reduction (redox) reaction potential (ORP), dissolved oxygen (DO), and turbidity) will be monitored and recorded approximately every five minutes. Stabilization is considered to be achieved when the final groundwater flow rate is achieved, and three consecutive readings for each parameter are within the following limits:

- pH: 0.1 pH units of the average value of the three readings;
- Temperature: 3 percent of the average value of the three readings;
- Conductivity: 0.005 milliSiemen per centimeter (mS/cm) of the average value of the three readings for conductivity <1 mS/cm and 0.01 mS/cm of the average value of the three readings for conductivity >1 mS/cm;
- ORP: 10 millivolts (mV) of the average value of the three readings;
- DO: 10 percent of the average value of the three readings; and

- Turbidity: 10 percent of the average value of the three readings, or a final value of less than 50 nephelometric turbidity units (NTU).

Upon stabilization groundwater samples will be collected into laboratory provided bottle ware and kept on ice in coolers. Samples will be sent to Alpha Analytical Laboratories of Westborough, MA, a New York State ELAP certified environmental laboratory, under proper chain of custody protocol. Groundwater samples will be analyzed for the following parameters:

- TCL Volatile Organic Compounds (VOCs) using EPA method 8260;
- Polychlorinated Biphenyls (PCBs) using EPA Method 8280A;

4.3.1.2 Pre-Design Offsite Soil Vapor Intrusion Investigation

Haley & Aldrich will again contact owners of the following properties via certified mail for access to the facilities in order to complete a soil vapor intrusion (SVI) investigation:

- Block 1716, Lot 18
- Block 1717, Lot 26
- Block 1717, Lot 29
- Block 177, Lot 6
- Block 1717, Lot 31
- Block 1717, Lot 34

Haley & Aldrich will follow up with an in person inquiry during regular business hours. Copies of certified mailings and confirmation of in person inquiries will be provided to NYSDEC.

If granted access, a field survey / observation and the Indoor Air Quality Questionnaire and Building Inventory form will be performed and submitted to the NYSDEC and NYSDOH prior to SVI sampling. Multiple sub-slab and/or indoor air sampling locations may be required on the property to properly address potential soil vapor intrusion concerns. Final location(s) will be determined in coordination with NYSDEC and NYSDOH. Sample locations will be coordinated with property owners and operators but biased towards areas where occupants spend a majority of time (i.e. offices, operation areas, etc.). A majority of the building appears to be warehouse space with limited occupancy. Upon access to the Site, we will evaluate if an additional location should be evaluated, however, it is noted that the historic operations of this property may also be a contributor to any potential contamination encountered.

Samples will be collected in accordance with the Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH October 2006). A Sub-slab vapor probe will be installed to a depth of 2 in. beneath the existing building slab. The implant will be installed by drilling a ½ in. hole through the concrete slab with a handheld drill and then inserting a ¼ in. polyethylene tube. Seal integrity will be verified with a tracer gas (helium) test and one to three volumes of air will be purged from the implant prior to sample collection. Indoor air samples and an ambient air sample will be set at approximately 4-5 ft above grade in the breathing zone.

Samples will be collected in 2.7 liter Summa canisters that have been certified clean by the laboratory. Samples will be collected for a period of eight hours concurrently with an indoor air sample, as per the NYSDOH soil vapor intrusion guidance, and flow rate for both purging and sampling will not exceed 0.2 L/min. Field personnel will record Summa canister and flow controller identification numbers, sample

date, sample start time, sample start vacuum, sample end time and sample end vacuum. Sample end vacuum will be between 5 to 8 in. mercury.

Samples will be analyzed for VOCs using USEPA Method TO-15. Samples will be sent to Alpha Analytical Laboratories of Westborough, MA, a New York State ELAP certified environmental laboratory, under proper chain of custody protocol.

4.3.1.3 Health and Safety

The PDI will adhere to the site specific HASP developed for the Supplemental and Offsite Remedial Investigations.

4.3.1.4 Community Air Monitoring Plan

The PDI will adhere to the site specific CAMP developed for the Supplemental and Offsite Remedial Investigations.

4.3.1.5 Reporting

Daily reports will be submitted each day there is investigative activities completed as part of the PDI. Information to be included in the daily reports includes a Site figure, a description of Site activities, a photo log and CAMP data. Daily reports will be submitted the follow morning after Site work is completed.

A summary of the PDI will be provided to NYSDEC in a Pre-Design Investigation Report to be an addendum to the RAWP.

4.3.1.6 Quality Assurance and Quality Control

The PDI will follow procedures as outlines in the Quality Assurance Project Plan (QAPP) developed for the Supplemental and Offsite Remedial Investigations.

4.3.2 Mobilization

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

- Identifying the location of aboveground and underground utilities (e.g., power, gas, water, sewer, and telephone), equipment, and structures as necessary to implement remediation;
- Mobilizing necessary remediation personnel, equipment, and materials to the Site;
- Constructing one or more stabilized construction entrances consisting of non-hazardous material at or near the site exit, which takes into consideration the Site setting and Site perimeter;
- Constructing an equipment decontamination area for trucks, equipment, and personnel that come into contact with impacted materials during remediation; and

4.3.3 Monitoring Well Decommissioning

Monitoring wells will be decommissioned in accordance with NYSDEC CP-43 by an experience driller with oversight from Haley & Aldrich. Decommissioning documentation will be provided in the FER.

4.3.4 Erosion and Sedimentation Controls

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

4.3.5 Utility Marker and Easement Layouts

The Participant and its Contractors are solely responsible for the identification of utilities and/or easements that might be affected by work under this RAWP and implementation of the required, appropriate, or necessary health and safety measures during performance of the work under this RAWP. The Participant and its Contractors are solely responsible for safe execution of the work performed under this RAWP. The Participant and its Contractors must obtain the necessary local, state, and/or federal permits or approvals that may be required to perform the work detailed in this RAWP. Approval of this RAWP by the NYSDEC does not constitute satisfaction of these requirements.

4.3.6 Excavation Support

Appropriate management of the structural stability of on-site or off-site structures during site activities is the sole responsibility of the Participant and its Contractors. The Participant and its contractors are solely responsible for the safe execution of the work performed under this RAWP. The Participant and its Contractors must obtain the necessary local, state, and/or federal permits or approvals that may be required to perform the work detailed in this RAWP. Additionally, the Participant and its Contractors are solely responsible for the implementation of the required, appropriate, or necessary health and safety measures during performance of work conducted under this RAWP.

4.3.7 Equipment and Material Staging

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

4.3.8 Site Security

The Site will be secured at the building entrance with appropriate signage maintained by the Contractor. Access will be limited to authorized personnel and protect pedestrian from Site activities.

4.3.9 Fill and Soil Removal

To achieve Track 4, it is anticipated that excavation will extend to 5 feet bgs sitewide with additional excavation to 13 feet bgs in the source area..

The estimated volume of material requiring removal and off-Site disposal for a Track 4 cleanup is about 1,100 cubic yards. The soil will be screened for visual, olfactory, and instrumental evidence of environmental impacts. Excavation is expected to extend below the water table during remedial excavation or construction; therefore, installation of a dewatering system or localized dewatering is anticipated.

4.3.10 Sub-slab Depressurization System

Historical soil vapor data is provided in Figure 10. A SSDS will be installed under the entire foundation of the Site as shown in Figure 11. The SSDS will consist of 3-inch, sock-wrapped, perforated ADS polyethylene piping installed within the gravel subbase to the concrete slab and vapor barrier. There will be SSDS piping will be installed under the first floor concrete slab and under the basement concrete slab. There will be two SSDS fans installed in the basement. Each blower will be connected to the lower and upper piping. The piping under the first floor will enter the basement area through two sealed penetrations in the basement concrete wall. The piping under the basement concrete slab will enter the basement through two sealed penetrations in the concrete slab floor. Details of the pipe penetrations are shown in Figure 12. The piping in the basement will be manifolded together and connected to the fans. The fans will be discharge above the roof line via solid schedule 40 PVC piping.

The estimated volume of sub-slab soil gas is approximately 30,300 cubic feet, assuming a soil gas porosity of 30% with dimension of 2,200 square feet and 12 feet depth for the soil under the first floor and 1,300 square feet and 3 feet depth for the soil under the basement floor. Assuming SSDS blowers will be sized to remove between one to five pore volumes per day, the desired flow rate will be 20 to 100 cubic feet per minute (cfm). Therefore, each of the blowers should be capable of removing at 10 to 50 cfm of soil vapor from the sub-slab. A demonstration test will be performed upon when the installation of the sub-slab piping and concrete floors and walls. The demonstration test will be used to determine the vacuum required to achieve the desired flow rates.

Confirmation of the SSDS system influence will be determined by measuring vacuum in five newly installed vapor monitoring points. The proposed locations of the vapor monitoring points are shown in Figure 11. The vapor monitoring point assembly will be installed in a sealed 2-inch penetration in the concrete floor. The vapor monitoring point assembly will consist of a ¼-inch diameter, 3-inch long stainless steel mesh screen installed within the sub-slab gravel. The stainless steel screen will be connected to a ¼-inch stainless steel tube with a ¼-inch compression fitting/connect installed at the top. The top will be sealed with a 2-inch flush mounted locking cap. The soil vapor monitoring point assembly will fit within the 2-inch penetration with grout, or equivalent system, to seal the sub-slab from the above slab. The details of the soil vapor monitoring point are shown in Figure 12.

4.3.11 Soil Vapor Extraction System

A SVE system (see Figure 11) will be installed throughout the unsaturated soil on Site not included in the excavation element. Using the SVE Pilot Study performed at 11 Spencer Street as guidance, the vapor extraction point (VEP) would have a 22-foot radius of influence (ROI) based on a vacuum of 60 in H20

and a flow rate of 12.5 cubic feet per minute (cfm). Based on an assumed 20-foot ROI, four VEPs will be required to cover the area (Figure 11). VEPs will be installed in the non-excavated area and will be screened from 5 to 10 feet bgs. The VEPs will be 4-inch diameter, schedule 40 PVC and have 0.010-inch slot screens (see Figure 12). Each VEP will be plumed to a four-inch header pipe that will be connected to the SVE blower. The header pipe will be sloped such that any condensate in the lines will drain back to the VEPs.

The SVE blower will be sized to provide an air flow of 113 cfm at an applied vacuum of 69 in H20. The extraction points will be valved independently. An air-water separator will be used to separate condensate from the vapor stream. The extracted water will be pumped from the separator to a tank. Any collected water will be analyzed for VOCs for disposal.

Off-gas from the SVE blower will be treated with two granular activated carbon in drums.

A process and instrumentation diagram is shown in Figure 11B.

Confirmation of the SVE system influence will be determined by measuring vacuum in existing and newly installed monitoring wells to be installed within the building footprint. There will be a total of four monitoring points (i.e., wells) to measure vacuum induced by the SVE system. The proposed locations of these monitoring points are shown in Figure 11.

4.3.12 Zero Valent Iron Source Treatment

The source area will be treated via direct push ZVI and electron donor injections from 15 to 45 feet bgs, with secondary elevated concentrations being treated via ZVI and an electron donor from 15 to 45 feet bgs as shown in Figure 13. These two treatment areas will address shallow, intermediate, and deeper impacts. The residual source treatment area will treat approximately 1,000 square feet within the area of highest concentration. Using an approximately 10-foot radius of influence, 4 injection points will be needed for the source area treatment that will treat the 15 to 45 feet bgs impacts. The remedy will include the injection of up to 4,000 pounds of ZVI and 2,000 pounds of an electron donor such as sodium lactate or emulsified vegetable oil.

The elevated source treatment area will treat approximately 1,000 square feet within the area of elevated CVOC concentrations. Using an approximately 10-foot radius of influence, 4 injection points will be needed for the elevated source area treatment. The remedy will include the injection of up to 2,000 pounds of ZVI and 2,000 pounds of an electron donor such as sodium lactate or emulsified vegetable oil.

The ZVI amount is calculated based on an estimated rate constant 0.1 day^{-1}, or approximately 0.01 L/g*day based on a microscale ZVI particle[3]. Studies of various ZVI particle size and contaminants have been conducted over the last several decades to estimate rate constants and can be used to approximate reductant demand. Based on the present contaminants, the groundwater flow, and the particle size of ZVI, a dosing of approximately 25 g/L has been calculated to complete the injected ZVI barrier and 15 g/L within the source area treatment zone. The ZVI proposed for this project is a small particle size, micron ranged ZVI in the range of 25 microns in diameter.

[3] Fan, D. et al. Sulfidation of Iron-Based Materials: A Review of Processes and Implications for Water Treatment and Remediation. *Environ. Sci. Technol.* 51, 13070–13085 (**2017**).

The remedy will address contamination from 15 to 45 feet bgs through the reaction of ZVI and the contaminant via surface area mediated reactions. The redox stoichiometry with PCE is shown in the equation below:

$$4Fe^0 + C_2Cl_4 + 4H^+ + 8e^- \rightarrow 4Fe^{2+} + 8e^- + C_2H_4 + 4Cl^-$$

The target treatment zone will treat impacted groundwater that flows through the barrier and within the source area. Offsite monitoring will be pending installation of two post remediation wells on site in addition to preserving MW-01 and MW-04 during construction. If wells cannot be preserved during construction, they will be reinstalled once intrusive work is completed and prior to occupancy. Additionally, MW-06 and MW-07, located outside the building to the southeast, will also be utilized as a post remediation monitoring well. Figure 14 shows proposed areas for post remedial monitoring well locations. Residual contamination in groundwater will be monitored for natural attenuation.

4.3.13 Zero Valent Iron Permeable Reactive Barrier

A ZVI PRB will be installed from 15 to 45 feet bgs along the south-southeastern boundary of the Site (Figure 7). This remedy will treat approximately 1,600 square feet along the boundary of the Site. The injections will be conducted via direct push injection and will include the introduction of ZVI and an electron donor. Using an approximately 7.5-foot radius of influence, 10 injection points will be needed for the PRB construction. The remedy will include the injection of up to 6,000 pounds of ZVI and 2,000 pounds of an electron donor such as sodium lactate or emulsified vegetable oil.

The ZVI amount is calculated based on an estimated rate constant 0.1 day^{-1}, or approximately 0.01 L/g*day based on a microscale ZVI particle. Based on the present contaminants, the groundwater flow, and the particle size of ZVI, a dosing of approximately 25 g/L within the barrier. The ZVI proposed for this project is a small particle size, micron ranged ZVI in the range of 25 microns in diameter.

The target treatment zone will treat impacted groundwater that flows through the barrier. Offsite monitoring will be pending installation of two post remediation wells on site in addition to preserving MW-01 and MW-04 during construction. If wells cannot be preserved during construction, they will be reinstalled once intrusive work is completed and prior to occupancy. Additionally, MW-06 and MW-07, located outside the building to the southeast, will also be utilized as a post remediation monitoring well. Figure 14 shows proposed areas for post remedial monitoring well locations. Residual contamination in groundwater will be monitored for natural attenuation and will be included in the Site Management Plan.

4.3.14 Demobilization

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

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

4.4 REPORTING

A site management plan (SMP) and a FER will be required to document the remedial action. The RE, Scott Underhill, will be responsible for certifying the SMP and FER is licensed to practice engineering in the State of New York. Should Mr. Underhill become unable to fulfill this responsibility, another suitably qualified NYS Professional Engineer will take his place.

A SMP will be submitted detailing ongoing monitoring at the Site. Procedures and timeframes for confirmation sampling, on-site groundwater monitoring and the reapplication of ZVI will be presented within the SMP.

Field reports will be included as appendices to the FER. In addition to the FER, copies of the relevant Contractor documents will be submitted to the NYSDEC.

4.4.1 Daily Reports

Daily reports providing a summary of activities for each day of active remedial work will be emailed to the Project Manager by the end of the following business day. These reports will include:

- The project number, statement of activities, an update of the progress made, locations of excavation, and any other remedial work performed
- Quantities of material imported and exported from the Site
- Status of on-Site soil/fill stockpiles
- A summary of all citizen complaints including relevant details (name, phone number, basis of complaint, actions taken, etc.)
- A summary of CAMP results noting all exceedances
- Photographs of notable Site conditions and activities

Daily reports are not intended to be the primary mode of communication for notifying NYSDEC and NYSDOH of emergencies, requests for changes to the RAWP, or time critical information. However, these conditions if to occur, will be included in the daily reports. Emergency conditions and changes to the RAWP will be directly communicated to the Project Manager. Daily reports will be provided to the NYSDEC and NYSDOH directly via email.

4.4.2 Monthly Reports

Monthly reports will consist of a summary of remedial work performed at the Site throughout the month and will include:

- Any investigative or remedial actions relative to the Site during the reporting period
- Actions relative to the Site anticipated for the next reporting period
- If there are any approved changes of work scope or schedule
- Results of sampling or testing
- Deliverables submitted during the reporting period
- The approximate percentage of completion of the project at the Site
- Any unresolved delays encountered that may affect the schedule

- Community participation (CP) plan activities during this reporting period and activities anticipated in support of the CP plan for the next reporting period
- Miscellaneous information

4.4.3 Photographs

Photographs of the remedial activities will be taken and included in the FER with provided descriptions of the representative photographs.

4.4.4 Complaint Management Plan

Complaints from the public regarding nuisance or other Site conditions will be addressed by notifying the NYSDEC of the complaint and investigating the cause/source of the issue. Records will be kept regarding the date and time of the complaint, the nature of the complaint, the type of communication (i.e., telephone, email, letter) and the name and contact information of the complaint provider. Corrective measures will then be formulated and put into place to address the complaint as soon as possible. Resolution will be documented and submitted to the NYSDEC. A representative of the Participant will reply within two weeks of receipt to the complaint provider to ensure resolution.

4.4.5 Deviations from the RAWP

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

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

5. Remedial Action: Material Removal

Remediation will include the following material removal tasks:

Excavation, stockpiling, off-site transport, and disposal of about 600 cubic yards of historic fill, solid waste, and native soil that exceeds CSCOs. This includes over-excavation in the on-site source area in northeast portion of the Site. Excavation in this area will extend to 13 feet bgs in an approximately 1,260 square foot area (Figure 8). Excavation also includes a 5 feet bgs excavation sitewide. In addition, the proposed excavation area will be backfilled with approximately 1,650 tons of soil, RCA or equivalent.

5.1 SOIL CLEANUP OBJECTIVES

SCOs for the site will be the Track 4 CSCO concentrations listed in Table 3. Soil and materials management will be conducted in accordance with the SMMP as described below.

5.2 REMEDIAL PERFORMANCE EVALUATION (CONFIRMATION SAMPLING)

5.2.1 Soil Sampling Frequency

One confirmation soil sample will be collected for every 900 square feet of excavation base site-wide in accordance with NYSDEC DER-10, or at an alternative frequency approved by NYSDEC. One confirmation soil sample will be collected at the base of the elevator pit/pool area.

Confirmation samples will be collected to confirm that CSCOs have been achieved. Sidewall samples will be collected from each excavation sidewall at a frequency of one sampler every 30 linear feet.

A total of five bottom samples and six sidewall samples, from the perimeter from the source area excavation, plus QA/QC samples, will be collected. If results of a confirmation soil sample do not comply with the CSCOs, over-excavation will be completed as practical to achieve a Track 4 remedy and additional confirmation samples will be collected of the over-excavation area at the frequencies indicated above.

5.2.2 Methodology

Confirmation samples soil samples will be collected from the base of the excavations in accordance with NYSDEC DER-10 to document remedial performance and will be analyzed for the Part 375 list of VOCs, SVOCs, metals, PCBs, PFAS, and 1,4-dioxane. Samples will be collected into laboratory-provided bottle ware. VOCs will be collected into Terracore or Encores. Samples will be transported under chain of custody protocol to an ELAP certified laboratory. Should additional soil samples be deemed necessary (e.g., additional tank closure, unknown environmental condition through visual evidence of a remaining source, over-excavation of failed confirmation sample), confirmation sampling will be conducted in accordance with NYSDEC DER-10.

5.2.3 Quality Assurance / Quality Control

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

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

5.2.4 Data Validation

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

5.2.5 Reporting

Analytical laboratories that analyze confirmation soil samples, prepare results, and perform contingency sampling will be NYSDOH ELAP-certified.

5.3 ESTIMATED MATERIAL REMOVAL QUANTITIES

Excavation on-Site for the proposed redevelopment plan is anticipated to generate approximately 600 cubic yards of soil.

5.4 SOIL/MATERIALS MANAGEMENT PLAN

This section presents the approach to management, disposal, and reuse of soil, fill, and materials excavated from the Site. This plan is based on the current knowledge of Site conditions and will be altered as necessary. Field personnel, under the direction of the RE, will monitor and document the handling and transport of material removed from the Site for disposal as a regulated solid waste. Field personnel, under the direction of the RE, will assist the remediation contractor in identifying impacted materials during remediation, determining materials suitable for direct load out versus temporary on-site stockpiling, selection of samples for waste characterization, if necessary, and determining the proper off-Site disposal facility. Separate stockpile areas will be constructed as needed for the various materials to be excavated or generated in order to avoid comingling impacted with nonimpacted soil.

5.4.1 Soil Screening Methods

Visual, olfactory, and instrumental soil screening and assessment will be performed during remediation and development-related ground intrusive activities into known or potentially contaminated material. Soil screening will be performed regardless of when the invasive work is done and will include excavation and invasive work performed during the remedy and development, such as excavations for foundations and utility work.

5.4.2 Stockpile Methods

Live loading will be the preferable method of soil load out however stockpiles will be used as necessary to separate and stage excavated material pending loading or characterization sampling. Separate stockpile areas will be constructed to avoid comingling materials. Stockpile areas will meet the following minimum requirements:

- Excavated soil will be placed onto a minimum thickness of 6 mil low-permeability liner of sufficient strength and thickness to prevent puncture during use; separate stockpiles will be created where material types are different. The use of multiple layers of thinner liners is permissible.
- Efforts will be made to place and remove the soil to minimize the potential to jeopardize the integrity of the liner.
- Stockpiles will be covered at the designated times (see below) with minimum 6-mil plastic sheeting or tarps which will be securely anchored to the ground. Stockpiles will be routinely inspected and broken sheeting covers will be promptly replaced.
- Stockpiles will be covered upon reaching their capacity (approximately 1,000 cubic yards) until ready for loading. Stockpiles that have not reached their capacity will be covered at the end of each workday.
- Each stockpile will be encircled with silt fences and hay bales, as needed, to contain and filter particulates from rainwater that has drained off the soils and to mitigate the potential for surface water run-off.
- Stockpiles will be inspected at a minimum of once daily and after every storm event.

5.4.3 Materials Excavation and Load Out

Field personnel, under the supervision of the RE, will monitor ground-intrusive work and the excavation and load-out of excavated material.

Loaded vehicles leaving the site will be appropriately lined, securely covered, manifested, and placarded in accordance with the appropriate federal, state, and local requirements, including applicable transportation requirements (i.e., New York State Department of Transportation and NYCDOT requirements). Trucks hauling historic fill material will not be lined unless free liquids are present or the material is grossly impacted. Trucks hauling hazardous lead impacted material will be lined and covered. Hazardous wastes derived from the site will be stored, transported, and disposed of in compliance with applicable local, state, and federal regulations.

A truck wash will be operated at the Site egress. Trucks will be washed, as necessary, before leaving the Site, and Site ingress and egress points will be cleaned of dirt and other materials to prevent material generated during remediation and development from being tracked off-Site.

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

The Participant and associated parties will ensure that site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this RAWP. Mechanical processing of historic fill and contaminated soil on-Site is prohibited unless otherwise approved by NYSDEC. The excavation will be surveyed, and survey information will be shown on maps to be included with the FER.

5.4.4 Materials Transport Off-Site

Transport of materials will be performed by licensed haulers in accordance with appropriate local, state, and federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded. Trucks headed to disposal facilities will travel north on Walworth Street to Flushing Avenue, west on Union Flushing to Bedford Avenue, northeast on Bedford Avenue to S 5th Street, west on S 5th Street which turns to S 4th Street onto the Williamsburg Bridge (or other routes approved by the NYSDEC). Truck routes are shown on Figure 16.

Loaded trucks will exit in the vicinity of the site using approved truck routes. These routes are the most appropriate route to and from the site and take into account the following:

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

Trucks will be prohibited from excessive stopping and idling in the neighborhood outside of the Site. Material transported by trucks exiting the Site will be secured with tight-fitting covers. Loose fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, or hazardous lead-impacted material, truck liners will be used.

5.4.5 Materials Disposal Off-Site

Disposal facilities have not been determined at the time of this report submittal; however, facility determination will be reported to the NYSDEC Project Manager prior to off-Site transport and disposal of excavated material. About 600 cubic yards of historic fill and native soil that exceeds the CSCOs is expected to be disposed off-Site. Soil/fill/solid waste excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed in accordance with local, state (including 6 NYCRR Part 360), and federal regulations. Hazardous material will be managed as an F listed hazardous waste in accordance with applicable federal, state, and local regulations. As such, the handling, transport, and disposal of this fill material is subject to USEPA and the OSHA HAZWOPER regulations. The presence of hazardous waste requires compliance with both federal and state regulations and the following requirements:

- Hazardous waste disposal requires obtaining a United States EPA RCRA generator ID number
- Hazardous waste must be transported to a facility permitted by RCRA to accept hazardous waste
- Hazardous waste must be segregated and cannot be comingled with other Site material
- Hazardous waste must be transported and disposed by properly-permitted (Part 364) transporters and facilities.

If disposal of soil/fill from this site is proposed for unregulated disposal (i.e., clean soil removed for development purposes), a formal request with an associated plan will be made to NYSDEC's Project Manager. Unregulated off-Site management of materials from this Site is prohibited without formal NYSDEC approval. Material that does not meet CSCOs, such as nonhazardous historic fill material, contaminated soil, and hazardous lead-impacted material excavated, is prohibited from being taken to a New York State recycling facility (6 NYCRR Part 360-16 Registration Facility). Non-hazardous historic fill material, contaminated soil, and hazardous lead-impacted material transported off-site will be handled, at a minimum, as a solid waste per 6 NYCRR Part 360.

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

- A letter from the RE or Participant to the receiving facility describing the material to be disposed of and requesting formal written acceptance of the material. This letter will state that material to be disposed of is contaminated material generated at an environmental remediation site located in New York State. The letter will provide the project identity and the name and phone number of the RE. The letter will include as an attachment a summary of chemical data for the material being transported (including waste characterization and RI data); and
- A letter from each receiving facility stating that it is in receipt of the correspondence (above) and acceptance of the material is approved.

5.4.6 Materials Reuse On-Site

Material will not be reused on-Site.

5.4.7 Fluids Management

Dewatering is not anticipated with the preferred remedy, however liquids removed from the Site, including dewatering fluids, will be handled, transported, and disposed of in accordance with applicable local, state and federal regulations. Liquids discharged into the New York City sewer system will be addressed through approval by NYCDEP.

Prior to mobilization, analytical data will be distributed to facilities capable of handling, treating, and/or disposing of groundwater representative of the Site. If supplemental data is needed, a representative groundwater sample will be collected from an existing on-Site groundwater observation well. The primary treatment will consist of a temporary holding tank for the settling of fines prior to offloading, transportation, and disposal. The Remediation Contractor's NYS-licensed Professional Engineer would design the dewatering and treatment system.

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

5.4.8 Backfill from Off-Site Sources

Backfill material will consist of clean fill (as described in the following paragraph) or other acceptable fill material such as virgin stone from a quarry or RCA. If RCA is imported to the site, it will be from a

NYSDEC-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require chemical testing, unless required by the NYSDEC under the terms for operation of the facility. RCA imported to the site must be derived from recognizable and uncontaminated concrete, with no more than 10% by weight passing through a No. 80 sieve. RCA is not acceptable for and will not be used as cover or drainage material.

Imported soil (i.e., clean fill) will meet Restricted Residential SCOs. Non-compliant soils will not be imported to the Site. Clean fill will be segregated at a source/facility that is free of environmental contaminants. Qualified environmental personnel will collect representative samples at a frequency consistent with NYSDEC CP-51. The samples will be analyzed for Part 375 VOCs, SVOCs, pesticides/herbicides, PCBs, cyanide, metals including trivalent and hexavalent chromium, 1,4-dioxane, and PFAS by a NYSDOH ELAP-certified laboratory. Upon meeting these criteria, the certified-clean fill will be transported to the Site and segregated from impacted material, as necessary, on plastic sheeting until used as backfill. Trucks entering the Site with imported soils will be secured with tight fitting covers.

Soils that meet "exempt" fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the site without prior approval by the NYSDEC. The contents of this RAWP and NYSDEC approval of this RAWP should not be considered an approval for this purpose.

5.4.9 Stormwater Pollution Prevention

Work will be conducted within an existing building structure. In the event it becomes necessary, silt fence or hay bales will be installed around the perimeter of the remedial construction area, as required. Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook maintained at the site and available for inspection by the NYSDEC. Necessary repairs to silt fence and/or hay bales will be made immediately. Accumulated sediments will be removed as required to keep the barriers and hay bale checks functional. Manufacturer's recommendations will be followed for replacing silt fence damaged due to weathering.

5.4.10 Contingency Plan

As discussed above in Section 4.2.7, if USTs or other previously unidentified contaminant sources are found during on-Site remedial excavation or development-related construction, sampling will be performed on product, if encountered, and surrounding subsurface materials (e.g., soil, stone). Chemical analyses will include Part 375 VOCs, SVOCs, PCBs, pesticides, and metals. Analyses will not be otherwise limited without NYSDEC approval. Identification of unknown or unexpected contaminated media identified by screening during ground-intrusive work will be promptly communicated by phone to the NYSDEC Project Manager. These findings will also be detailed in the monthly BCP progress report.

5.4.11 Community Air Monitoring Plan

The Community Air Monitoring Plan will require real-time monitoring for particulates (i.e., dust) and VOCs at the work area and downwind perimeters when ground intrusive activities. Details are included in Appendix C. Any exceedances of the approved CAMP thresholds will be reported to NYSDEC and NYSDOH via email and included in the following daily report.

5.4.12 Odor, Dust and Nuisance Control Plan

Dust, odor, and nuisance controls will be accomplished by the remediation contractor as described in this section.

Odor Control

This odor control plan is capable of controlling emissions of nuisance odors off-Site. Specific odor control methods to be used if needed will include application of foam suppressants or tarps over the odor or VOC source areas. If nuisance odors are identified, work will be halted, and the source of odors will be identified and corrected. Work will not resume until nuisance odors have been abated. The NYSDEC and NYSDOH will be notified of odor events and of other complaints about the project. Implementation of odor controls is the responsibility of the Contractor. Monitoring odor emission, including the halt of work, will be the responsibility of the RE or his/her designated representative.

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

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

Dust Control

A dust suppression plan that addresses dust management during ground-intrusive on-Site work will include, at a minimum: (a) use of a dedicated water distribution system, on-Site water truck for road wetting, or an alternate source with suitable supply and pressure for use in dust control; (b) gravel used for on-Site roads to provide a clean and dust-free road surface; and (c) on-Site roads will be limited in total area to minimize the area required for water spraying.

Other Nuisances

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

6. Residual Contamination to Remain On-Site

Residual contaminated soil and groundwater will exist beneath the developed footprint after the Track 4 remedy is complete, therefore engineering controls and institutional controls will be required to protect human health and the environment. Contamination remaining will include TCE and PCE impacted soil and groundwater with impacts to soil vapor. Other contaminants of concern include PCBs, metals and PFAS.

7. Engineering Controls

The following engineering controls have been designed for incorporation into the remedial action.

7.1 COMPOSITE COVER SYSTEM AND VAPOR BARRIER SYSTEM

A composite cover system, consisting of 2 to 4 inches of subbase (RCA) overlain by a 4-inch concrete slab and installation of a waterproofing/vapor barrier or equivalent, which is a requirement of the NYC Building Code, that will exceed the expectations of a 20-mil vapor barrier which will reduce the potential for a soil vapor exposure pathway, will be installed throughout the Site footprint. The vapor barrier will be installed as per manufacturer specifications.

7.2 ZERO VALENT IRON INJECTIONS

ZVI injections along the southeastern site boundary will be injected at 15 to 45 feet bgs to treat VOC-impacted groundwater with the potential to leave Site. In addition, source area injections will be conducted to treat the VOC-impacted soils and groundwater not excavated from the Site.

7.3 SUB-SLAB DEPRESSURIZATION SYSTEM

A SSDS will be installed to mitigate potential exposures related to soil vapor intrusion.

7.4 SOIL VAPOR EXTRACTION SYSTEM

A SVE system will be installed to treat the VOC-impacted unsaturated soils not excavated from the Site. The VOC-impacted soil vapor removed with the SVE system will be treated with GAC prior to discharge to the atmosphere.

8. Final Engineering Report

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

- Documentation that the remedial work required under this RAWP has been completed and has been performed in substantial conformance with this plan.
- A summary of the locations and characteristics of material removed from the Site including the surveyed map(s) of each area, as necessary.
- As-built drawings for constructed elements, certifications, manifests, and bills of lading.
- A description of the changes to the remedy from the elements provided in the RAWP and associated design documents, if any.
- A tabular summary of performance evaluation sampling results and material characterization results and other sampling and chemical analyses performed as part of the remedy.
- Written and photographic documentation of remedial work performed under this remedy.
- A summary of the post-excavation groundwater analytical results.
- A summary of confirmation sampling results to show that remaining soil left on-Site meets the Track 4 CSCOs.
- If necessary, a summary of remaining contamination that exceeds the Track 4 CSCOs and an explanation for why the material was not removed as part of the remedy. A table and a map that shows remaining contamination in excess of the Track 4 CSCOs would also be included.
- Documentation of treatment and/or disposal of material removed from the Site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with the disposal of material must also include records and approvals for receipt of the material.
- Documentation of the origin and chemical quality of each material type imported onto the Site.
- As-built drawings detailing design of engineering controls including SSDS/SVE system, SVI source area treatment injections and ZVI permeable reactive barrier.

Before approval of the FER and issuance of a Certificate of Completion, the daily or weekly reports and monthly BCP progress reports must be submitted in digital format (i.e., PDF).

8.1 CERTIFICATIONS

The following certification will appear in front of the FER Executive Summary. The certification will be signed by the RE, Scott Underhill, who is a NYS-licensed Professional Engineer. The certification will be appropriately signed and stamped.

The certification will include the following statements:

I, _____, certify that I am currently a NYS registered professional engineer, I had primary direct responsibility for the implementation of the subject remedial program, and I certify that the Remedial Work Plan was implemented and that all remediation activities were completed in substantial conformance with the DER-approved Remedial Work Plan.

If the Remedial Action Work Plan identifies time frames to be achieved by the remedial program, the certification will include: The data submitted to DER demonstrates that the remediation requirements set forth in the Remedial Work and all applicable statutes and regulations have been or will be achieved in accordance with the time frames, if any, established in the work plan.

9. Schedule

Mobilization for implementation of the RAWP is expected to take about one to two weeks. Once mobilization is complete, remediation of the Site will proceed. The remedy, which will be implemented in accordance with this RAWP, is anticipated to take about two to three months to complete. After completion of the remedy, groundwater monitoring will commence on a quarterly basis. A SMP and FER will be drafted concurrently to the groundwater monitoring program and subsequently submitted to the NYSDEC for review and approval. A detailed project schedule is included in Appendix I.

References

1. Supplemental Remedial Investigation Report. 8 Walworth Street, Brooklyn, New York. Prepared by Haley & Aldrich of New York, prepared for Toldos Yehudah, LLC and the New York State Department of Environmental Conservation, August 2020

2. Phase II Environmental Site Assessment, 12-18 Walworth Street, December 2007, Prepared by P.W. Grosser Consulting, Prepared for AAA Group.

3. Soil Vapor Intrusion Report- 8 Walworth Street, May 2017, Prepared by Environmental Business Consultants, Prepared for the New York State Department of Environmental Conservation

4. Brownfield Cleanup Program Application. 8 Walworth Street, Brooklyn, New York, June 2017, Prepared by Toldos Yehudah, LLC & Environmental Business Consultants, Prepared for the New York State Department of Environmental Conservation

5. Remedial Investigation Report- 8 Walworth Street Site, September 2019, Prepared by Environmental Business Consultants, Prepared for the New York State Department of Environmental Conservation

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

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Tables

Table 1
Alternative I Remedial Cost Estimate
8 Walworth Street
Brooklyn, New York
NYSDEC BCP Site C224239

Consulting/Engineering Costs					
Task	**Description**	**Unit**	**Unit Cost**	**Quantity**	**Total Cost**
1	Waste Characterization	Lump Sum	$ 10,000	1	$ 10,000
2	Program Management (NYSDEC/NYSDOH Correspondence, Daily/Weekly/Monthly Reporting, etc.)	Month	$ 8,000	16	$ 128,000
3	Remedial Oversight	Month	$ 30,000	12	$ 360,000
4	Endpoint Sampling	Sample	$ 1,750	10	$ 17,500
5	Post Remedial Monitoring Well Installation	Lump Sum	$ 25,000	1	$ 25,000
6	Operations & Maintenance (Quarterly Groundwater Sampling and Reporting)	Quarter	$ 8,000	4	$ 32,000
7	Closure Reporting and COC Coordination	Allowance	$ 75,000	1	$ 75,000
				Consulting/Engineering Subtotal	$ 647,500
Contractor Costs					
Task					
1	Mobilization/Demobilization, Site Maintenance, Security, etc.	Allowance	$ 50,000	1	$ 50,000
2	Support of Excavation	Linear Foot	$ 125	260	$ 32,500
3	Transport and Disposal of Hazardous Material (F Listed and/or Lead)	Ton	$ 500	1,760	$ 880,000
4	Transport and Disposal of Non-Hazardous Material	Ton	$ 310	7,040	$ 2,182,400
5	IDW Drum Contents Disposal	Drum	$ 500	51	$ 25,500
6	Vapor Barrier (Materials & Installation)	Allowance	$ 25,000	1	$ 25,000
7	Zero Valent Iron Wall	Lump Sum	$ 40,000	1	$ 40,000
8	Import/Backfilling	Cubic Yard	$ 15	140,000	$ 2,100,000
9	Dewatering System	Lump Sum	$ 75,000	1	$ 75,000
10	Underground Storage Tank (Contingency Budget)	Allowance	$ 20,000	1	$ 20,000
				Contractor Subtotal	$ 5,430,400
				Total	$ 6,077,900
				15% Contingency	$ 911,685
				Estimated Total	$ 6,989,585

Notes:

1. Assuming a conditional Track 1 Remedy after 1 year of post remedy quarterly groundwater sampling.
2. Assumes density of 1.6 tons per cubic yard of fill/soil
3. Assumes residual soil will meet Track 1 Unrestricted Use Soil Cleanup Objectives
4. Assumes localized dewatering
5. Costs are estimated and subject to change. Costs do not include new building construction.
6. RAWP implementation is assumed to take 10-12 months.
7. This cost estimate was prepared to compare various remedial alternatives as was based on available information at the time of preparation. The estimate may be +/- 30-50% of the actual cost. This estimate was not prepared for financial or legal consulting purposes and was not intended for use regarding compliance with financial reporting requirements or liability services.
8. This estimate does not include legal fees associated with attorneys involved in the project, insurance fees or outside consulting fees.

Table 2
Alternative II Remedial Cost Estimate
8 Walworth Street
Brooklyn, New York
NYSDEC BCP Site C224239

Consulting/Engineering Costs					
Task	**Description**	**Unit**	**Unit Cost**	**Quantity**	**Total Cost**
1	Waste Characterization	Lump Sum	$ 10,000	1	$ 10,000
2	Program Management (NYSDEC/NYSDOH Correspondence, Daily/Weekly/Monthly Reporting, etc.)	Month	$ 8,000	8	$ 64,000
3	Remedial Oversight	Month	$ 30,000	4	$ 120,000
4	Endpoint Sampling	Sample	$ 1,750	10	$ 17,500
5	Post Remedial Monitoring Well Installation	Lump Sum	$ 25,000	1	$ 25,000
6	Operations & Maintenance Monitoring (Quarterly Groundwater Sampling, Vapor Mitigation System Operations Monitoring, Reporting)	Quarter	$ 12,000	12	$ 144,000
7	Closure Reporting and COC Coordination	Allowance	$ 75,000	1	$ 75,000
				Consulting/Engineering Subtotal	$ 455,500
Contractor Costs					
Task					
1	Mobilization/Demobilization, Site Maintenance, Security, etc.	Allowance	$ 25,000	1	$ 25,000
2	Support of Excavation	Linear Foot	$ 125	260	$ 32,500
3	Transport and Disposal of Hazardous Material (F Listed and/or Lead)	Ton	$ 500	1,760	$ 880,000
4	IDW Drum Contents Disposal	Drum	$ 500	51	$ 25,500
6	Vapor Barrier (Materials & Installation)	Allowance	$ 20,000	1	$ 20,000
7a	ZVI Treatment of Source Area and ZVI Wall	Lump Sum	$ 60,000	1	$ 60,000
7b	Installation of Vapor Mitigation System	Lump Sum	$ 100,000	1	$ 100,000
8	Import/Backfilling	Cubic Yard	$ 15	500	$ 7,500
9	Localized Dewatering System	Lump Sum	$ 50,000	1	$ 50,000
10	Underground Storage Tank (Contingency Budget)	Allowance	$ 20,000	1	$ 20,000
				Contractor Subtotal	$ 1,220,500
				Total	$ 1,676,000
				15% Contingency	$ 251,400
				Estimated Total	$ 1,927,400

Notes:

1. Assuming a conditional Track 4 Remedy (preferred remedy)
2. Assumes density of 1.6 tons per cubic yard of fill/soil
3. Assumes residual soil will meet Track 4 Site Specific Use Soil Cleanup Objectives
4. Assumes localized dewatering
5. Costs are estimated and subject to change. Costs do not include new building construction.
6. RAWP implementation is assumed to take 4 months.
7. This cost estimate was prepared to compare various remedial alternatives as was based on available information at the time of preparation. The estimate may be +/- 30-50% of the actual cost. This estimate was not prepared for financial or legal consulting purposes and was not intended for use regarding compliance with financial reporting requirements or liability services.
8. This estimate does not include legal fees associated with attorneys involved in the project, insurance fees or outside consulting fees.

Table 3
Track 4 Commerical Soil Cleanup Objectives
8 Walworth Street
Brooklyn, New York
NYSDEC BCP Site C224239

Volatile Organics	CSCO (mg/kg)
Methylene chloride	500
1,1-Dichloroethane	240
Chloroform	350
Carbon tetrachloride	22
1,2-Dichloropropane	NS
Dibromochloromethane	NS
1,1,2-Trichloroethane	NS
Tetrachloroethene	150
Chlorobenzene	500
Trichlorofluoromethane	NS
1,2-Dichloroethane	30
1,1,1-Trichloroethane	500
Bromodichloromethane	NS
trans-1,3-Dichloropropene	NS
cis-1,3-Dichloropropene	NS
1,3-Dichloropropene, Total	NS
1,1-Dichloropropene	NS
Bromoform	NS
1,1,2,2-Tetrachloroethane	NS
Benzene	44
Toluene	500
Ethylbenzene	390
Chloromethane	NS
Bromomethane	NS
Vinyl chloride	13
Chloroethane	NS
1,1-Dichloroethene	500
trans-1,2-Dichloroethene	500
Trichloroethene	200
1,2-Dichlorobenzene	500
1,3-Dichlorobenzene	280
1,4-Dichlorobenzene	130
Methyl tert butyl ether	500
p/m-Xylene	NS
o-Xylene	NS
Xylenes, Total	500
cis-1,2-Dichloroethene	500
1,2-Dichloroethene, Total	NS
Dibromomethane	NS
Styrene	NS
Dichlorodifluoromethane	NS
Acetone	500
Carbon disulfide	NS
2-Butanone	500
Vinyl acetate	NS
4-Methyl-2-pentanone	NS
1,2,3-Trichloropropane	NS
2-Hexanone	NS
Bromochloromethane	NS
2,2-Dichloropropane	NS
1,2-Dibromoethane	NS
1,3-Dichloropropane	NS
1,1,1,2-Tetrachloroethane	NS
Bromobenzene	NS
n-Butylbenzene	500
sec-Butylbenzene	500
tert-Butylbenzene	500
o-Chlorotoluene	NS
p-Chlorotoluene	NS
1,2-Dibromo-3-chloropropane	NS
Hexachlorobutadiene	NS
Isopropylbenzene	NS
p-Isopropyltoluene	NS
Naphthalene	500
Acrylonitrile	NS
n-Propylbenzene	500
1,2,3-Trichlorobenzene	NS
1,2,4-Trichlorobenzene	NS
1,3,5-Trimethylbenzene	190
1,2,4-Trimethylbenzene	190
1,4-Dioxane	130
p-Diethylbenzene	NS
p-Ethyltoluene	NS
1,2,4,5-Tetramethylbenzene	NS
Ethyl ether	NS
trans-1,4-Dichloro-2-butene	NS

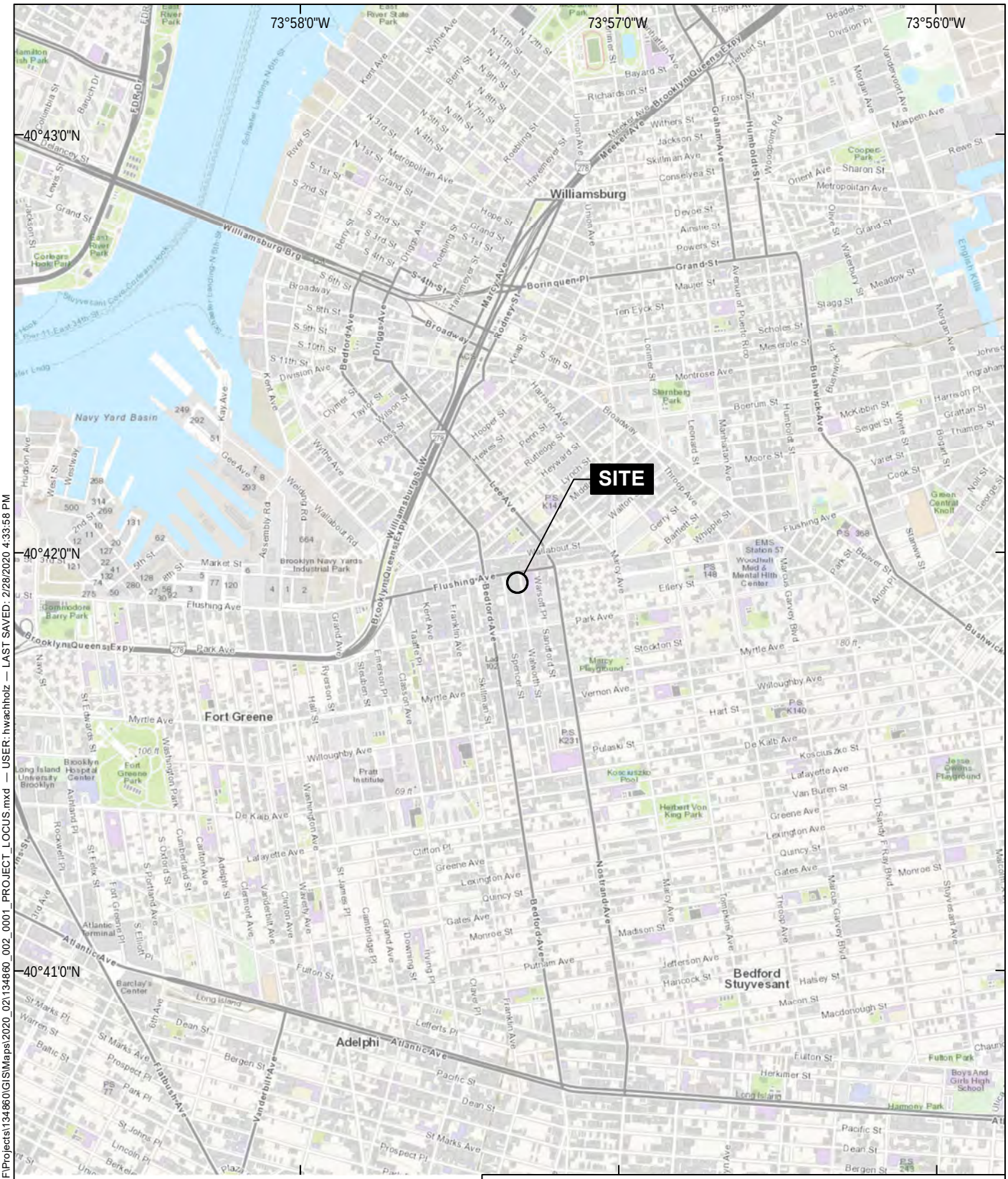
Polychlorinated Biphenyls	CSCO (mg/kg)
Aroclor 1016	1
Aroclor 1221	1
Aroclor 1232	1
Aroclor 1242	1
Aroclor 1248	1
Aroclor 1254	1
Aroclor 1260	1
Aroclor 1262	1
Aroclor 1268	1
PCBs, Total	1

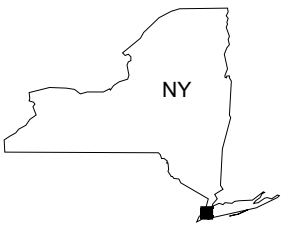
Notes:
mg/kg: milligrams per kilogram
CSCO: NYSDEC Part 375 Commercial Soil Cleanup Objective
NS: No Standard

Semi-Volatile Organic Compounds	CSCO (mg/kg)
Acenaphthene	500
1,2,4-Trichlorobenzene	NS
Hexachlorobenzene	6
Bis(2-chloroethyl)ether	NS
2-Chloronaphthalene	NS
1,2-Dichlorobenzene	500
1,3-Dichlorobenzene	280
1,4-Dichlorobenzene	130
3,3'-Dichlorobenzidine	NS
2,4-Dinitrotoluene	NS
2,6-Dinitrotoluene	NS
Fluoranthene	500
4-Chlorophenyl phenyl ether	NS
4-Bromophenyl phenyl ether	NS
Bis(2-chloroisopropyl)ether	NS
Bis(2-chloroethoxy)methane	NS
Hexachlorobutadiene	NS
Hexachlorocyclopentadiene	NS
Hexachloroethane	NS
Isophorone	NS
Naphthalene	500
Nitrobenzene	NS
NDPA/DPA	NS
n-Nitrosodi-n-propylamine	NS
Bis(2-ethylhexyl)phthalate	NS
Butyl benzyl phthalate	NS
Di-n-butylphthalate	NS
Di-n-octylphthalate	NS
Diethyl phthalate	NS
Dimethyl phthalate	NS
Benzo(a)anthracene	5.6
Benzo(a)pyrene	1
Benzo(b)fluoranthene	5.6
Benzo(k)fluoranthene	56
Chrysene	56
Acenaphthylene	500
Anthracene	500
Benzo(ghi)perylene	500
Fluorene	500
Phenanthrene	500
Dibenzo(a,h)anthracene	0.56
Indeno(1,2,3-cd)pyrene	5.6
Pyrene	500
Biphenyl	NS
4-Chloroaniline	NS
2-Nitroaniline	NS
3-Nitroaniline	NS
4-Nitroaniline	NS
Dibenzofuran	350
2-Methylnaphthalene	NS
1,2,4,5-Tetrachlorobenzene	NS
Acetophenone	NS
2,4,6-Trichlorophenol	NS
p-Chloro-m-cresol	NS
2-Chlorophenol	NS
2,4-Dichlorophenol	NS
2,4-Dimethylphenol	NS
2-Nitrophenol	NS
4-Nitrophenol	NS
2,4-Dinitrophenol	NS
4,6-Dinitro-o-cresol	NS
Pentachlorophenol	6.7
Phenol	500
2-Methylphenol	500
3-Methylphenol/4-Methylphenol	500
2,4,5-Trichlorophenol	NS
Benzoic Acid	NS
Benzyl Alcohol	NS
Carbazole	NS
1,4-Dioxane	130

Metals	CSCO (mg/kg)
Aluminum, Total	NS
Antimony, Total	NS
Arsenic, Total	16
Barium, Total	400
Beryllium, Total	590
Cadmium, Total	9.3
Calcium, Total	NS
Chromium, Total	NS
Cobalt, Total	NS
Copper, Total	270
Iron, Total	NS
Lead, Total	1000
Magnesium, Total	NS
Manganese, Total	10000
Mercury, Total	2.8
Nickel, Total	310
Potassium, Total	NS
Selenium, Total	1500
Silver, Total	1500
Sodium, Total	NS
Thallium, Total	NS
Vanadium, Total	NS
Zinc, Total	10000

Figures





MAP SOURCE: ESRI
SITE COORDINATES: 40°41'55"N,73°57'18"W

HALEY ALDRICH

8 WALWORTH STREET
BROOKLYN, NEW YORK

PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT
FEBRUARY 2020

FIGURE 1

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\134860\GISMaps\2020_02\134860_002_0001_PROJECT_LOCUS.mxd — USER: hwachholz — LAST SAVED: 2/28/2020 4:33:58 PM

COMMERCIAL (FORMER WAREHOUSE)
LOT 21

BCP SITE C224204

COMMERCIAL (WAREHOUSE)
LOT 18

2ND FLOOR MEZZANINE

STORAGE

COMMERCIAL (PARKING)
LOT 30

BCP SITE C224259

LOT 30

WALWORTH STREET

LEGEND

- SITE BOUNDARY
- EXISTING BUILDING
- KINGS COUNTY PARCEL

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. KINGS COUNTY PARCELS RETRIEVED FROM GIS.NY.GOV

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SCALE IN FEET

HALEY ALDRICH

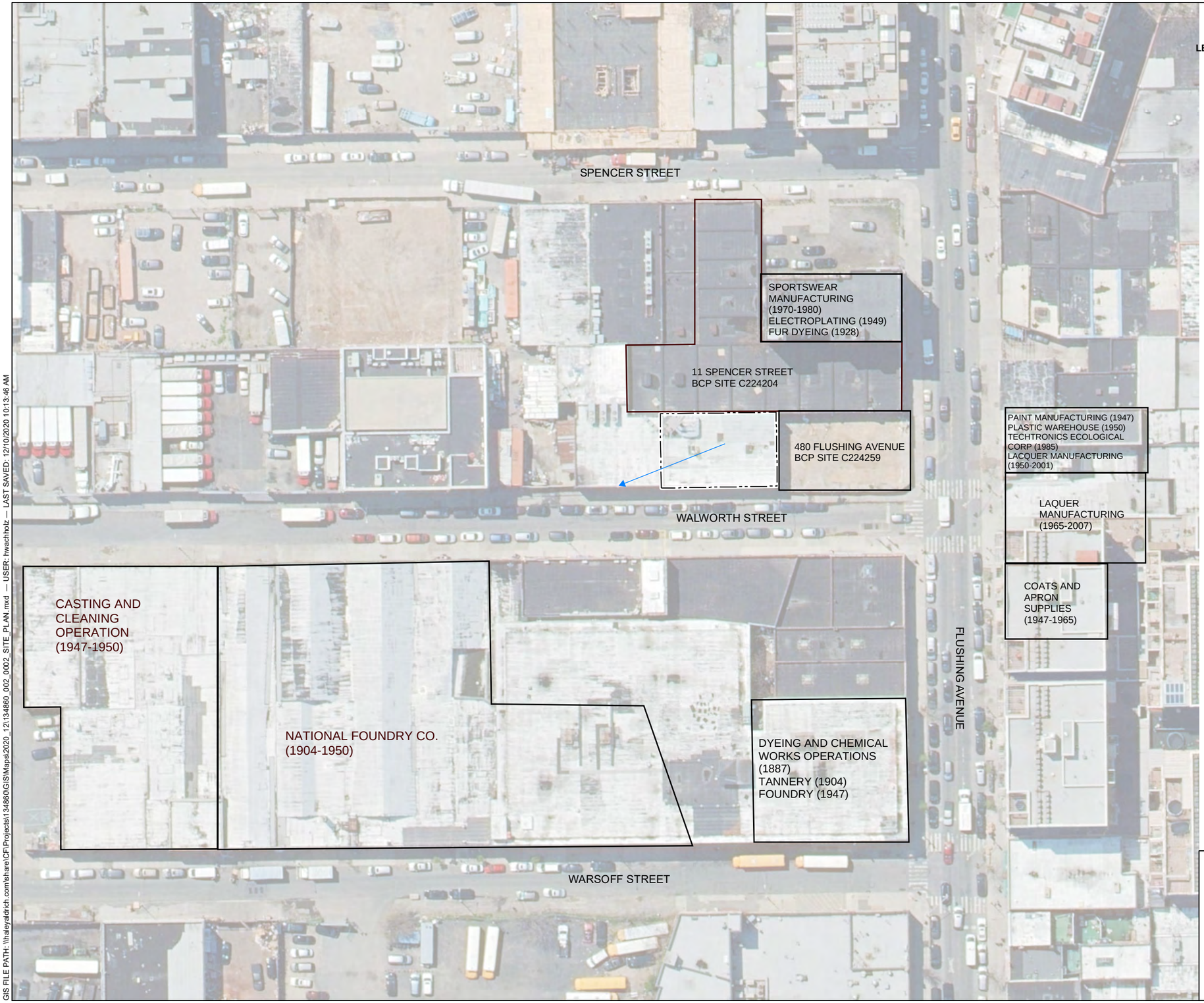
8 WALWORTH STREET
BROOKLYN, NEW YORK

SITE FEATURE MAP

FEBRUARY 2020

FIGURE 2A

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\134860\GIS\Maps\2020_02\134860_002_0002_SITE_FEATURE_MAP.mxd — USER: hwaetholz — LAST SAVED: 2/28/2020 2:44:44 PM



LEGEND

SITE BOUNDARY

GROUNDWATER FLOW DIRECTION

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI

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SCALE IN FEET

HALEY ALDRICH

8 WALWORTH STREET
BROOKLYN, NEW YORK

SURROUNDING LAND USE MAP

OCTOBER 2021

FIGURE 2B

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\134860\GIS\Maps\2020_12\134860_002_0002_SITE_PLAN.mxd — USER: hwachholz — LAST SAVED: 12/10/2020 10:13:46 AM

LEGEND

SITE BOUNDARY

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI

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SCALE IN FEET

HALEY ALDRICH

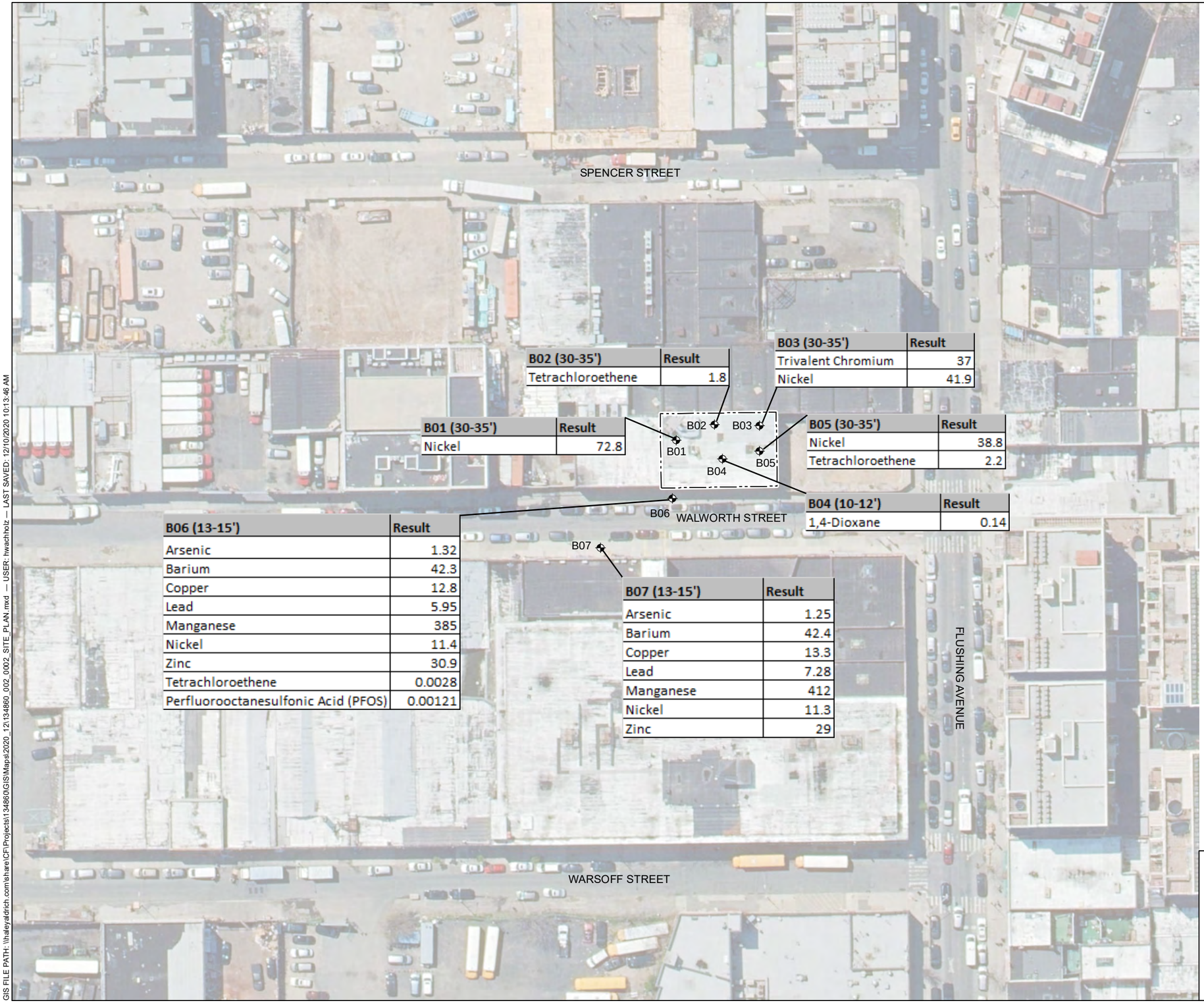
8 WALWORTH STREET
BROOKLYN, NEW YORK

SURROUNDING SENSITIVE RECEPTOR MAP

NOVEMBER 2021

FIGURE 2C

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\134860\GIS\Maps\2020_12\134860_002_0002_SITE_PLAN.mxd — USER: mconlon — LAST SAVED: 12/10/2020 10:18:44 AM



LEGEND

SITE BOUNDARY

OFFSITE MONITORING WELL CLUSTER LOCATIONS

FORMER OFFSITE SOIL VAPOR SAMPLING LOCATIONS (INSTALLED IN NOVEMBER 2018 BY EBC)

NYCRR Part 375 Unrestricted and Restricted Residential SCOs			
Analyte	**Units**	**NY- ResRestricted**	**NY- Unrestricted**
Arsenic	mg/kg	16	13
Barium	mg/kg	400	350
Copper	mg/kg	270	50
Chromium, Trivalent	mg/kg	180	30
Lead	mg/kg	400	63
Manganese	mg/kg	2000	1600
Nickel	mg/kg	310	30
Zinc	mg/kg	10000	109
Tetrachloroethene	mg/kg	19	1.3

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI
3. PROPOSED OFFSITE SOIL VAPOR, INDOOR AIR AND AMBIENT AIR ARE SUBJECT TO CHANGE BASED ON FIELD OBSERVATIONS AND ACCESSIBILITY

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SCALE IN FEET

HALEY ALDRICH

8 WALWORTH STREET
BROOKLYN, NEW YORK

MAP OF DEEP INTERVAL SOIL CHEMISTRY

JUNE 2021

FIGURE 3A

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\134860\GIS\Maps\2020_12\134860_002_0002_SITE_PLAN.mxd — USER: hwaehholz — LAST SAVED: 12/10/2020 10:13:46 AM

SB1702 (0-6") 12/20/2018	
VOCs (µg/Kg)	
1,4-Dioxane	430
Acetone	3,200
cis-1,2-Dichloroethene	550
Methyl Ethyl Ketone	1,800
Methylene chloride	79
Tetrachloroethene	37,000
Trichloroethene	3,400
SVOCs (µg/Kg)	
Indeno(1,2,3-cd)pyrene	540
Phenol	930
Pesticides (µg/Kg)	
4,4' -DDD	37
4,4' -DDE	22
4,4' -DDT	52
Dieldrin	15
PCB (µg/Kg)	
PCB-1254	590
Metals (mg/Kg)	
Lead	250
Zinc	168

SB1702 (6-12") 12/20/2018	
VOCs (µg/Kg)	
1,4-Dioxane	350
Acetone	970
cis-1,2-Dichloroethene	540
Methyl Ethyl Ketone	3,500
Methylene chloride	130
Tetrachloroethene	33,000
Trichloroethene	3,300
SVOCs (µg/Kg)	
Benz(a)anthracene	1,700
Benzo(a)pyrene	1,500
Benzo(b)fluoranthene	1,900
Benzo(k)fluoranthene	1,500
Chrysene	2,000
Indeno(1,2,3-cd)pyrene	1,200
Phenol	900
Pesticides (µg/Kg)	
4,4' -DDD	10
4,4' -DDE	18
4,4' -DDT	17
Dieldrin	12
PCB (µg/Kg)	
PCB-1254	540
Metals (mg/Kg)	
Lead	250
Zinc	168

SB1702 (12-24") 12/20/2018	
VOCs (µg/Kg)	
1,4-Dioxane	370
Acetone	1,100
cis-1,2-Dichloroethene	830
Methyl Ethyl Ketone	4,300
Methylene chloride	72
Tetrachloroethene	30,000
Trichloroethene	4,700
SVOCs (µg/Kg)	
Benzo(b)fluoranthene	1,100
Benzo(k)fluoranthene	960
Indeno(1,2,3-cd)pyrene	800
Pesticides (µg/Kg)	
4,4' -DDD	24
4,4' -DDE	47
4,4' -DDT	54
Dieldrin	19
PCB (µg/Kg)	
PCB-1254	2,800
Metals (mg/Kg)	
Lead	336
Zinc	249

SB1702 (7-9') 11/19/2018	
VOCs (µg/Kg)	
Tetrachloroethene	680,000
Trichloroethene	28,000
PCB (µg/Kg)	
PCB-1254	4,200

SB1702 (13-15') 12/20/2018	
VOCs (µg/Kg)	
cis-1,2-Dichloroethene	13,000
Tetrachloroethene	3,600
Trichloroethene	650
Vinyl Chloride	100
Pesticides (µg/Kg)	
4,4' -DDD	13
4,4' -DDE	29
PCB (µg/Kg)	
PCB-1254	220

SB1701 (0-6") 11/19/2018	
VOCs (µg/Kg)	
cis-1,2-Dichloroethene	380
Tetrachloroethene	13,000
Trichloroethene	5,300
SVOCs (µg/Kg)	
Benz(a)anthracene	2,800
Benzo(a)pyrene	2,600
Benzo(b)fluoranthene	2,300
Benzo(k)fluoranthene	2,500
Chrysene	3,000
Indeno(1,2,3-cd)pyrene	1,300
PCB (µg/Kg)	
PCB-1254	830
Metals (mg/Kg)	
Copper	50.6
Lead	600
Mercury	3.11
Zinc	184

SB1701 (6-12") 11/19/2018	
VOCs (µg/Kg)	
cis-1,2-Dichloroethene	370
Tetrachloroethene	15,000
Trichloroethene	5,400
SVOCs (µg/Kg)	
Benz(a)anthracene	4,000
Benzo(a)pyrene	3,300
Benzo(b)fluoranthene	3,100
Benzo(k)fluoranthene	3,200
Chrysene	4,100
Dibenz(a,h)anthracene	560
Indeno(1,2,3-cd)pyrene	1,900
PCB (µg/Kg)	
PCB-1254	250
Metals (mg/Kg)	
Lead	360
Mercury	1.06
Zinc	160

SB1701 (12-24") 11/19/2018	
VOCs (µg/Kg)	
cis-1,2-Dichloroethene	300
Tetrachloroethene	15,000
Trichloroethene	4,700
SVOCs (µg/Kg)	
Benz(a)anthracene	2,400
Benzo(a)pyrene	2,200
Benzo(b)fluoranthene	2,100
Benzo(k)fluoranthene	2,100
Chrysene	2,500
Indeno(1,2,3-cd)pyrene	1,200
PCB (µg/Kg)	
PCB-1254	440
Metals (mg/Kg)	
Lead	395
Mercury	2.4
Zinc	238

SB1701 (11-13') 11/19/2018	
VOCs (µg/Kg)	
Tetrachloroethene	2,100
Trichloroethene	870

SB1701 (13-15') 11/19/2018
No Exceedances

SB1705 (0-6") 11/20/2018	
VOCs (µg/Kg)	
1,1,1-Tricholorethane	740
cis-1,2-Dichloroethene	5,900
m&p -Xylene	1,200
Methyl Ethyl Ketone	470
Methylene Chloride	3,700
Tetrachloroethene	11,000
Trichloroethene	3,500
Metals (mg/Kg)	
Arsenic	43.4
Barium	351
Cadmium	3.76
Copper	54.8
Lead	1,840
Mercury	1.82
Selenium	10.6
Zinc	486

SB1705 (6-12") 11/20/2018	
VOCs (µg/Kg)	
1,1,1-Tricholorethane	1,100
cis-1,2-Dichloroethene	5,100
m&p -Xylene	330
Methylene Chloride	420
Tetrachloroethene	22,000
Trichloroethene	3,100
SVOCs (µg/Kg)	
Benz(a)anthracene	1,100
Benzo(b)fluoranthene	1,900
Benzo(k)fluoranthene	1,500
Chrysene	1,700
Indeno(1,2,3-cd)pyrene	1,600
Pesticides (µg/Kg)	
4,4' - DDE	8.5
PCB (µg/Kg)	
PCB-1254	1,700
Metals (mg/Kg)	
Arsenic	14.2
Barium	721
Cadmium	3.79
Chromium	44.7
Copper	110
Lead	1,090
Mercury	1.42
Zinc	675

SB1705 (12-24") 11/20/2018	
VOCs (µg/Kg)	
cis-1,2-Dichloroethene	3,900
Tetrachloroethene	17,000
Trichloroethene	20,000
SVOCs (µg/Kg)	
Indeno(1,2,3-cd)pyrene	1,000
Metals (mg/Kg)	
Arsenic	78.1
Barium	5,630
Cadmium	10.9
Copper	66.8
Lead	5,970
Mercury	5.2
Selenium	24
Zinc	4,370

SB1705 (11-13') 11/20/2018	
VOCs (µg/Kg)	
1,1,1-Tricholoroethane	70,000
1,1-Dichloroethane	1,100
1,1-Dichloroethene	340
1,2,4-Trimethylbenzene	53,000
1,2-Dichlorobenzene	13,000
1,3,5-Trimethylbenzene	21,000
1,4-Dichlorobenzene	2,700
cis-1,2-Dichloroethene	78,000
Ethylbenzene	38,000
m&p-Xylenes	140,000
n-Propylbenzene	8,900
Tetrachloroethene	96,000
Toluene	79,000
Trichloroethene	7,400
Vinyl Chloride	89
SVOCs (µg/Kg)	
1,2-Dicholorbenzene	3,300
PCB (µg/Kg)	
PCB-1254	340

SB1705 (13-15') 11/20/2018	
VOCs (µg/Kg)	
1,1,1-Tricholoroethane	51,000
1,1-Dichloroethane	710
1,2,4-Trimethylbenzene	14,000
1,2-Dichlorobenzene	2,700
Acetone	990
cis-1,2-Dichloroethene	38,000
Ethylbenzene	35,000
m&p-Xylenes	140,000
Tetrachloroethene	440,000
Toluene	88,000
Trichloroethene	26,000
PCB (µg/Kg)	
PCB-1254	340

SB1703 (0-6") 11/20/2018	
VOCs (µg/Kg)	
1,1,1-Tricholorethane	2,800
Acetone	75
cis-1,2-Dichloroethene	3,300
m&p -Xylene	1,900
Methylene Chloride	130
Tetrachloroethene	110,000
Trichloroethene	7,900
SVOCs (µg/Kg)	
Indeno(1,2,3-cd)pyrene	650
Pesticides (µg/Kg)	
4,4' - DDT	200
PCB (µg/Kg)	
PCB-1254	3,200
Metals (mg/Kg)	
Copper	58.5
Zinc	284

SB1703 (6-12") 11/20/2018	
VOCs (µg/Kg)	
1,1,1-Tricholorethane	4,300
1,1-Dichloroethane	840
cis-1,2-Dichloroethene	16,000
m&p -Xylene	4,500
Tetrachloroethene	370,000
Toluene	2,800
trans-1,2-Dichloroethene	300
Trichloroethene	29,000
SVOCs (µg/Kg)	
Benzo(b)fluoranthene	1,300
Benzo(k)fluoranthene	1,100
Chrysene	1,200
Indeno(1,2,3-cd)pyrene	1,400
Pesticides (µg/Kg)	
4,4' - DDT	46
PCB (µg/Kg)	
PCB-1254	550
Metals (mg/Kg)	
Copper	76.6
Zinc	610

SB1703 (12-24") 11/20/2018	
VOCs (µg/Kg)	
cis-1,2-Dichloroethene	2,200
m&p -Xylene	1,300
Tetrachloroethene	17,000
Trichloroethene	4,400
Metals (mg/Kg)	
Zinc	254

SB1703 (7-9') 11/20/2018	
VOCs (µg/Kg)	
1,2-Dichlorobenzene	1,500
cis-1,2-Dichloroethene	1,200
Tetrachloroethene	10,000
Trichloroethene	1,800

SB1703 (11-13') 11/20/2018	
VOCs (µg/Kg)	
1,2-Dichlorobenzene	2,500
cis-1,2-Dichloroethene	2,500
Tetrachloroethene	57,000
Trichloroethene	5,200

SB1703 (13-15') 11/20/2018	
VOCs (µg/Kg)	
1,2-Dichlorobenzene	1,600
cis-1,2-Dichloroethene	1,800
Tetrachloroethene	7,900
Trichloroethene	5,200

SB1706 (0-6") 11/20/2018	
SVOCs (µg/Kg)	
Benz(a)anthracene	1,300
Benzo(a)pyrene	1,200
Benzo(b)fluoranthene	1,200
Benzo(k)fluoranthene	1,200
Chrysene	1,400
Indeno(1,2,3-cd)pyrene	790
Pesticides (µg/Kg)	
4,4' -DDT	46
a-Chlordane	240
Chlordane	830
Metals (mg/Kg)	
Lead	457
Mercury	1.44
Zinc	230

SB1706 (6-12") 11/20/2018	
SVOCs (µg/Kg)	
Benz(a)anthracene	2,000
Benzo(a)pyrene	1,900
Benzo(b)fluoranthene	1,700
Benzo(k)fluoranthene	1,800
Chrysene	2,100
Dibenz(a,h)anthracene	620
Indeno(1,2,3-cd)pyrene	1,400
Pesticides (µg/Kg)	
4,4' -DDT	43
a-Chlordane	1,200
Chlordane	4,400
Metals (mg/Kg)	
Barium	354
Chromium	32.8
Copper	56.6
Lead	691
Mercury	2.41
Zinc	358

SB1706 (12-24") 11/20/2018	
VOCs (µg/Kg)	
1,1,1-Trichloroethane	1,700
cis-1,2-Dichloroethene	820
M&P - Xylenes	2,900
Tetrachloroethene	13,000
Toluene	1,500
Trichloroethene	840
SVOCs (µg/Kg)	
Benz(a)anthracene	1,200
Benzo(a)pyrene	1,500
Benzo(b)fluoranthene	1,600
Benzo(k)fluoranthene	1,400
Chrysene	1,300
Indeno(1,2,3-cd)pyrene	1,600
Pesticides (µg/Kg)	
4,4' -DDT	16
a-Chlordane	260
Chlordane	970
Metals (mg/Kg)	
Cadmium	3.38
Chromium	42.2
Lead	301
Mercury	2.5
Zinc	235

SB1706 (7-9') 11/20/2018	
VOCs (µg/Kg)	
n-Propylbenzene	4,000

SB1706 (13-15') 11/20/2018	
VOCs (µg/Kg)	
Acetone	200

SB1704 (0-6") 11/20/2018	
VOCs (µg/Kg)	
cis-1,2-Dichloroethene	630
Tetrachloroethene	11,000
Trichloroethene	4,600
SVOCs (µg/Kg)	
Benz(a)anthracene	1,800
Benzo(a)pyrene	1,600
Benzo(b)fluoranthene	1,400
Benzo(k)fluoranthene	1,600
Chrysene	1,900
Indeno(1,2,3-cd)pyrene	870
Pesticides (µg/Kg)	
4,4,4-DDT	9.4
Metals (mg/Kg)	
Lead	208
Mercury	1.47
Zinc	197

SB1704 (6-12") 11/20/2018	
Metals (mg/Kg)	
Copper	83
Lead	0.28

SB1704 (12-24") 11/20/2018
No Exceedances

SB1704 (13-15') 11/20/2018	
VOCs (µg/Kg)	
Tetrachloroethene	4,500
Trichloroethene	2,200

SB1707 (0-6") 11/20/2018	
VOCs (µg/Kg)	
cis-1,2-Dichloroethene	3,300
Methylene Chloride	53
Trichloroethene	28,000
Tetrachloroethene	6,700
SVOCs (µg/Kg)	
Benz(a)anthracene	1,400
Benzo(b)fluoranthene	1,300
Benzo(k)fluoranthene	1,400
Chrysene	1,900
Indeno(1,2,3-cd)pyrene	1,000
Pesticides (µg/Kg)	
4,4,4-DDT	60
Dieldrin	20
Pesticides (µg/Kg)	
4,4,4-DDT	890
Metals (mg/Kg)	
Chromium	30.5
Copper	51
Lead	483
Zinc	3.96

SB1707 (6-12") 11/20/2018	
VOCs (µg/Kg)	
cis-1,2-Dichloroethene	1,300
Tetrachloroethene	11,000
Trichloroethene	2,000
PCB (µg/Kg)	
PCB-1254	340
Metals (mg/Kg)	
Lead	302
Mercury	0.58

SB1707 (12-24") 11/20/2018
No Exceedances

SB1707 (13-15') 11/20/2018	
VOCs (µg/Kg)	
cis-1,2-Dichloroethene	4,500
Tetrachloroethene	120,000
Trichloroethene	11,000
Pesticides (µg/Kg)	
4,4,4-DDD	6.2

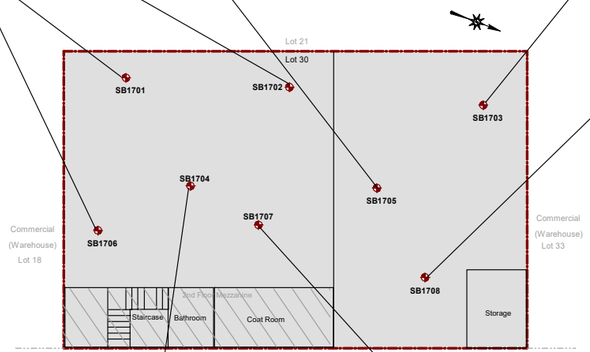
SB1708 (0-6") 11/20/2018	
VOCs (µg/Kg)	
1,1,1-Tricholorethane	1,000
1,1-Dichloroethane	310
Acetone	170
cis-1,2-Dichloroethene	5,400
m&p -Xylene	640
Methyl Ethyl Ketone	500
Tetrachloroethene	7,600
Trichloroethene	1,600
SVOCs (µg/Kg)	
Benzo(a)pyrene	1,200
Benzo(b)fluoranthene	1,400
Benzo(k)fluoranthene	1,200
Chrysene	2,100
Indeno(1,2,3-cd)pyrene	1,400
PCB (µg/Kg)	
PCB-1254	190
Metals (mg/Kg)	
Lead	282
Mercury	1.13
Zinc	182

SB1708 (6-12") 11/20/2018	
VOCs (µg/Kg)	
1,1,1-Tricholorethane	1,000
cis-1,2-Dichloroethene	3,500
Tetrachloroethene	6,500
Trichloroethene	1,200
SVOCs (µg/Kg)	
Benzo(a)pyrene	1,700
Benzo(b)fluoranthene	2,100
Benzo(k)fluoranthene	2,100
Indeno(1,2,3-cd)pyrene	1,300
Benzo(k)fluoranthene	870
Indeno(1,2,3-cd)pyrene	2,900
Pesticides (µg/Kg)	
4,4,4-DDT	280
PCB (µg/Kg)	
PCB-1260	5,400
Metals (mg/Kg)	
Arsenic	16.6
Cadmium	18.9
Chromium	56.8
Copper	224
Lead	851
Manganese	1,880
Mercury	0.99
Nickel	46.5
Zinc	679

SB1708 (12-24") 11/20/2018	
VOCs (µg/Kg)	
1,1,1-Tricholorethane	3,400
1,1-Dichloroethane	690
cis-1,2-Dichloroethene	11,000
m&p -Xylene	4,100
o -Xylene	1,900
Tetrachloroethene	39,000
Toluene	4,800
trans-1,2-Dichloroethene	420
Trichloroethene	8,800
SVOCs (µg/Kg)	
Indeno(1,2,3-cd)pyrene	550
PCB (µg/Kg)	
PCB-1254	390
Metals (mg/Kg)	
Arsenic	17
Cadmium	6.64
Chromium	51.5
Copper	188
Lead	1,240
Manganese	4,920
Mercury	1.87
Nickel	43.8
Zinc	222

SB1708 (7-9') 11/20/2018	
VOCs (µg/Kg)	
1,1,1-Trichloroethane	480,000
1,1-Dichloroethane	5,600
1,1-Dichloroethene	1,600
1,2,4-Trimethylbenzene	39,000
1,2-Dichlorobenzene	7,000
1,3,5-Trimethylbenzene	17,000
Benzene	110
cis-1,2-Dichloroethene	210,000
Ethylbenzene	210,000
m&p-Xylenes	777,000
n-Propylbenzene	8,700
o-Xylene	200,000
Tetrachloroethene	3,200,000
Toluene	390,000
Trichloroethene	200,000
Vinyl Chloride	100
PCB (µg/Kg)	
PCB-1254	440

SB1708 (13-15') 11/20/2018	
VOCs (µg/Kg)	
1,1,1-Tricholorethane	4,000
1,1-Dichloroethane	600
cis-1,2-Dichloroethene	21,000
m&p -Xylene	2,800
Tetrachloroethene	1,700
Trichloroethene	170



NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. ALL DATA FROM THE REMEDIAL INVESTIGATION COMPLETED BY EBC AND PUBLISHED IN THE REMEDIAL INVESTIGATION REPORT DATED SEPTEMBER 2019.

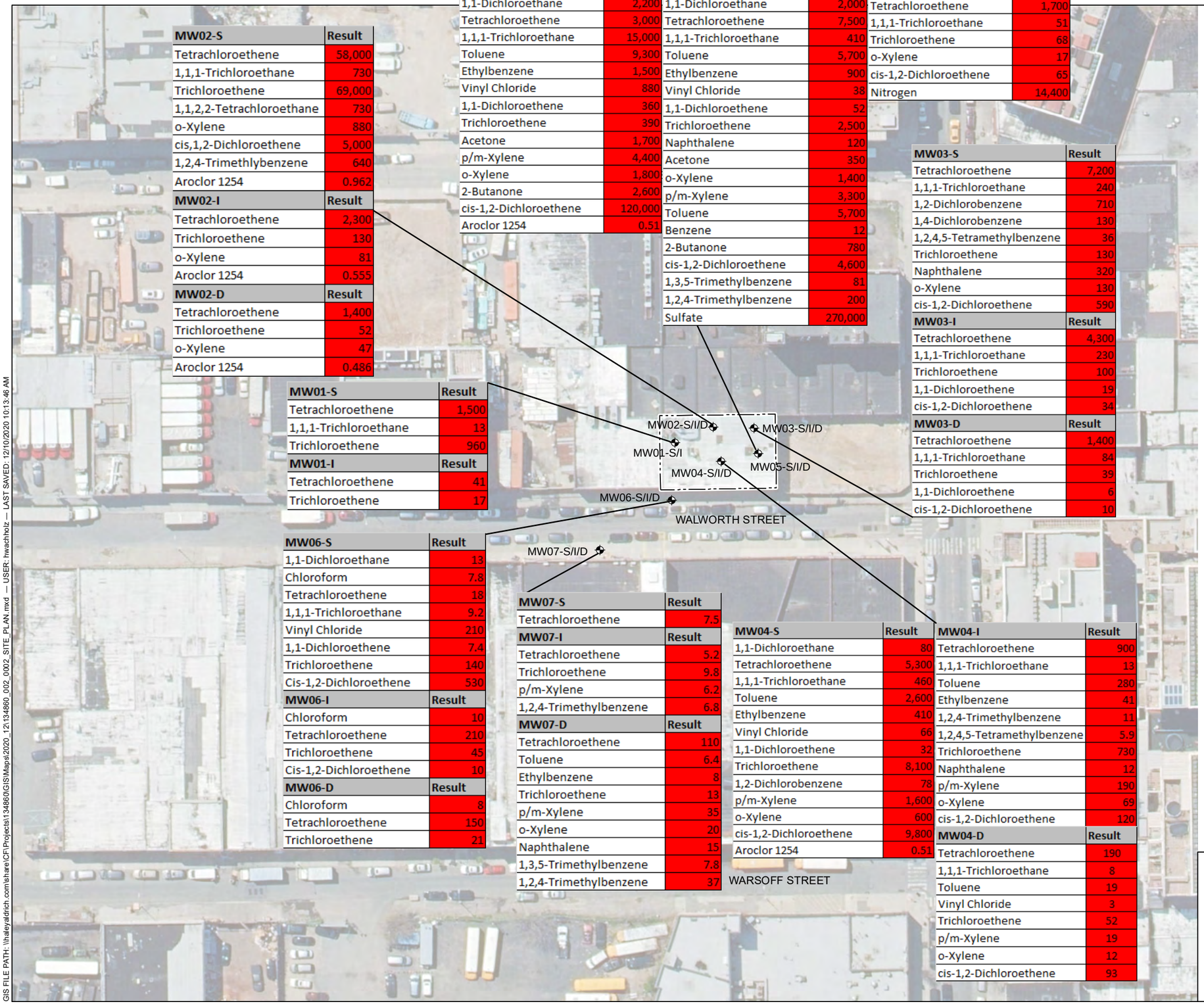
HALEY ALDRICH

8 WALWORTH STREET
BROOKLYN, NEW YORK

MAP OF SHALLOW INTERVAL SOIL CHEMISTRY

JUNE 2021

FIGURE 4



MW02-S	Result
Tetrachloroethene	58,000
1,1,1-Trichloroethane	730
Trichloroethene	69,000
1,1,2,2-Tetrachloroethane	730
o-Xylene	880
cis,1,2-Dichloroethene	5,000
1,2,4-Trimethylbenzene	640
Aroclor 1254	0.962

MW02-I	Result
Tetrachloroethene	2,300
Trichloroethene	130
o-Xylene	81
Aroclor 1254	0.555

MW02-D	Result
Tetrachloroethene	1,400
Trichloroethene	52
o-Xylene	47
Aroclor 1254	0.486

MW05-S	Result
1,1-Dichloroethane	2,200
Tetrachloroethene	3,000
1,1,1-Trichloroethane	15,000
Toluene	9,300
Ethylbenzene	1,500
Vinyl Chloride	880
1,1-Dichloroethene	360
Trichloroethene	390
Acetone	1,700
p/m-Xylene	4,400
o-Xylene	1,800
2-Butanone	2,600
cis-1,2-Dichloroethene	120,000
Aroclor 1254	0.51

MW05-I	Result
1,1-Dichloroethane	2,000
Tetrachloroethene	7,500
1,1,1-Trichloroethane	410
Toluene	5,700
Ethylbenzene	900
Vinyl Chloride	38
1,1-Dichloroethene	52
Trichloroethene	2,500
Naphthalene	120
Acetone	350
o-Xylene	1,400
p/m-Xylene	3,300
Toluene	5,700
Benzene	12
2-Butanone	780
cis-1,2-Dichloroethene	4,600
1,3,5-Trimethylbenzene	81
1,2,4-Trimethylbenzene	200
Sulfate	270,000

MW05-D	Result
Tetrachloroethene	1,700
1,1,1-Trichloroethane	51
Trichloroethene	68
o-Xylene	17
cis-1,2-Dichloroethene	65
Nitrogen	14,400

MW03-S	Result
Tetrachloroethene	7,200
1,1,1-Trichloroethane	240
1,2-Dichlorobenzene	710
1,4-Dichlorobenzene	130
1,2,4,5-Tetramethylbenzene	36
Trichloroethene	130
Naphthalene	320
o-Xylene	130
cis-1,2-Dichloroethene	590

MW03-I	Result
Tetrachloroethene	4,300
1,1,1-Trichloroethane	230
Trichloroethene	100
1,1-Dichloroethene	19
cis-1,2-Dichloroethene	34

MW03-D	Result
Tetrachloroethene	1,400
1,1,1-Trichloroethane	84
Trichloroethene	39
1,1-Dichloroethene	6
cis-1,2-Dichloroethene	10

MW01-S	Result
Tetrachloroethene	1,500
1,1,1-Trichloroethane	13
Trichloroethene	960

MW01-I	Result
Tetrachloroethene	41
Trichloroethene	17

MW06-S	Result
1,1-Dichloroethane	13
Chloroform	7.8
Tetrachloroethene	18
1,1,1-Trichloroethane	9.2
Vinyl Chloride	210
1,1-Dichloroethene	7.4
Trichloroethene	140
Cis-1,2-Dichloroethene	530

MW06-I	Result
Chloroform	10
Tetrachloroethene	210
Trichloroethene	45
Cis-1,2-Dichloroethene	10

MW06-D	Result
Chloroform	8
Tetrachloroethene	150
Trichloroethene	21

MW07-S	Result
Tetrachloroethene	7.5

MW07-I	Result
Tetrachloroethene	5.2
Trichloroethene	9.8
p/m-Xylene	6.2
1,2,4-Trimethylbenzene	6.8

MW07-D	Result
Tetrachloroethene	110
Toluene	6.4
Ethylbenzene	8
Trichloroethene	13
p/m-Xylene	35
o-Xylene	20
Naphthalene	15
1,3,5-Trimethylbenzene	7.8
1,2,4-Trimethylbenzene	37

MW04-S	Result
1,1-Dichloroethane	80
Tetrachloroethene	5,300
1,1,1-Trichloroethane	460
Toluene	2,600
Ethylbenzene	410
Vinyl Chloride	66
1,1-Dichloroethene	32
Trichloroethene	8,100
1,2-Dichlorobenzene	78
p/m-Xylene	1,600
o-Xylene	600
cis-1,2-Dichloroethene	9,800
Aroclor 1254	0.51

MW04-I	Result
Tetrachloroethene	900
1,1,1-Trichloroethane	13
Toluene	280
Ethylbenzene	41
1,2,4-Trimethylbenzene	11
1,2,4,5-Tetramethylbenzene	5.9
Trichloroethene	730
Naphthalene	12
p/m-Xylene	190
o-Xylene	69
cis-1,2-Dichloroethene	120

MW04-D	Result
Tetrachloroethene	190
1,1,1-Trichloroethane	8
Toluene	19
Vinyl Chloride	3
Trichloroethene	52
p/m-Xylene	19
o-Xylene	12
cis-1,2-Dichloroethene	93

LEGEND

- SITE BOUNDARY
- OFFSITE MONITORING WELL CLUSTER LOCATIONS
- PROPOSED OFFSITE MONITORING WELLS (POST REMEDY INSTALLATION)

NY TOGS 111 Ambient Water Quality Standards		
Analyte	**Units**	**NY AWQS**
Chloroform	µg/L	7
Tetrachloroethene	µg/L	5
Trichloroethene	µg/L	5
Cis-1,2-Dichloroethene	µg/L	5
1,1,1-Trichloroethane	µg/L	5
Vinyl Chloride	µg/L	2
1,1-Dichloroethene	µg/L	5
p/m-Xylene	µg/L	5
o-Xylene	µg/L	5
1,2,4-Trimethylbenzene	µg/L	5
Ethylbenzene	µg/L	5
Naphthalene	µg/L	10
1,3,5-Trimethylbenzene	µg/L	5

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI

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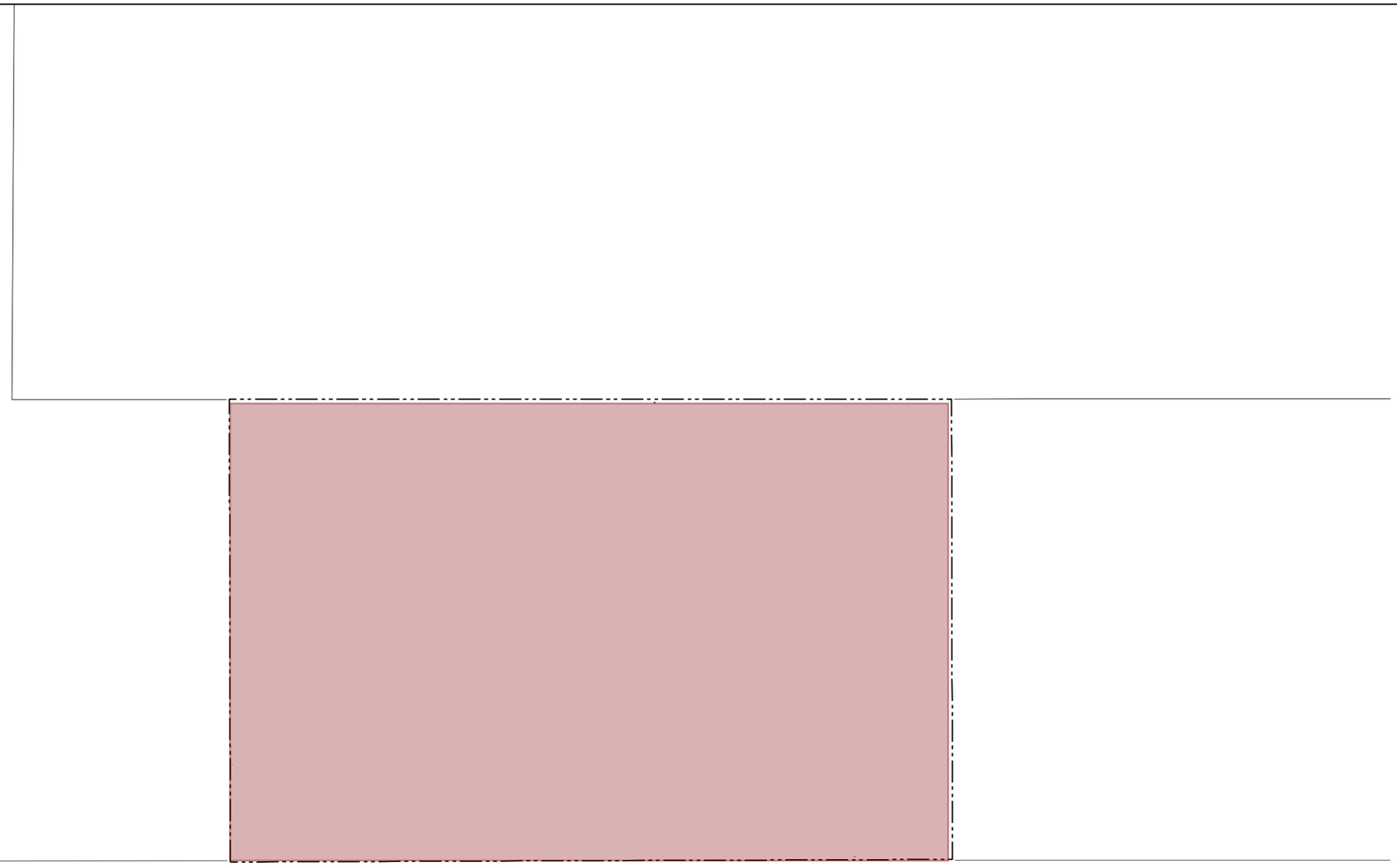
HALEY ALDRICH

8 WALWORTH STREET
BROOKLYN, NEW YORK

MAP OF GROUNDWATER CHEMISTRY

JUNE 2021

FIGURE 5



LEGEND

SITE BOUNDARY

35 FT EXCAVATION (WITH POTENTIAL 45 FT BGS HOTSPOTS)

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. KINGS COUNTY PARCELS RETRIEVED FROM GIS.NY.GOV

WALWORTH STREET

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HALEY ALDRICH

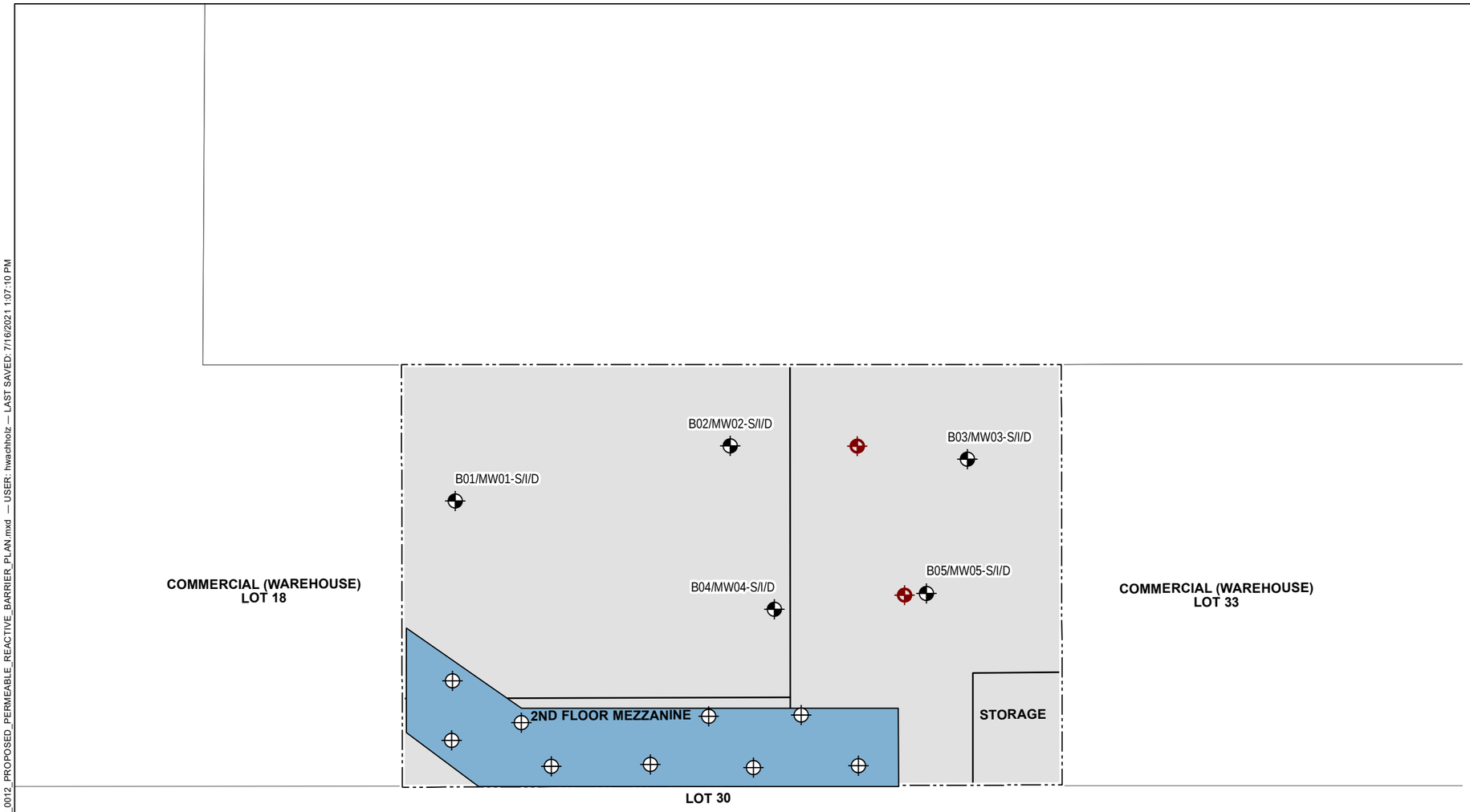
8 WALWORTH STREET
BROOKLYN, NEW YORK

ALTERNATIVE I CLEANUP PROGRAM EXCAVATION MAP

JUNE 2021

FIGURE 6

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\134860\GIS\Maps\2020_02\134860_002_0002_SITE_FEATURE_MAP.mxd — USER: hwachholz — LAST SAVED: 2/28/2020 2:44:44 PM



LEGEND

- SAMPLE LOCATION
- APPROXIMATE LOCATION OF ZVI INJECTION POINT
- PROPOSED PERMEABLE REACTIVE BARRIER (15-30 FT BGS)
- EXISTING BUILDING
- KINGS COUNTY PARCEL
- SITE BOUNDARY
- PROPOSED MONITORING WELLS (POST REMEDY INSTALLATION)

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. KINGS COUNTY PARCELS RETRIEVED FROM GIS.NY.GOV
3. INSTALLATION OF TWO POST REMEDIATION WELLS ON SITE IN ADDITION TO PRESERVING MW-01, MW-02 AND MW-04 DURING CONSTRUCTION. IF WELLS CANNOT BE PRESERVED DURING CONSTRUCTION, THEY WILL BE REINSTALLED UPON COMPLETION OF INTRSUSIVE WORK AND PRIOR TO OCCUPANCY.
4. SOIL VAPOR MONITORING POINTS WILL BE INSTALLED AT MW-01, MW-02 AND MW-04, TO BE RETAINED OR REINSTALLED POST CONSTRUCTION, AND AT PROPOSED WELL LOCATIONS WITHIN THE SOURCE AREA, TO BE INSTALLED POST REMEDY PRIOR TO OCCUPANCY.

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SCALE IN FEET

HALEY ALDRICH

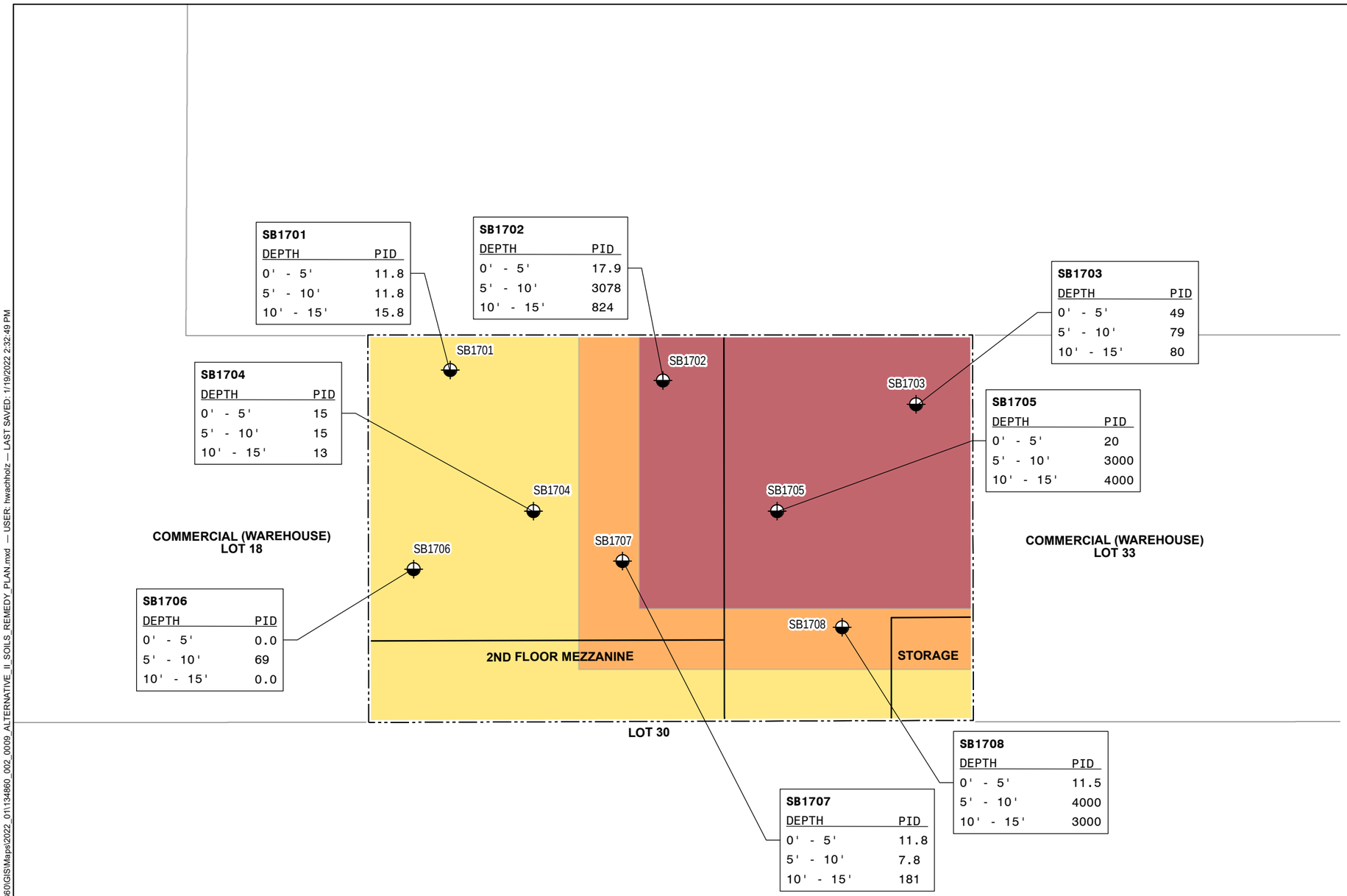
8 WALWORTH STREET
BROOKLYN, NEW YORK

PROPOSED PERMEABLE REACTIVE BARRIER PLAN

JULY 2021

FIGURE 7

GIS FILE PATH: C:\Users\hwachholz\Documents\working\134860\GIS\Maps\2021_071134860_002_0012_PROPOSED_PERMEABLE_REACTIVE_BARRIER_PLAN.mxd — USER: hwachholz — LAST SAVED: 7/16/2021 1:07:10 PM



LEGEND

- SOIL BORING
- 5-FT EXCAVATION
- 1:1 SLOPED EXCAVATION
- 13-FT EXCAVATION
- KINGS COUNTY PARCEL
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. PHOTOIONIZATION DETECTOR (PID) READINGS ARE DISPLAYED IN PARTS PER MILLION (PPM)
3. EXCAVATION DEPTHS BASED ON FOUNDATION/CELLAR FLOOR PLAN, DRAWING FO-100.00, DATED 12/10/21 BY DJLU ARCHITECT
4. KINGS COUNTY PARCELS RETRIEVED FROM GIS.NY.GOV

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SCALE IN FEET

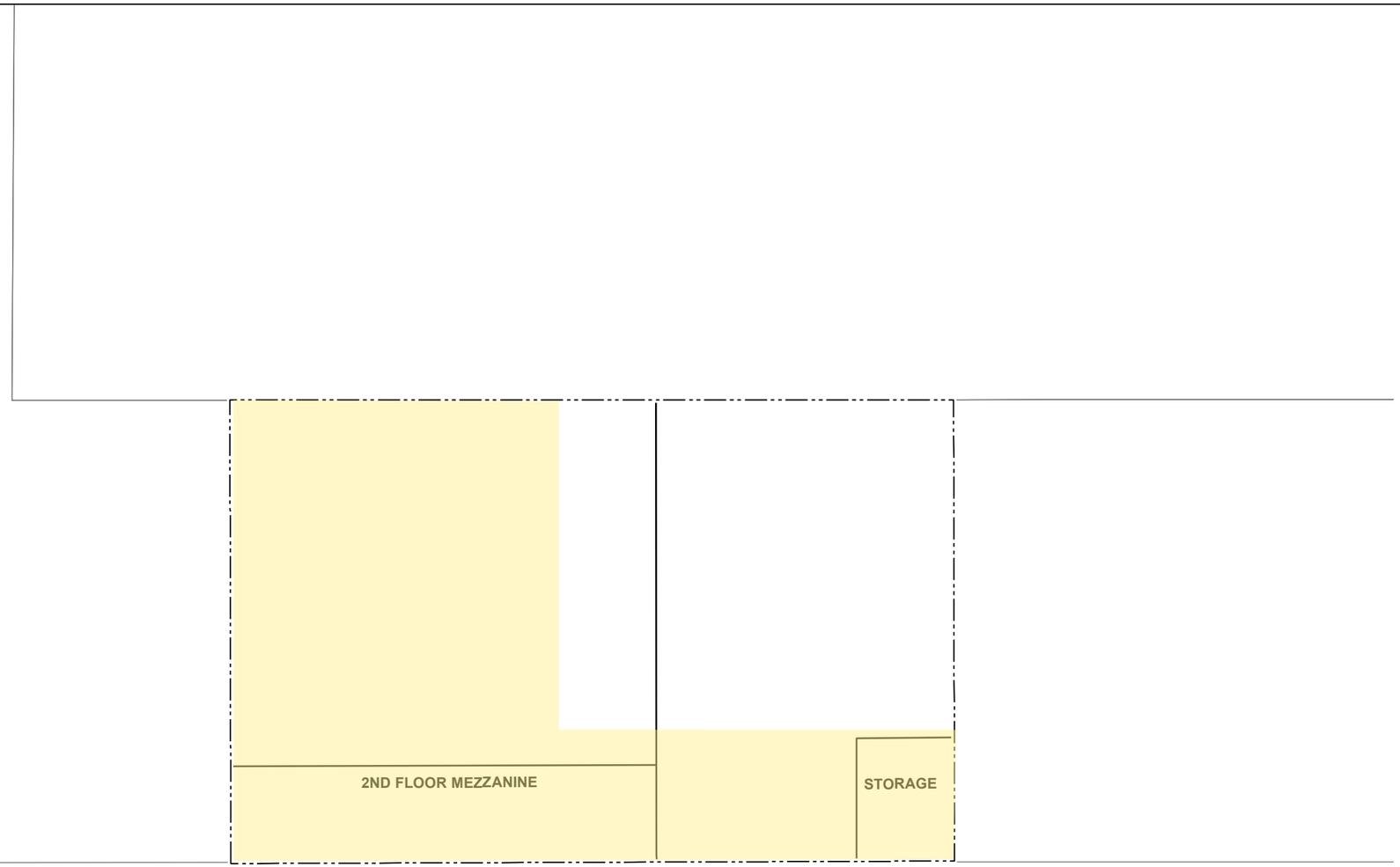
HALEY ALDRICH

8 WALWORTH STREET
BROOKLYN, NEW YORK

ALTERNATIVE II SOILS REMEDY PLAN

JANUARY 2022

FIGURE 8



LEGEND

- SITE BOUNDARY
- BACKFILL AREA
- KINGS COUNTY PARCEL

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. KINGS COUNTY PARCELS RETRIEVED FROM GIS.NY.GOV

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SCALE IN FEET

HALEY ALDRICH

8 WALWORTH STREET
BROOKLYN, NEW YORK

BACKFILL PLAN

FEBRUARY 2020

FIGURE 9

GIS FILE PATH: \\haleyaldrich.com\shares\CF\Projects\134860\GIS\Maps\2020_02\134860_002_0002_SITE_FEATURE_MAP.mxd — USER: hwachholz — LAST SAVED: 2/28/2020 2:44:44 PM

SS1 - 1/17/2019	
1,1,1,2-Tetrachloroethane	115
1,1,1-Trichloroethane	29,700
1,1,2-Trichloroethane	85.1
1,1-Dichloroethane	1,410
1,1-Dichloroethene	355
1,2,4-Trimethylbenzene	12.6
4-Ethyltoluene	17.2
Acetone	304
Benzene	53
Carbon Tetrachloride	6,010
Chloroform	839
cis-1,2-Dichloroethene	36,400
Cyclohexane	37.8
Ethanol	79.3
Ethylbenzene	13.4
Heptane	10.5
Isopropylalcohol	104
Xylene (m&p)	45.6
Xylene (o)	21.7
Propylene	35.4
Tetrachloroethene	590,000
Toluene	124
trans-1,2-Dichloroethene	255
Trichloroethene	488,000
Trichlorofluoromethane	769
Trichlorotrifluoroethane	366
Vinyl Chloride	99.6

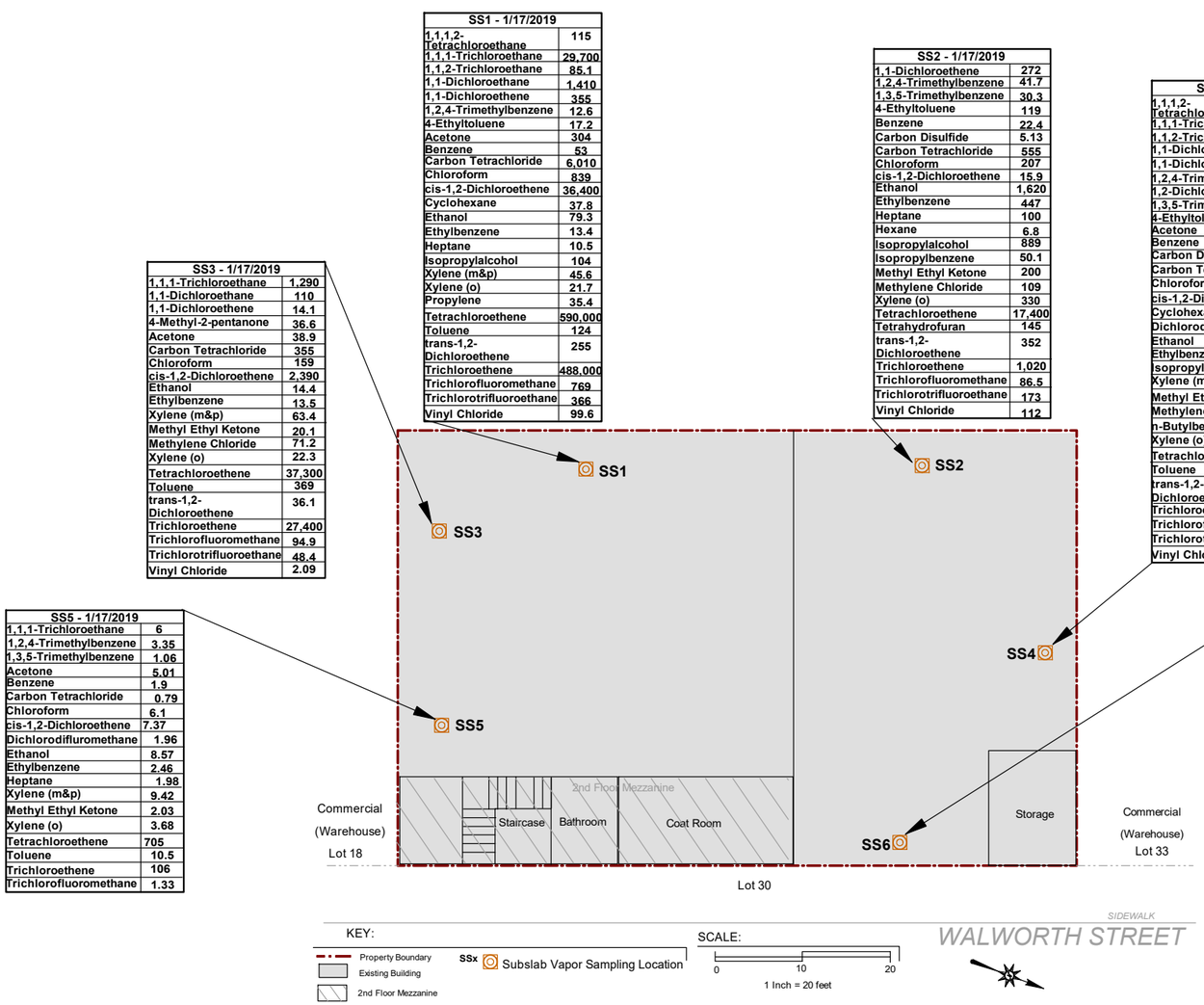
SS2 - 1/17/2019	
1,1-Dichloroethene	272
1,2,4-Trimethylbenzene	41.7
1,3,5-Trimethylbenzene	30.3
4-Ethyltoluene	119
Benzene	22.4
Carbon Disulfide	5.13
Carbon Tetrachloride	555
Chloroform	207
cis-1,2-Dichloroethene	15.9
Ethanol	1,620
Ethylbenzene	447
Heptane	100
Hexane	6.8
Isopropylalcohol	889
Isopropylbenzene	50.1
Methyl Ethyl Ketone	200
Methylene Chloride	109
Xylene (o)	330
Tetrachloroethene	17,400
Tetrahydrofuran	145
trans-1,2-Dichloroethene	352
Trichloroethene	1,020
Trichlorofluoromethane	86.5
Trichlorotrifluoroethane	173
Vinyl Chloride	112

SS3 - 1/17/2019	
1,1,1-Trichloroethane	1,290
1,1-Dichloroethane	110
1,1-Dichloroethene	14.1
4-Methyl-2-pentanone	36.6
Acetone	38.9
Carbon Tetrachloride	355
Chloroform	159
cis-1,2-Dichloroethene	2,390
Ethanol	14.4
Ethylbenzene	13.5
Xylene (m&p)	63.4
Methyl Ethyl Ketone	20.1
Methylene Chloride	71.2
Xylene (o)	22.3
Tetrachloroethene	37,300
Toluene	369
trans-1,2-Dichloroethene	36.1
Trichloroethene	27,400
Trichlorofluoromethane	94.9
Trichlorotrifluoroethane	48.4
Vinyl Chloride	2.09

SS4 - 1/17/2019	
1,1,1,2-Tetrachloroethane	4.65
1,1,1-Trichloroethane	42,400
1,1,2-Trichloroethane	32.8
1,1-Dichloroethane	6,710
1,1-Dichloroethene	456
1,2,4-Trimethylbenzene	4.11
1,2-Dichloroethane	4.65
1,3,5-Trimethylbenzene	1.7
4-Ethyltoluene	4.44
Acetone	228
Benzene	8.17
Carbon Disulfide	1.82
Carbon Tetrachloride	66
Chloroform	68.3
cis-1,2-Dichloroethene	60,600
Cyclohexane	15.2
Dichlorodifluromethane	2.8
Ethanol	18.8
Ethylbenzene	3.91
Isopropylalcohol	14
Xylene (m&p)	16.7
Methyl Ethyl Ketone	20.7
Methylene Chloride	175
n-Butylbenzene	1.03
Xylene (o)	6.21
Tetrachloroethene	54,400
Toluene	51.2
trans-1,2-Dichloroethene	1,690
Trichloroethene	16,900
Trichlorofluoromethane	14.4
Trichlorotrifluoroethane	167
Vinyl Chloride	143

SS5 - 1/17/2019	
1,1,1-Trichloroethane	6
1,2,4-Trimethylbenzene	3.35
1,3,5-Trimethylbenzene	1.06
Acetone	5.01
Benzene	1.9
Carbon Tetrachloride	0.79
Chloroform	6.1
cis-1,2-Dichloroethene	7.37
Dichlorodifluromethane	1.96
Ethanol	8.57
Ethylbenzene	2.46
Heptane	1.98
Xylene (m&p)	9.42
Methyl Ethyl Ketone	2.03
Xylene (o)	3.68
Tetrachloroethene	705
Toluene	10.5
Trichloroethene	106
Trichlorofluoromethane	1.33

SS6 - 1/17/2019	
1,1,1-Trichloroethane	88,300
1,1-Dichloroethane	15,200
1,1-Dichloroethene	1,030
4-Methyl-2-pentanone	35.8
Acetone	323
Benzene	12.5
Carbon Tetrachloride	20.1
Chloroform	51.2
cis-1,2-Dichloroethene	73,300
Cyclohexane	59.2
Ethanol	61.6
Heptane	106
Hexane	15.8
Isopropylalcohol	71.7
Xylene (m&p)	20.8
Methyl Ethyl Ketone	115
Tetrachloroethene	25,200
Toluene	88.5
trans-1,2-Dichloroethene	2,800
Trichloroethene	11,000
Trichlorofluoromethane	13.1
Trichlorotrifluoroethane	460
Vinyl Chloride	593



NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. ALL DATA FROM THE REMEDIAL INVESTIGATION COMPLETED BY EBC AND PUBLISHED IN THE REMEDIAL INVESTIGATION REPORT DATED SEPTEMBER 2019.

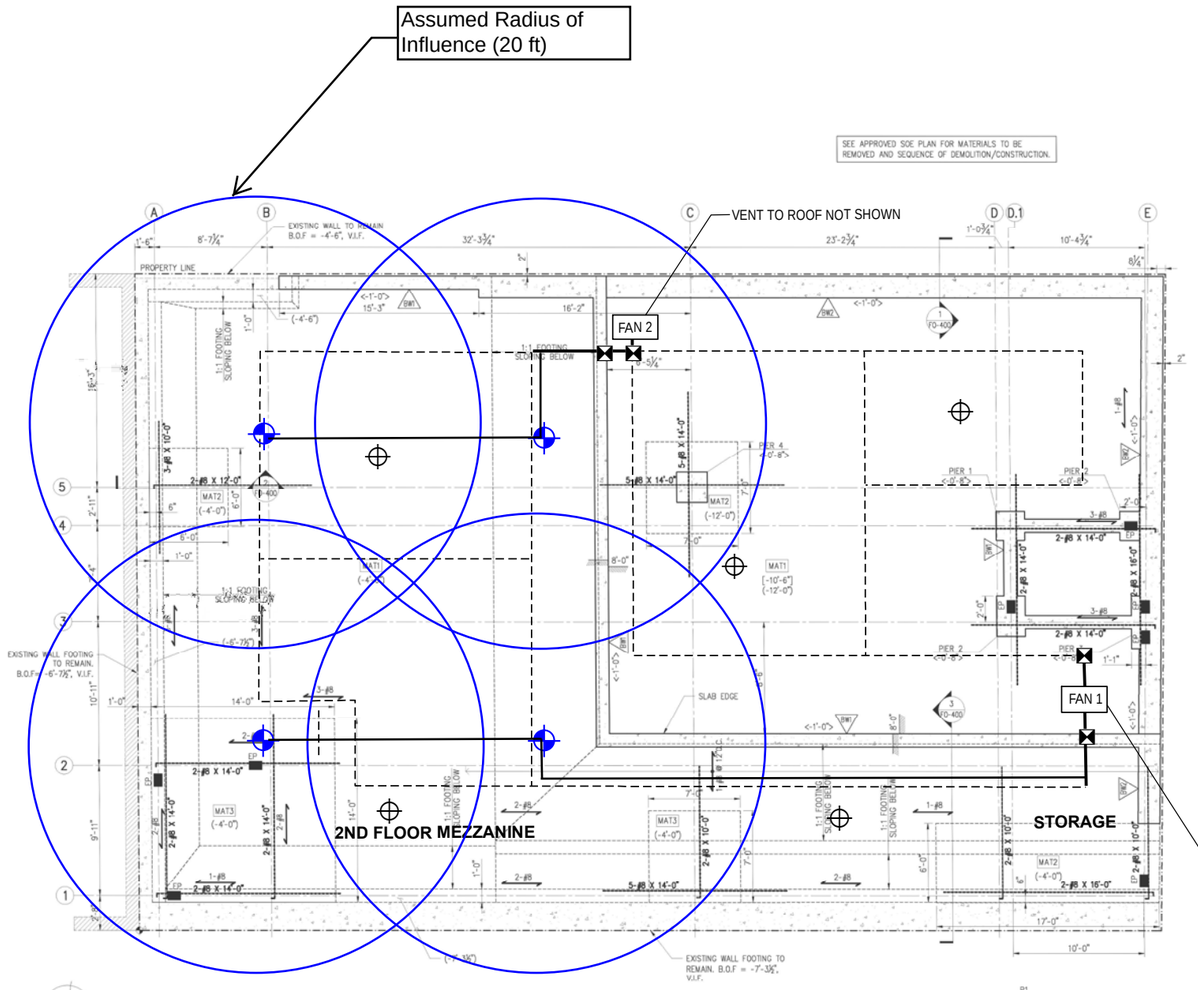
HALEY ALDRICH

8 WALWORTH STREET
BROOKLYN, NEW YORK

MAP OF HISTORICAL SOIL VAPOR CHEMISTRY

JUNE 2021

FIGURE 10



N

FOUNDATION / CELLAR FLOOR PLAN

SCALE: ⅛" = 1'-0"

LEGEND:

- ADDITIONAL CONTINUOUS TOP STEEL
- ADDITIONAL BOTTOM STEEL
- INDICATES (0,0) COORDINATE LOCATION (CORNER OF PROPERTY LINE)

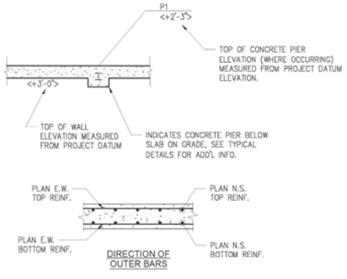
FOUNDATION WALLS ARE INDICATED ON PLAN THUS:

REINFORCED CONCRETE WALL BELOW SOG AND 1ST FLOOR SLAB

FOUNDATION WALLS MARKED ON PLAN

INDICATED THUS: BW1

SHALL BE CONCRETE WALLS REINFORCED IN ACCORDANCE WITH FOUNDATION WALL SCHEDULE. SEE TYPICAL DETAILS FOR ADDITIONAL INFORMATION.



FOUNDATION NOTES:

1. [XX'-XX"] INDICATES TOP OF SLAB ELEVATION RELATIVE TO THE PROJECT DATUM. [±XX'-XX"] INDICATES ELEVATION RELATIVE TO TOP OF SLAB ELEVATION. NOTE, +13.35 NAVD88 CORRESPONDS TO +0'-0" PROJECT DATUM. SEE ARCH/CIVIL DRAWINGS FOR VERIFICATION.
2. FSX INDICATES FOOTING TYPE. SEE FOOTING SCHEDULE THIS SHEET.
3. SEE THE FOLLOWING DRAWINGS FOR THE ITEMS NOTED:

GENERAL NOTES	S-001
COLUMN/SHEAR WALL SCHEDULE & DETAILS	S-200's
TYPICAL DETAILS	S-300's
SECTIONS & DETAILS	S-400's

4. COOR. ALL SLAB OPEN. W/ MECH. SHOP DWGS. REINF. OPENING PER TYPICAL DETAILS.
5. SEE ARCHITECTURAL EDGE OF SLAB DRAWINGS FOR ALL DIMENSIONS AND COORDINATES, U.O.N.
6. (XX'-XX") INDICATES BOTTOM OF FOOTING ELEVATION RELATIVE TO PROJECT DATUM.

MAT FOOTING SCHEDULE (3TSF)

MAT MARK	MAT THICKNESS	REINFORCEMENT BOTTOM LONG WAY	BOTTOM SHORT WAY	TOP LONG WAY	TOP SHORT WAY	REMARK
MAT1	1'-6"	#6@12" O.C.	#6@12" O.C.	#6@12" O.C.	#6@12" O.C.	SEE PLAN FOR ADD'L REINF.
MAT2	2'-0"	#6@12" O.C.	#6@12" O.C.	#6@12" O.C.	#6@12" O.C.	SEE PLAN FOR ADD'L REINF.
MAT3	3'-0"	#8@12" O.C.	#8@12" O.C.	#8@12" O.C.	#8@12" O.C.	SEE PLAN FOR ADD'L REINF.

NOTES:
1. SEE TYPICAL DETAILS AND SECTIONS FOR ADDITIONAL INFORMATION
2. SEE ARCH. DWGS FOR WATERPROOFING DETAILS BELOW MAT.

CONCRETE PIER SCHEDULE

MARK	SIZE-WxD WIDTH	DEPTH	REINFORCEMENT LONGITUDINAL	TIES SIZE & SPACING	NOTES
P1	26	26	10-#8	#4 @ 12" O.C	
P2	26	37	14-#8	#4 @ 12" O.C	
P3	26	48	16-#8	#4 @ 12" O.C	
P4	28	28	10-#8	#4 @ 12" O.C	

NOTES:
1. SEE TYPICAL DETAILS AND SECTIONS FOR ADDITIONAL INFORMATION.
2. PROVIDE SUPPLEMENTAL TIES PER S-300'S.

FOUNDATION WALL SCHEDULE

WALL MARK	WALL THICKNESS	VERTICAL BARS INSIDE FACE	VERTICAL BARS OUTSIDE FACE	HORIZONTAL BARS INSIDE FACE	HORIZONTAL BARS OUTSIDE FACE	REMARK
BW1	12"	#5@12" O.C.	#4@12" O.C.	#4@12" O.C.	#4@12" O.C.	-
BW2	20"	#5@12" O.C.	#4@12" O.C.	#4@12" O.C.	#4@12" O.C.	-

NOTES:
1. SEE TYPICAL DETAILS AND SECTIONS FOR ADDITIONAL INFORMATION.
2. FOR SHEAR WALLS COINCIDENTAL WITH FOUNDATION WALLS, PROVIDE THE LARGER SIZE AND SMALLER SPACING OF THE SHEAR WALL OR FOUNDATION WALL REINFORCEMENT AT EACH FACE, EACH DIRECTION.

LEGEND

- VAPOR MONITORING POINT
- SEALED WELL/FLOOR PENETRATION
- SSDS 3-INCH PERFORATED ADS PIPE
- SSDS/SVE 3-INCH SOLID ADS PIPE
- SSDS/SVE FAN
- SVE POINT INSTALLED FROM 5-10' BGS

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. BASEMENT LAYOUT FROM FOUNDATION/CELLAR FLOOR PLAN, DRAWING FO-100.00, DATED 12/10/21 BY DJLU ARCHITECT
3. PILOT TEST PERFORMED BY GZA GEOENVIRONMENTAL IN 2017 CALCULATED A RADIUS OF INFLUENCE (ROI) OF 22'. IN CONSIDERATION OF THE PLANNED DEVELOPMENT AND CURRENT SLAB CONDITION (MULTIPLE PENETRATIONS FROM THE SUPPLEMENTAL REMEDIAL INVESTIGATION) WE HAVE EVALUATED THE GZA PILOT TEST AND BELIEVE THE ROI WOULD BE SIMILAR FOR THIS SITE. THIS IS IN CONSIDERATION TO THE PROXIMITY OF THE SITE TO THE 11 SPENCER SITE (ABUTTING BUILDING) AND THE SIMILAR GEOLOGIC FEATURES. AN ROI OF 20' HAS BEEN ASSUMED FOR THE DESIGN OF THIS SYSTEM.

N

0 12 24

SCALE IN FEET

HALEY ALDRICH

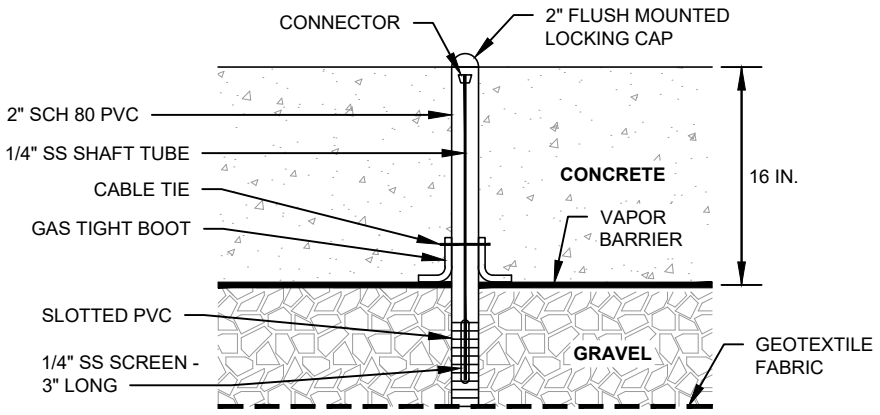
8 WALWORTH STREET
BROOKLYN, NEW YORK

SUB-SLAB DEPRESSURIZATION AND SOIL VAPOR EXTRACTION SYSTEM PLAN

JANUARY 2022

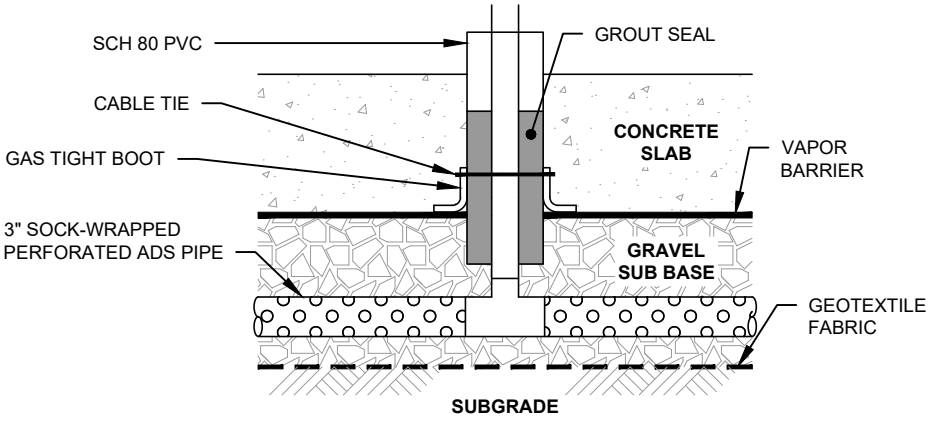
FIGURE 11

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\134860\GIS\Maps\2022_011134860_002_000X_ALTERNATIVE_II_SUBSLAB_DEPRESSURIZATION_SYSTEM_PLAN.mxd — USER: hwachholz — LAST SAVED: 1/19/2022 4:01:42 PM

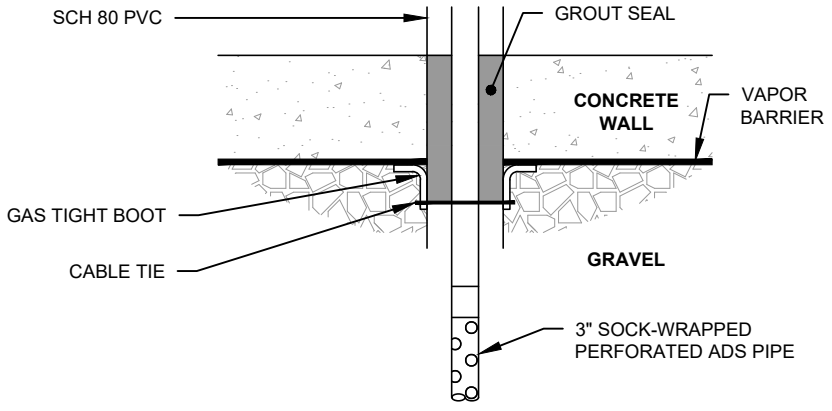


VAPOR MONITORING POINT

NOT TO SCALE



FLOOR



WALL

SEALING AROUND ANY PIPE PENETRATION

NOT TO SCALE

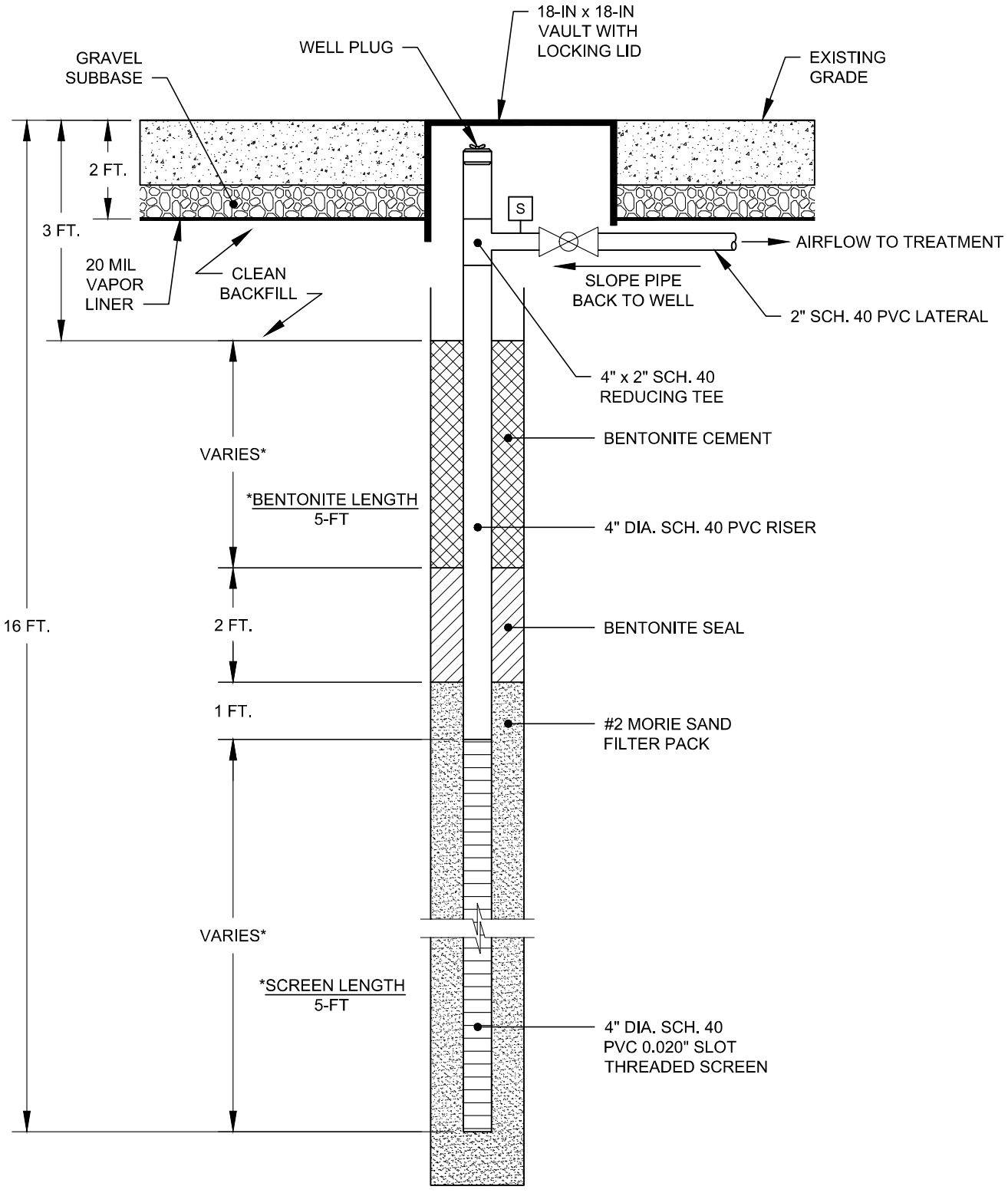
HALEY ALDRICH

8 WALWORTH STREET
BROOKLYN, NEW YORK

SUBSLAB DEPRESSURIZATION SYSTEM DETAILS

SCALE: NONE
JANUARY 2022

FIGURE 12A



LEGEND

BALL VALVE

S SAMPLE PORT

HALEY ALDRICH

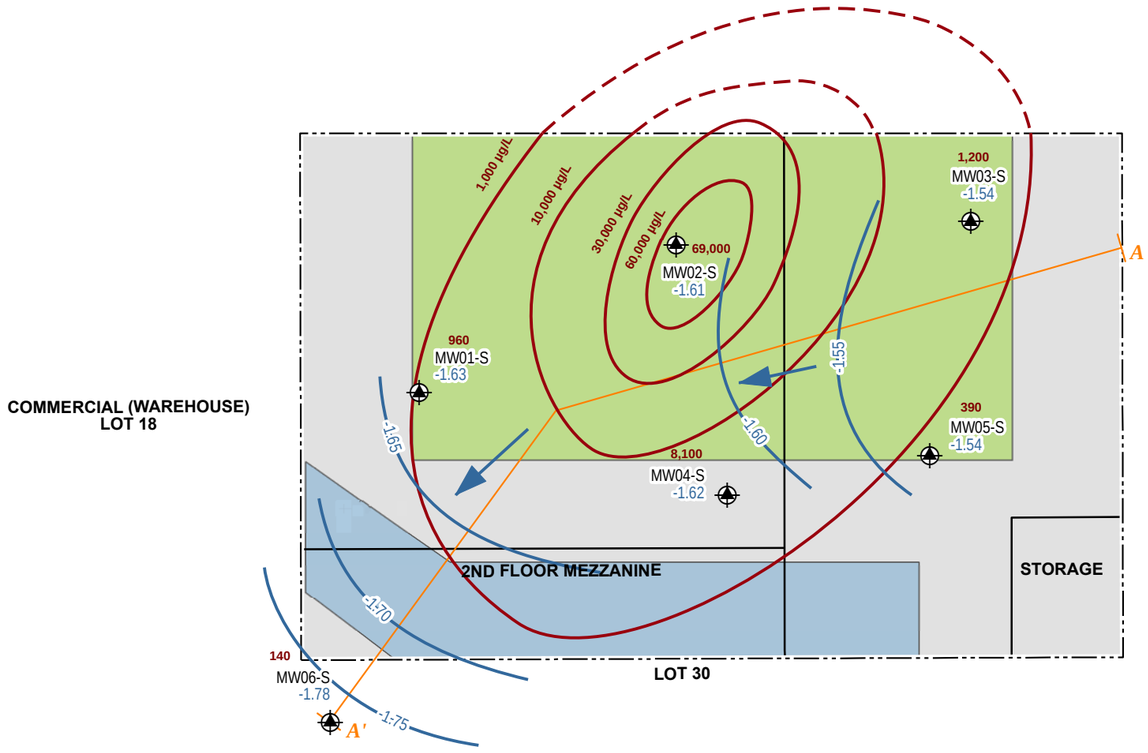
8 WALWORTH STREET
BROOKLYN, NEW YORK

SOIL VAPOR EXTRACTION WELL CONSTRUCTION DETAIL

SCALE: AS SHOWN
JULY 2021

FIGURE 12B

Saved by: ERVIN, DAYNA Printed: 7/15/2021 8:13 PM Sheet: SVE WELL
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\134860\CAD\134860_002_SVE WELL DETAIL.DWG



LEGEND

- MONITORING WELL
- TCE CONTOUR
- INFERRED TCE CONTOUR
- CROSS SECTION
- GROUNDWATER ELEVATION CONTOUR, IN FEET
- GROUNDWATER FLOW DIRECTION
- RESIDUAL SOURCE TREATMENT AREA (15-55 FT
- PROPOSED PERMEABLE REACTIVE BARRIER (15-30 FT BGS)
- EXISTING BUILDING
- SITE BOUNDARY

69,000 TCE CONCENTRATION, UG/L

-1.61 GROUNDWATER ELEVATION, FEET

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.

2. KINGS COUNTY PARCELS DATA SOURCE: GIS.NY.GOV

3. INSTALLATION OF TWO POST REMEDIATION WELLS ON SITE IN ADDITION TO PRESERVING MW-01, MW-02 AND MW-04 DURING CONSTRUCTION. IF WELLS CANNOT BE PRESERVED DURING CONSTRUCTION, THEY WILL BE REINSTALLED UPON COMPLETION OF INTRSUSIVE WORK AND PRIOR TO OCCUPANCY.

4. TCE CONTOURS FROM SHALLOW WELLS (12-20 FT BGS) FROM JULY 2020.

N

0 10 20
SCALE IN FEET

HALEY ALDRICH

8 WALWORTH STREET
BROOKLYN, NEW YORK

ALTERNATIVE II GROUNDWATER REMEDY PLAN

JANUARY 2022

FIGURE 13

LEGEND

- SITE BOUNDARY
- OFFSITE MONITORING WELL CLUSTER LOCATIONS
- PROPOSED MONITORING WELLS (POST REMEDY INSTALLATION)

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI
3. INSTALLATION OF TWO POST REMEDIATION WELLS ON SITE IN ADDITION TO PRESERVING MW-01, MW-02 AND MW-04 DURING CONSTRUCTION. IF WELLS CANNOT BE PRESERVED DURING CONSTRUCTION, THEY WILL BE REINSTALLED UPON COMPLETION OF INTRSUSIVE WORK AND PRIOR TO OCCUPANCY. MW-06 WILL ALSO BE INCLUDED IN POST REMEDY MONITORING.
4. SOIL VAPOR MONITORING POINTS WILL BE INSTALLED AT MW-01, MW-02 AND MW-04, TO BE RETAINED OR REINSTALLED POST CONSTRUCTION, AND AT PROPOSED WELL LOCATIONS WITHIN THE SOURCE AREA, TO BE INSTALLED POST REMEDY PRIOR TO OCCUPANCY.

N

0 70 140
SCALE IN FEET

HALEY ALDRICH

8 WALWORTH STREET
BROOKLYN, NEW YORK

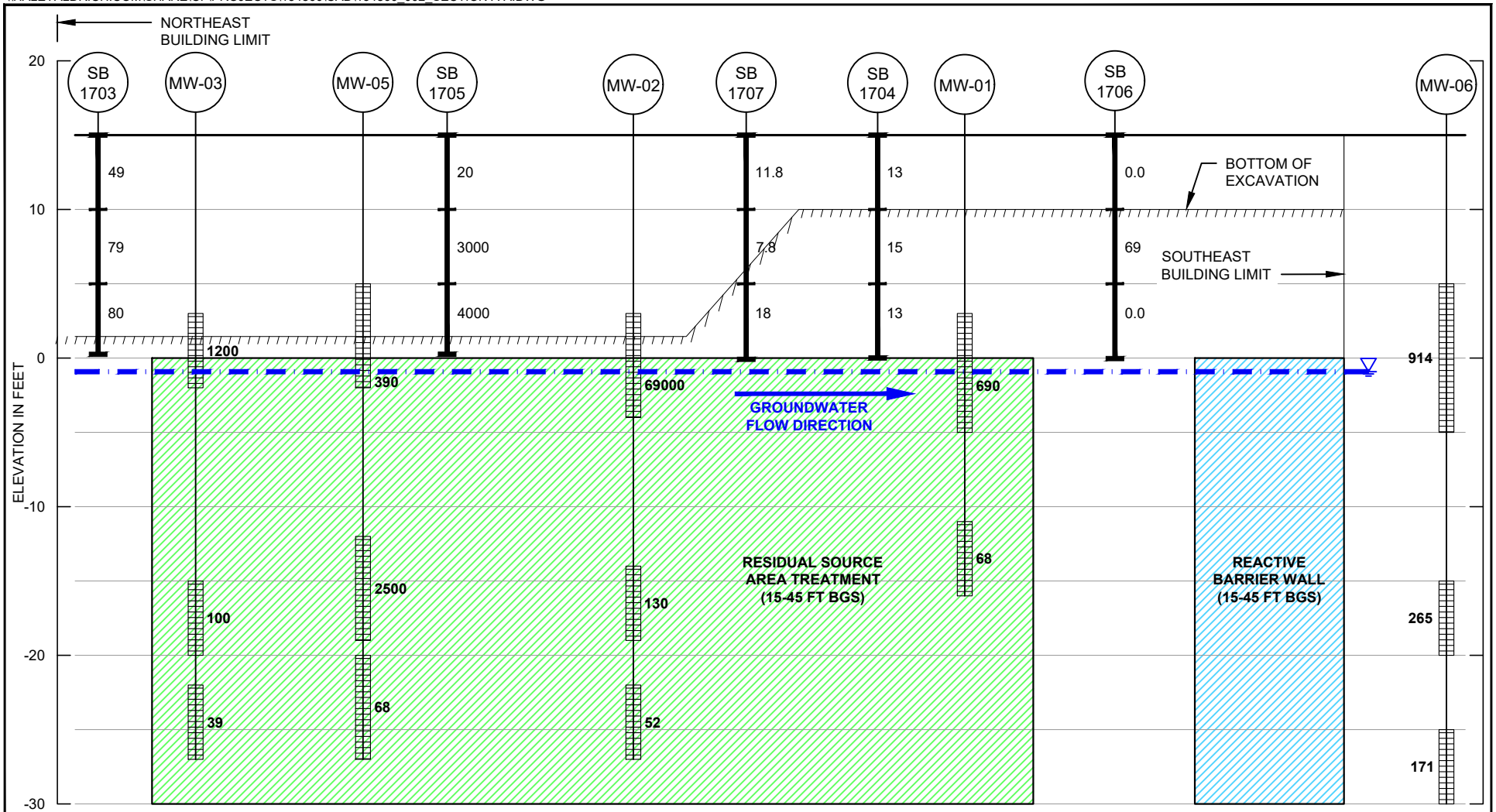
PROPOSED WELL LOCATIONS FOR POST REMEDY MONITORING

DECEMBER 2021

FIGURE 14

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\134860\GIS\Maps\2020_12\134860_002_0002_SITE_PLAN.mxd — USER: hwachholz — LAST SAVED: 12/10/2020 10:13:46 AM

Saved by: DTE Printed: 1/17/2022 10:06 AM Sheet: SECTION A-A
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\134860\CAD\134860_002_SECTION A-A.DWG



LEGEND

9230 TCE CONCENTRATIONS IN GROUNDWATER (UG/L) FROM JULY 2020

49 PHOTOIONIZATION DETECTER (PID) READINGS IN SOIL (PPM) FROM NOVEMBER 2018

HORIZ. 0 5 10
VERT. 0 5 10
SCALE IN FEET

HALEY ALDRICH

8 WALWORTH STREET
BROOKLYN, NEW YORK

SECTION A-A

SCALE: AS SHOWN
JANUARY 2022

FIGURE 15

LEGEND

- SITE BOUNDARY
- TRUCK ROUTE
- CONSTRUCTION ENTRANCE
- TRUCK INGRESS
- TRUCK EGRESS

Local Truck Route
Trucks with an origin or destination for the purpose of delivery, loading or servicing within the respective Borough, shall only operate on designated local routes, except that an operator may operate on a non-designated street for the purpose of arriving at his/her destination. This shall be accomplished by leaving a designated truck route at the intersection that is nearest to their destination, proceeding by the most direct route, and then returning to the nearest designated truck route by the most direct route. If the operator has additional destinations in the same general area, he/she may proceed by the most direct route to his/her next destination without returning to a designated truck route, provided that the operator's next destination does not require that he/she cross a designated truck route.

Through Truck Route
Trucks having neither an origin nor a destination within the respective Borough shall restrict the operation of such vehicles to those street segments designated as Through Truck Routes.

Through Truck Route on Expressway

Through Truck Route on Tunnel

Exception 53' Trailers Allowed
For definition see information on reverse side.

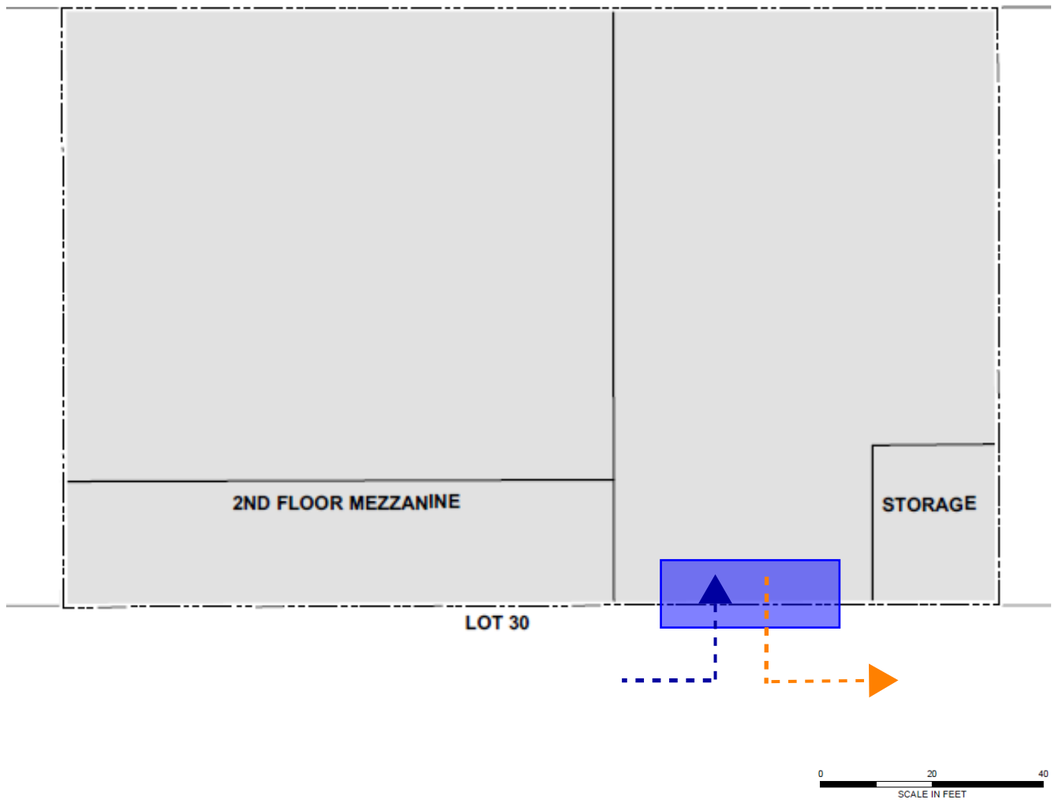
Industrial Business Zones (IBZ)

Parks and Open Spaces

29A Highway Exit

Commercial Vehicles Prohibited

Low Vertical Clearance Area



NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. IMAGERY ADAPTED FROM NEW YORK CITY DEPARTMENT OF TRANSPORTATION 2015 TRUCK ROUTE MAP.
3. CONSTRUCTION ENTRANCE IS APPROXIMATED.

HALEY ALDRICH

8 WALWORTH STREET
BROOKLYN, NEW YORK

TRUCK ROUTE MAP

JUNE 2021

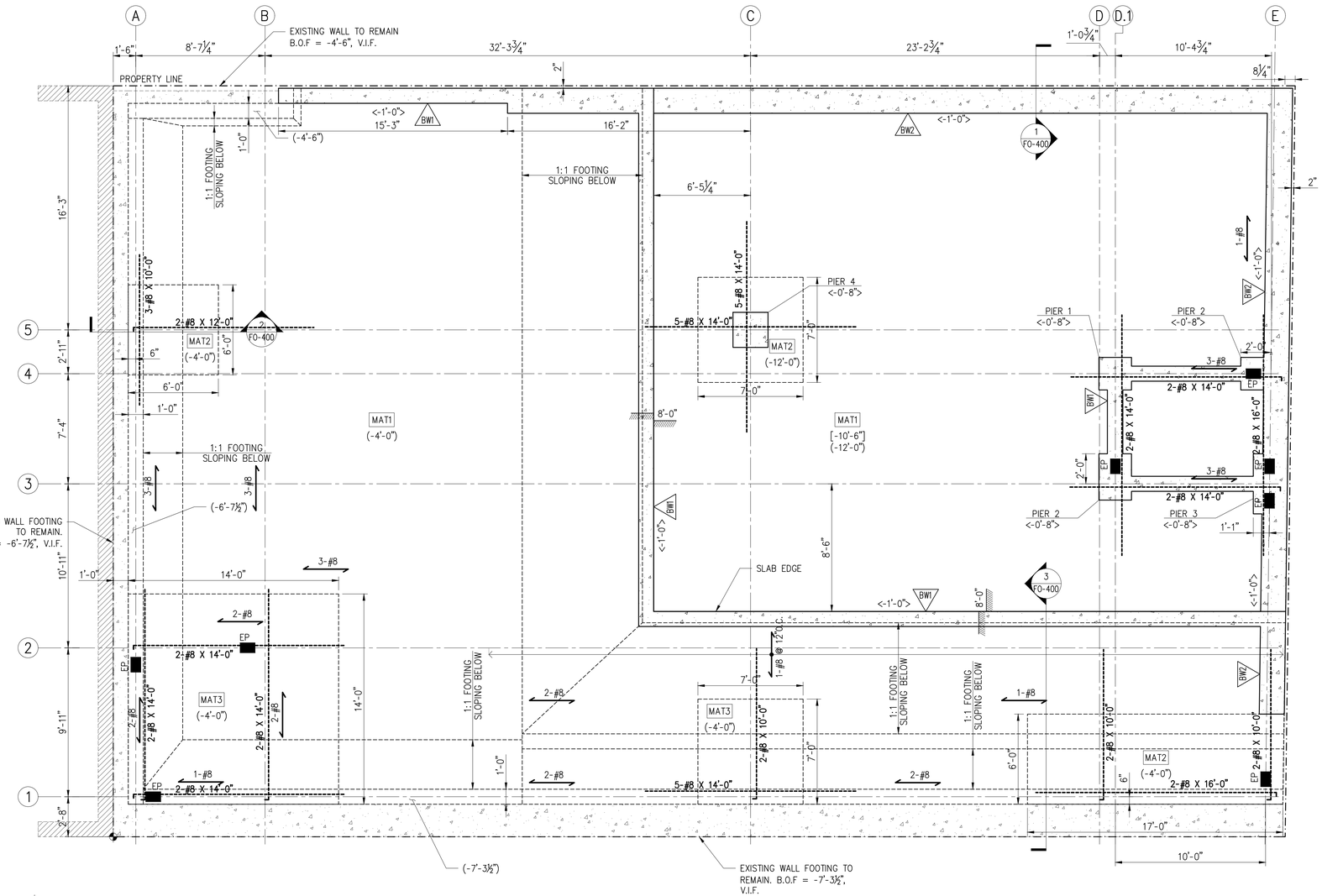
FIGURE 16

FILE PATH: \\haleyaldrich.com\share\CF\Projects\133156\005 - 297 Wallabout\Deliverables\RIR\Figures

APPENDIX A

Proposed Foundation Plan

SEE APPROVED SOE PLAN FOR MATERIALS TO BE REMOVED AND SEQUENCE OF DEMOLITION/CONSTRUCTION.



N

FOUNDATION / CELLAR FLOOR PLAN

SCALE: ¼" = 1'-0"

LEGEND:

ADDITIONAL CONTINUOUS TOP STEEL

ADDITIONAL BOTTOM STEEL

INDICATES (0,0) COORDINATE LOCATION (CORNER OF PROPERTY LINE)

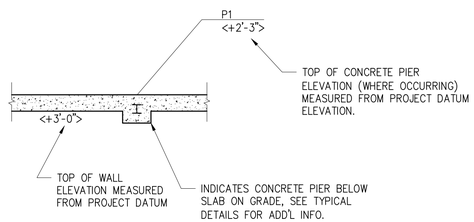
FOUNDATION WALLS ARE INDICATED ON PLAN THUS:

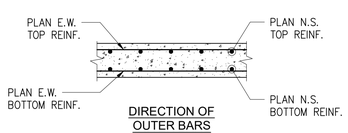
REINFORCED CONCRETE WALL BELOW SOG AND 1ST FLOOR SLAB

FOUNDATION WALLS MARKED ON PLAN

INDICATED THUS: BW1

SHALL BE CONCRETE WALLS REINFORCED IN ACCORDANCE WITH FOUNDATION WALL SCHEDULE. SEE TYPICAL DETAILS FOR ADDITIONAL INFORMATION.





DIRECTION OF OUTER BARS

FOUNDATION NOTES:

1. [XX'-XX"] INDICATES TOP OF SLAB ELEVATION RELATIVE TO THE PROJECT DATUM. {±XX'-XX"} INDICATES ELEVATION RELATIVE TO TOP OF SLAB ELEVATION. NOTE, +13.35 NAVD88 CORRESPONDS TO +0'-0" PROJECT DATUM. SEE ARCH/CIVIL DRAWINGS FOR VERIFICATION.
2. FSX INDICATES FOOTING TYPE. SEE FOOTING SCHEDULE THIS SHEET.
3. SEE THE FOLLOWING DRAWINGS FOR THE ITEMS NOTED:

GENERAL NOTES	S-001
COLUMN/SHEAR WALL SCHEDULE & DETAILS	S-200's
TYPICAL DETAILS	S-300's
SECTIONS & DETAILS	S-400's

4. COOR. ALL SLAB OPEN. W/ MECH. SHOP DWGS. REINF. OPENING PER TYPICAL DETAILS.
5. SEE ARCHITECTURAL EDGE OF SLAB DRAWINGS FOR ALL DIMENSIONS AND COORDINATES, U.O.N.
6. (XX'-XX") INDICATES BOTTOM OF FOOTING ELEVATION RELATIVE TO PROJECT DATUM.

MAT FOOTING SCHEDULE (3TSF)

MAT MARK	MAT THICKNESS	REINFORCEMENT				REMARK
		BOTTOM		TOP		
		LONG WAY	SHORT WAY	LONG WAY	SHORT WAY	
MAT1	1'-6"	#6@12" O.C.	#6@12" O.C.	#6@12" O.C.	#6@12" O.C.	SEE PLAN FOR ADD'L REINF.
MAT2	2'-0"	#8@12" O.C.	#8@12" O.C.	#8@12" O.C.	#8@12" O.C.	SEE PLAN FOR ADD'L REINF.
MAT3	3'-0"	#8@12" O.C.	#8@12" O.C.	#8@12" O.C.	#8@12" O.C.	SEE PLAN FOR ADD'L REINF.

NOTES:
1. SEE TYPICAL DETAILS AND SECTIONS FOR ADDITIONAL INFORMATION
2. SEE ARCH, DWGS FOR WATERPROOFING DETAILS BELOW MAT.

CONCRETE PIER SCHEDULE

MARK	SIZE-WxD		REINFORCEMENT		NOTES
	WIDTH	DEPTH	LONGITUDINAL	TIES SIZE & SPACING	
P1	26	26	10-#8	#4 @ 12" O.C	
P2	26	37	14-#8	#4 @ 12" O.C	
P3	26	48	16-#8	#4 @ 12" O.C	
P4	28	28	10-#8	#4 @ 12" O.C	

NOTES:
1. SEE TYPICAL DETAILS AND SECTIONS FOR ADDITIONAL INFORMATION.
2. PROVIDE SUPPLEMENTAL TIES PER S-300'S.

FOUNDATION WALL SCHEDULE

WALL MARK	WALL THICKNESS	VERTICAL BARS		HORIZONTAL BARS		REMARK
		INSIDE FACE	OUTSIDE FACE	INSIDE FACE	OUTSIDE FACE	
BW1	12"	#5@12" O.C.	#4@12" O.C.	#4@12" O.C.	#4@12" O.C.	-
BW2	20"	#5@12" O.C.	#4@12" O.C.	#4@12" O.C.	#4@12" O.C.	-

NOTES:
1. SEE TYPICAL DETAILS AND SECTIONS FOR ADDITIONAL INFORMATION.
2. FOR SHEAR WALLS COINCIDENTAL WITH FOUNDATION WALLS, PROVIDE THE LARGER SIZE AND SMALLER SPACING OF THE SHEAR WALL OR FOUNDATION WALL REINFORCEMENT AT EACH FACE, EACH DIRECTION.

DJLU ARCHITECT
office@djluarchitect.com 646.820.3558
10 W 46th Street, Suite 1603, New York, New York 10036

PROJECT
8 WALWORTH STREET
8 WALWORTH STREET
BROOKLYN, NY 11205

ISSUE / REVISION RECORD

NO.	DATE	DESCRIPTION
0.	7/12/2019	ISSUED FOR PERMIT
1.	1/21/2020	ISSUED FOR FILING
2.	12/10/2021	ISSUED FOR FILING

SEAL & SIGNATURE

DRAWING TITLE
FOUNDATION/CELLAR FLOOR PLAN

DRAWING NO. FO-100.00

DATE
SCALE AS NOTED
PROJ. # TJ16215
DRAWN BY PVM/JL
CHECKED BY JMM/RJG

APPENDIX B

Construction Health & Safety Plan

HALEY & ALDRICH, INC.

CONSTRUCTION HEALTH AND SAFETY PLAN

FOR

8 Walworth Street
Project/File No. 134860-002

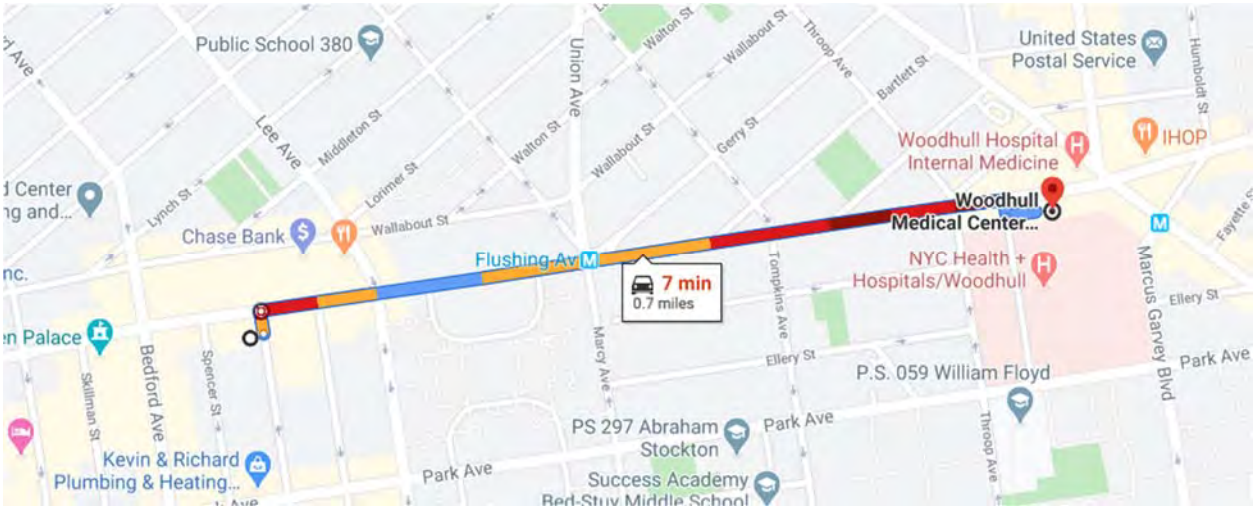
Prepared By: Conlon, Mari	**Date: 07-09-2021**
Revised By:	**Date:**

EMERGENCY INFORMATION

Project Name: 8 Walworth Street BCP Services	**H&A File No:** 134860-002
Location: **8 Walworth Street, Brooklyn, NY**	
Client/Site Contact: Phone Number: Cell Phone Number:	Toldos Yehuda, LLC Fischel, Miller 347-451-4472
Contractor: **Superintendent:** Phone Number:	Eastern Environmental Solutions Scott Hamarich 631-774-9821
H&A Project Manager: Office Phone Number: Cell Phone Number:	Conlon, Mari Cate 646-277-5688 347-271-1521
Regional Health & Safety Manager: Office Phone Number: Cell Phone Number:	Ferguson, Brian 617-886-7439 617-908-2761
Nearest Hospital: Address: (see map on next page) Phone Number:	**NYC Health + Hospitals/Woodhull** 760 Broadway, Brooklyn, NY 11206 718-963-8000
Nearest Occ. Health Clinic: Address: (see map on next page) Phone Number	**ModernMD Urgent Care** 68 Graham Avenue, Brooklyn, NY 11206 646-604-8120
Liberty Mutual Claim Policy	**WC6-Z11-254100-031**
Other Local Emergency Response Number:	911
Other Ambulance, Fire, Police, or Environmental Emergency Resources:	911

Emergency Hospital

NYC Health + Hospitals/Woodhull
760 Broadway
Brooklyn, NY 11206
718-963-8000



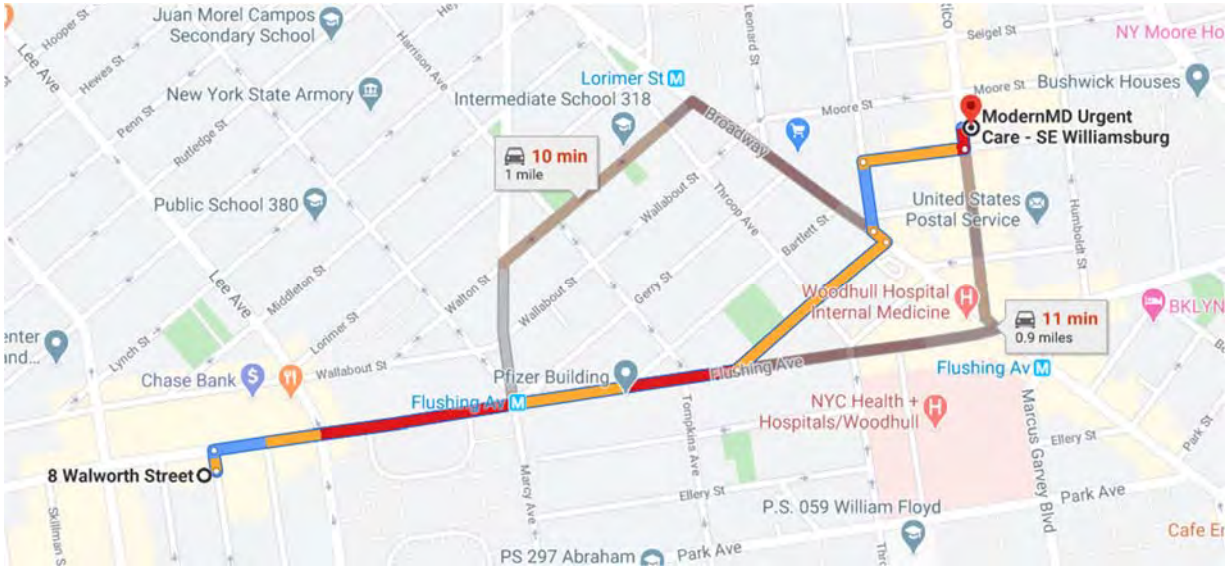
8 Walworth St
Brooklyn, NY 11205

- Head north on Walworth St toward Flushing Ave — 98 ft
- Turn right onto Flushing Ave — 0.6 mi
- Turn right — 72 ft
- Turn left — 125 ft

Woodhull Medical Center- Emergency Room
760 Broadway, Brooklyn, NY 11206

Clinic

ModernMD Urgent Care
68 Graham Avenue, Brooklyn, NY 11206
646-604-8120



8 Walworth St

Brooklyn, NY 11205

- Head north on Walworth St toward Flushing Ave
  98 ft
- Turn right onto Flushing Ave
  0.5 mi
- Slight left onto Whipple St
  0.2 mi
- Turn left onto Broadway
  79 ft
- Turn right onto Manhattan Ave
  331 ft
- Turn right onto Varet St
  479 ft
- Turn left after Bank of America Financial Center (on the left)
  Destination will be on the right
  95 ft

ModernMD Urgent Care - S.E. Williamsburg

68 Graham Ave, Brooklyn, NY 11206

STOP WORK

In accordance with H&A Stop Work Policy (OP1035), any individual has the right to refuse to do work that they believe to be unsafe and they have the obligation and responsibility to stop others from working in an unsafe manner without fear of retaliation. STOP Work Policy is the stop work policy for all personnel and subcontractors on the Site. When work has been stopped due to an unsafe condition, H&A site management (e.g., Project Manager, Site Safety Manager) and the H&A Senior Project Manager will be notified immediately. Reasons for issuing a stop work order include, but are not limited to:

- The belief/perception that injury to personnel or accident causing significant damage to property or equipment is imminent.
- A H&A subcontractor is in breach of site safety requirements and / or their own site HASP.
- Identifying a sub-standard condition (e.g., severe weather) or activity that creates an unacceptable safety risk as determined by a qualified person.

Work will not resume until the unsafe act has been stopped OR sufficient safety precautions have been taken to remove or mitigate the risk to an acceptable degree. Stop work orders will be documented as part of an on-site stop work log, on daily field reports to include the activity(ies) stopped, the duration, person stopping work, person in-charge of stopped activity(ies), and the corrective action agreed to and/or taken. Once work has been stopped, only the H&A SM or SSO can give the order to resume work. H&A senior management is committed to support anyone who exercises his or her “Stop Work” authority.

TABLE OF CONTENTS

ADMINISTRATIVE INFORMATION

Project Name	8 Walworth Street	**Project Number**	134860-002
Project Start Date	8/15/2021	**Project End Date**	12/31/2021
Client Site/Contact: Phone:	Toldos Yehuda, LLC, Fischel, Miller 347.451.4472		
H&A Project Manager: Office Phone Number: Cell Phone Number:	Conlon, Mari Cate 646.277.5688 347.271.1521		
H&A Site Safety Officer: Office Phone Number: Cell Phone Number:	Zach Simmel 646.277.5688 646.787.7669		
Subcontractor: Phone: Emergency Phone number:	Eastern Environmental Solutions 631774-9821		

APPROVALS: The following signatures constitute approval of this Health & Safety Plan

Electronic Signature

Site Project Manager Date

Corporate H&S Date

This document is valid for a maximum time period of one year after completion. The document must be reviewed if the scope of work or nature of site hazards changes and must be updated as warranted.

PROJECT INFORMATION

Site Overview/History

Site Classification	Vacant Warehouse	**Site Status**	Vacant	**Regulatory Authority**	OSHA, NYSDEC

Project Summary

The Site, identified as Block 1715 Lot 33 on the New York City tax map, is 3,910-square feet (sf) and is bounded by a vacant lot to the north, a warehouse to the south, Walworth Street to the east, and a vacant lot to the west. The Site is currently improved with a vacant one-story warehouse constructed in 1982 and accessed from Walworth Street to the east.

The Site is currently in the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) identified as NYSDEC Site Number 224239 with Toldos Yehudah as listed as a participant. The Site was operated by Techtronics Ecological Corporation from 1962 through the 1990s. The Site is also identified in the Resource Conservation and Recovery Act database as a Large Quantity Generator under Handler ID NYD000824334.

Scope of Work: Remedial Oversight

Project Tasks

Task: 1	**Remedial Oversight**
Perform remedial oversight during implementation of the approved remedy including community air monitoring. Remedy will include excavation of source area soil, installation of a soil vapor extraction system and installation of zero valent iron reactive barrier. Remedial activities and engineering controls will be installed by Eastern Environmental solutions.	
Start Date: 10-1-2021	End Date 12-1-2021
H&A Site Supervisor: Simmel, Zach	Subcontractor: Eastern Environmental Solutions
Task: 2	**Endpoint Sampling**
Collect endpoint confirmation samples.	
Start Date: 10-1-2021	End Date 12-1-2021
H&A Site Supervisor: Simmel, Zach	Subcontractor: N/A

INTRODUCTION

This project specific Construction Health and Safety Plan (CHASP) has been developed by Haley & Aldrich, Inc. (Haley & Aldrich) to establish the procedures necessary for protection from potential contaminated soils resulting from the excavation of soil at 8 Walworth, Brooklyn, New York (the Site) due to the redevelopment plans for the Site. This CHASP is intended to supplement the Client's Corporate Safety Management Program (CSMP). The procedures in this plan have been developed based on current knowledge regarding the hazards which are known or anticipated for the operations to be conducted at this Site.

SITE HAZARDS

This CHASP covers only the hazards associated with potential chemical exposures. Physical hazards such as injuries from typical excavation field work activities, including the operation of heavy equipment, noise exposure, heat and cold stress, electrical hazards, fire hazards, and general safety hazards associated with walking on working surfaces (trip and fall) are covered by the Client's CSMP.

Site activities may pose chemical exposure hazards. Potential chemical exposure hazards include skin contact, ingestion and inhalation hazards which may result from the presence semi-volatile organic compounds and inorganic metallic elements (metals) on-Site. The potential adverse health effects form these detected contaminants are diverse. Many of these compounds are known or suspected to result in chronic illness from long-term exposures. However, due to the limited nature of the proposed work, only acute effects are a potential concern. See Section 2.0 for detailed chemical hazard information.

PROJECT TEAM

The organizational structure established for the implementation of health and safety requirements established by this CHASP are outlined in the CSMP. Personnel who have been assigned specific authority to implement and enforce the provisions of this CHASP are identified below.

Name	Project Title/Assigned Role	Phone Numbers
Mari Conlon	Project Manager	Work: 646-277-5688 Mobile: 347-271-1521
Zachary Simmel	Site Supervisor	Work: 646-277-5690 Mobile: 646-787-7669

The control of Site hazards is dependent upon the degree to which management enforces compliance and employees cooperate with the specified health and safety requirements. Therefore, personnel at all levels of the organization must recognize their individual responsibility to comply. All activities covered by this CHASP must be conducted in compliance with this CHASP and with applicable federal, state, and local health and safety regulations, including 29 CFR 1910.120. Personnel covered by this CHASP who cannot or will not comply must be excluded from Site activities by the Project Superintendent, as defined in the CSMP.

WORK ACTIVITIES

Excavation and Soil Screening

Field personnel will screen excavated material for visual, olfactory, and instrumental indicators suggestive of a potential chemical or petroleum release. Instrument screening for the presence of volatile organic compounds (VOCs) may be performed with a duly calibrated Photoionization

detector (PID). Impacted material shall be segregated and disposed in accordance with federal, state and city regulations.

Stockpiling

As part of excavation activities, potentially impacted soil may be stockpiled pending waste characterization analysis. Visibly contaminated soil shall be segregated and stockpiled on at least 10 millimeters of plastic sheeting; reusable soil and fill shall be segregated and stockpiled separately from unusable fill, concrete and other debris. Stockpiles will be covered with 6 millimeters anchored plastic sheeting when not in use and overnight.

Soil Sampling

Soil samples (waste characterization, endpoint or delineation, may be collected during construction, as required.

Backfilling

Areas of the site that were over-excavated may be backfilled to development grade. Imported material will consist of clean fill that meets the 6 New York Codes, Rules and Regulations (NYCRR) Part 375-6.8(a) Unrestricted Use Soil Cleanup Objectives (UU SCOs) or other acceptable fill material such as virgin stone from a permitted mine or quarry or recycled concrete aggregate (RCA), from a New York State Department of Environmental Conservation (NYSDEC)-registered facility.

Dewatering

Dewatering may be part of construction activities. In this case, a dewatering contractor will be responsible for handling contaminated dewatering fluids in accordance with federal, state and local regulations. Dewatering fluids are may be discharged to the local sewer system after treatment and with an approved permit. Alternatively, containerized storage may allow for testing of groundwater prior to, and after, treatment and before disposal.

HAZARD ASSESSMENT

The following hazard assessment applies only to the activities within the scope of this CHASP.

CHEMICAL HAZARDS AND KNOWN/SUSPECT CHEMICALS OF CONCERN

The chemical hazard information provided below is based on the data provided in previous environmental investigations including the Phase II Site Investigation Report/Remedial Investigation Report (prepared by Haley & Aldrich dated April 2019). During the investigations, representative Site soils were sampled for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), Target Analyte List metals, pesticides and polychlorinated biphenyl (PCBs). Groundwater was not encountered. Moderate to low concentrations of metal compounds were detected in the soil. Constituents with exceeding concentrations and their respective health effects are listed below for reference. Information presented is based upon established Occupational Safety and Health Administration (OSHA) permissible exposure limits (PEL) and The National Institute for Occupational Safety and Health (NIOSH) recommended exposure limits (RELs). All other analytical parameters were reported within acceptable levels for Site urban residential land use. See Section 4.0 for a description of the PPE that should be used for this Site.

Table 1. Health Hazards for Site Contaminants of Concern

Chemicals	REL/PEL/STEL (ppm)	Health Hazards
Trichloroethylene (TCE)	PEL = 100 ppm TWA	Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury
Tetrachloroethene (PCE)	PEL = 100 ppm TWA	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage

VOLATILE AND SEMI-VOLATILE ORGANIC COMPOUNDS

The VOC and SVOC compounds identified in the soils at the Site exceeded the New York State Department of Environmental Conservation (NYSDEC) standards promulgated in the Part 375 Commercial Use criteria. If Site conditions are dry, the generation of contaminated dusts may pose a potential inhalation hazard. Therefore, dust levels should be controlled with wetting if necessary, as described in Section 3.2. Odors will also be controlled and monitored via photoionization detectors stationed at the perimeters in accordance with standard CAMP procedures. In addition, repeated contact with certain VOC and SVOC compounds have been associated with the development of skin cancer. Contact with the skin may cause photosensitization of the skin, producing skin burns after subsequent exposure to ultraviolet radiation. Protective measures, such as the wearing of chemically resistant gloves, are appropriate when handling SVOC contaminated materials.

ADDITIONAL HAZARD ASSESSMENTS

Additional site specific hazards present during project work include simultaneous operations, hot temperatures, sun and slips and trips.

Site Hazards and Controls

Site Hazard Summary		
Slips, Trips, Falls	Hot Temperatures	Cold Temperatures
Sun	Urban Fill	COVID-19

COVID-19

Hazard Information

See attached:

- Fact Sheet HASP Add – This provides general information on the COVID-19 risk and the second page is the HASP Amendment form that will need to be completed for every project (current projects and future) – COVID-19 should be treated the same as any potential project risk.

- Fact Sheet COVID-19 Field Guidance Hygiene – This fact sheet provides guidance to staff performing field work on hygiene practices to undertake to reduce the risk of exposure in the field. The documentation includes information on proper PPE and disinfection.

- Fact Sheet Field Cleaning and Disinfection COVID-19 – This fact sheet provides guidance on cleaning and disinfecting field offices.

- Fact Sheet Field Cloth Face Covering – This fact sheet provides guidance on face covering practices.

Controls

See attachments.

SUN

Hazard Information

Acute excessive exposure to solar radiation may cause painful sunburn, and chronic exposure may contribute to eye damage and skin cancer. The average peak intensity of solar ultraviolet (UV) radiation is at midday. Most of the total daily UV is received between 10 AM and 2 PM. UV radiation can reflect off of water, concrete, light colored surfaces, and snow. Cloud cover can reduce UV levels, but overexposure may still occur.
Use the shadow test to determine sun strength: If your shadow is shorter than you are, the sun´s rays are at their peak, and it is important to protect yourself.

Controls

- Wear light-colored, closely woven clothing, which covers as much of the body as practicable.
- Use sunscreens with broad spectrum protection (against both UVA and UVB rays) and sun protection factor (SPF) values of 30 or higher. Ideally, about 1 ounce of sunscreen (about a

shot glass or palmful) should be used to cover the arms, legs, neck, and face of the average adult. Sunscreen needs to be reapplied at least every 2 hours to maintain protection.
- Hats should be worn and should be wide brimmed, protecting as much of the face, ears, and neck as possible. Hats should also provide ventilation around the head. Sunscreen should be applied to areas around the head not protected by the hat (ears, lips, neck, etc.).
- Wear sunglasses while working outdoors. Sunglasses should allow no more than 5% of UVA and UVB penetration and must also meet the ANSI Z87.1 standard for safety glasses.
- Use natural or artificial shade, where possible.

HOT TEMPERATURES (HEAT STRESS)

Hazard Information

Heat stress may occur at any time work is being performed at elevated ambient temperatures. Heat stress is one of the most common and potentially serious illnesses associated with outdoor work during hot seasons; therefore, regular monitoring and other preventative measures are vital. Site workers must learn to recognize and treat various forms of heat stress.

H&A employees and their subcontractors should be aware of potential health effects and/or physical hazards of working when there are hot temperatures or a high heat index.
Staff members should consult OP 1015 Heat Stress for additional information regarding hot weather hazards.

Heat Stress Conditions

Heat Rash: Caused by continuous exposure to heat and humid air and aggravated by chafing clothes. Decreases ability to tolerate heat.
Symptoms: Mild red rash, especially in areas of the body on contract with protective gear.
Treatment: Decrease amount of time in protective gear and provide powder to help absorb moisture and decrease chaffing.

Heat Cramps: Caused by perspiration that is not balanced by adequate fluid intake. Heat cramps are often the first sign of a condition that can lead to heat stroke. This condition is much less dangerous than heat stroke, but it nonetheless must be treated.
Symptoms: Acute painful spasms of voluntary muscles (e.g., abdomen and extremities).
Treatment: Remove the victim to a cool area and loosen clothing. Have the patient drink 1 to 2 cups water immediately, and every 20 minutes thereafter until symptoms subside. Total water consumption should be 1 to 2 gallons per day.

Heat Exhaustion: A state of definite weakness or exhaustion caused by the loss of fluids from the body.
Symptoms: Pale, clammy, moist skin, profuse perspiration and extreme weakness. Body temperature is normal, pulse is weak and rapid, and breathing is shallow. The person may have a headache, may vomit, and may be dizzy.
Treatment: Remove the person to a cool place, loosen clothing, and place in a head-low position. Provide bed rest. Consult physician, especially in severe cases. The normal thirst mechanism is not sensitive enough to ensure body fluid replacement. Have patient drink 1 to 2 cups water immediately and every 20 minutes thereafter until symptoms subside. Total water consumption should be 1 to 2 gallons per day.

Heat Stroke: An acute and dangerous reaction to heat exposure caused by failure of heat regulating mechanisms of the body; the individual´s temperature control system that causes sweating stops working correctly. Body temperature rises so high that brain damage and death will result if the person is not cooled quickly.

Symptoms: Red, hot, dry skin, although person may have been sweating earlier; nausea; dizziness; confusion; extremely high body temperature; rapid respiratory and pulse rate; unconsciousness or coma.
Treatment: Cool the victim quickly and obtain immediate medical assistance. If the body temperature is not brought down fast, permanent brain damage or death may result. Soak the victim in cool but not cold water, sponge the body with rubbing alcohol or cool water, or gently pour water on the body to reduce the temperature to a safe level (102°F). Observe the victim and obtain medical help. Do not give coffee, tea or alcoholic beverages.

Controls

Practice heat stress management:

- Workers should drink 16 ounces of water before beginning or restarting work after a break. Water should be maintained at 50 to 60 degrees Fahrenheit (°F). Workers should drink one to two 4-ounce cups of water every 30 to 60 minutes during work. The use of alcohol during non-working hours and the intake of caffeine during working hours can lead to an increase in susceptibility to heat stress. Monitor for signs of heat stress (shown in Heat Stress Conditions above).
- Workers should acclimate to site work conditions by slowly increasing workloads (i.e., do not begin site work activities with extremely demanding activities). This acclimation process may require up to two weeks.
- In hot weather, field activities should be conducted in the early morning or evening when temperatures are cooler. Rotate shifts of workers with potential heat stress exposure.
- Adequate shelter should be available to protect personnel from heat, which can decrease physical efficiency and increase the probability of heat stress. Erect temporary shade at the workstation if necessary. A cool area for rest breaks should be designated, preferably air-conditioned.
- Cooling devices should be used to aid natural body ventilation. Note: These devices add weight, and their use should be balanced against worker efficiency.

COLD TEMPERATURES

Hazard Information

Cold stress may occur at any time work is being performed during low ambient temperatures and high velocity winds. Because cold stress is common and potentially serious illnesses are associated with outdoor work during cold seasons, regular monitoring and other preventative measures are vital.

Staff members should consult OP1003-Cold Stress for additional information on cold weather hazards.

Cold Stress Conditions

Frostbite: Localized injury resulting from cold is included in the generic term "frostbite. There are several degrees of damage.

Symptoms: Frost nip or incident frostbite; sudden blanching or whitening of the skin.

- Superficial frostbite: Skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- Deep frostbite: Tissues are cold, pale, and solid; extremely serious injury.

Treatment:

- Bring the victim indoors and heat the areas quickly in water between 102° and 105° F.
    - Never place frostbitten tissue in hot water as the area will have a reduced heat awareness and such treatment could result in burns.
- Give the victim a warm drink (not coffee, tea, or alcohol).
    - The victim should not smoke or do anything that will inhibit blood circulation.
- Keep the frozen parts in warm water or covered with warm clothes for 30 minutes even though the tissue will be very painful as it thaws.
    - Elevate the injured area and protect it from injury.
    - Do not allow blisters to be broken. Use sterile, soft, dry material to cover the injured areas.
- Keep victim warm and get medical care immediately following first aid treatment.
- After thawing, the victim should try to move the injured areas slightly, but no more than can be done without assistance.

Do <u>NOT</u>:

- Rub the frostbitten area(s)
- Use ice, snow, gasoline, or anything cold on frostbite
- Use heat lamps or hot water bottles to rewarm the frostbitten area
- Place the frostbitten area near a hot stove

<u>Hypothermia:</u> Significant loss of body heat that is also a potential hazard during cold weather operations. Hypothermia is characterized as "moderate" or "severe".
Symptoms:

- Early hypothermia - Chills, pale skin, cold skin, muscle rigidity, depressed heart rate, and disorientation
- Moderate hypothermia - Any combination of severe shivering, abnormal behavior, slowing of movements, stumbling, weakness, repeated falling, inability to walk, collapse, stupor, or unconsciousness
- Severe hypothermia - Extreme skin coldness, loss of consciousness, faint pulse, and shallow, infrequent or apparently absent respiration

Death is the ultimate result of untreated hypothermia. The onset of severe shivering signals danger to personnel; exposure to cold shall be immediately terminated for any severely shivering worker.
Treatment: Staff members should seek emergency medical treatment in the event of hypothermia. The following actions can be taken prior to obtaining medical treatment:

- Gently place patients in an environment most favorable to reducing further heat loss from evaporation, radiation, conduction, or convection.
- Remove wet clothing and replace it with dry blankets or sleeping bags.
- Initiate active external rewarming with heat packs (e.g., hot water bottles, chemical packs, etc.) placed in the areas of the armpits, groin, and abdomen.

- Be aware of the risk of causing body surface burns from excessive active external rewarming.

In dire circumstances, rescuers may provide skin-to-skin contact with patients when heat packs are unavailable and such therapy would not delay evacuation.

Controls

- Recognize the environmental and workplace conditions that may be dangerous.
    - When the temperature is below 41° F, workers should be aware that cold stress is a potential hazard.
- Learn signs of cold-induced illnesses and injuries and how to help affected staff members.
    - Observe fellow staff members for signs of cold stress and administer first aid, where necessary.
- Staff members should maintain a clothing level that keeps them warm but dry (not sweating).
    - Staff should wear thermal clothing including gloves and footwear and beneath chemical resistant clothing, when appropriate.
    - Workers should have a spare set of clothing in case work clothes are not warm enough or become wet.
    - If a worker begins to sweat, he/she should remove a layer.
    - If clothing becomes wet and temperatures are below 36° F, clothing must be immediately replaced with dry clothing.
- A warm area for rest breaks should be designated.
    - In cold temperatures, rotate shifts of workers with potential cold stress exposure or take periodic breaks to allow recovery from cold stress.
    - Do not go into the field alone when cold stress could occur.
- Avoid fatigue or exhaustion because energy is needed to keep muscles warm.
- Workers should drink warm liquids (non-alcoholic, non-caffeinated) periodically throughout their shifts so they do not get dehydrated.

URBAN FILL

Hazard Information

Urban Fill consists of historically placed soil materials commonly found in urban areas, and typically comprised of a heterogeneous mixture of granular and fine-grained solids containing various proportions of gravel and cobbles, construction and demolition debris, coal ash, wood ash or other deleterious materials. Urban fill usually contains anthropogenic levels of metals, petroleum hydrocarbons and/or polynuclear aromatic hydrocarbons (PAHs) due to non-point sources and/or which originated prior to placement.

Controls

- Physical Hazards: Urban fill can contain debris such as glass, ceramics, rebar, wire, wood, nails and other objects that contain sharp edges. Personnel should use caution and wear appropriate gloves (e.g., leather) to prevent cuts associated with handling material contain sharp and abrasive edges.
- Personal Hygiene: Always wash hands prior and after eating and drinking. Take off work boots prior to getting in your car and going home which will help prevent introducing potentially contaminated soils to your car and home. Wash work clothing separately from non-work clothes to prevent clothing impacted by soil from urban fill to be cross contaminated with other clothing. Use chemical resistant gloves when handling soil to prevent contact with skin.

- Control the dust from urban fill material. Measures should be taken to prevent dust, such as wetting the material or covering the stockpiles.

SLIPS AND TRIPS

Hazard Information

Slip and trip injuries are the most frequent injuries to workers. Both slips and trips result from some kind of unintended or unexpected change in the contact between the foot and the ground or walking surface. This shows that good housekeeping, quality of walking surfaces (flooring), awareness of surroundings, selection of proper footwear, and appropriate pace of walking are critical to preventing fall accidents.

Site workers will be walking on a variety of irregular surfaces that may affect their balance. Extra care must be taken to walk cautiously near any surfaces that are unfamiliar or may have unseen slip or trip hazards such as rivers because the bottom of the river bed maybe slick and may not be visible. Rocks, gradient changes, sandy bottoms, and debris may be present but not observable.

Controls

- Take your time and pay attention to where you are going.
- Adjust your stride to a pace that is suitable for the walking surface and the tasks you are doing.
- Check the work area to identify hazards - beware of trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain.
- Establish and utilize a pathway free of slip and trip hazards.
- Choose a safer walking route.
- Carry loads you can see over and are not so heavy as to increase your trip/slip probability.
- Keep work areas clean and free of clutter.
- Communicate hazards to on-site personnel and mitigate hazards as appropriate.

TASK SPECIFIC HAZARDS

Task Description

Remedial Oversight –Remedial oversight may require working in close proximity to heavy equipment and may be exposed to many of the same hazards as the subcontractor. It is imperative that staff are aware of emergency stops and establish communication protocols with the drillers prior to the start of work. See OP 1002 Drilling Safety.

Potential Hazards

Noise	Heavy Equipment	Ergonomics	Line of Fire
Ground Disturbance			

Top Task Specific Hazards

Overhead Utilities

When work is undertaken near overhead electrical lines, the distance maintained from those lines shall also meet the minimum distances for electrical hazards as defined in Table 1 below. Note: utilities other than overhead electrical utilities need to be considered when performing work

Table 1 Minimal Radial Clearance Distances *

Normal System Voltage Kilovolts (kV)	Required Minimal Radial Clearance Distance (feet/meters)
0 – 50	10/3.05
51 – 100	12/3.66
101 – 200	15/4.57
201 – 300	20/6.1
301 – 500	25/7.62
501 – 750	35/10.67
750 – 1000	45/13.72

* For those locations where the utility has specified more stringent safe distances, those distances shall be observed.

Controls

- To prevent damage, guy wires shall be visibly marked and work barriers or spotters provided in those areas where work is being conducted.
    - When working around guy wires, the minimum radial clearance distances for electrical power shall be observed.
- The PM shall research and determine if the local, responsible utility or client has more restrictive requirements than those stated in Table 1.
- If equipment cannot be positioned in accordance with the requirements established in Table 1 the lines need to be de-energized.

Ground Disturbance

Ground disturbance is defined as any activity disturbing the ground. Ground disturbance activities include, but are not limited to, excavating, trenching, drilling (either mechanically or by hand), digging, plowing, grading, tunneling and pounding posts or stakes.

Because of the potential hazards associated with striking an underground utility or structure, the operating procedure for underground utility clearance shall be followed prior to performing any ground disturbance activities.
See OP1020 Working Near Utilities

Controls

Prior to performing ground disturbance activities, the following requirements should be applied:

- Confirm all approvals and agreements (as applicable) either verbal or written have been obtained.
- Request for line location has been registered with the applicable One-Call or Dial Before You Dig organization, when applicable

    - Whenever possible, ground disturbance areas should be adequately marked or staked prior to the utility locators site visit.
- Notification to underground facility operator/owner(s) that may not be associated with any known public notification systems such as the One-Call Program regarding the intent to cause ground disturbance within the search zone.
- Notifications to landowners and/or tenant, where deemed reasonable and practicable.
- Proximity and Common Right of Way Agreements shall be checked, if the line locator information is inconclusive.

Underground Utilities

Various forms of underground/overhead utility lines or conveyance pipes may be encountered during site activities. Prior to the start of intrusive operations, utility clearance is mandated, as well as obtaining authorization from all concerned public utility department offices. Should intrusive operations cause equipment to come into contact with utility lines, the SSO, Project Manager, and Regional H&S Manager shall be notified immediately. Work will be suspended until the client and applicable utility agency is contacted and the appropriate actions for the situation can be addressed.

See OP1020 Work Near Utilities for complete information.

Controls

- Obtain as-built drawings for the areas being investigated from the property owner;
- Visually review each proposed soil boring locations with the property owner or knowledgeable site representative;
- Perform a geophysical survey to locate utilities;
- Hire a private line locating firm to determine the location of utility lines that are present at the property;
- Identifying a no-drill or dig zone;
- Hand dig or use vacuum excavation in the proposed ground disturbance locations if insufficient data is unavailable to accurately determine the location of the utility lines.

Noise

Working around heavy equipment (drill rigs, excavators, etc.) often creates excessive noise. The effects of noise can include physical damage to the ear, pain, and temporary and/or permanent hearing loss. Workers can also be startled, annoyed, or distracted by noise during critical activities. Noise monitoring data that indicates that work locations within 25 feet of operating heavy equipment (e.g., drill rigs, earthworking equipment) can result in exposure to hazardous levels of noise (levels greater than 85 dBA).

See OP 1031 Hearing Conservation for additional information.

Controls

- Personnel are required to use hearing protection (earplugs or earmuffs) within 25 feet of any operating piece of heavy equipment.
- Limit the amount of time spent at a noise source.
- Move to a quiet area to gain relief from hazardous noise sources.
- Increase the distance from the noise source to reduce exposure.

Heavy Equipment

Staff members must be careful and alert when working around heavy equipment, since equipment failure or breakage and limited visibility can lead to accidents and worker injury. Heavy equipment such as cranes, drills, haul trucks, or other can fail during operation increasing the likelihood of worker injury. Equipment of this nature should be visually inspected and checked for proper working order prior to the commencement of field work. Those that operate heavy equipment must meet all of the requirements to operate heavy equipment. Haley & Aldrich, Inc. staff members that supervise projects or are associated with such high risk projects that involve digging or drilling should use due diligence when working with a construction firm.

See OP1052 Heavy Equipment for additional information.

Controls

- Only approach equipment once you have confirmed contact with the operator (e.g., the operator places the bucket on the ground).
- Maintain visual contact with operators at all times and keep out of the strike zone whenever possible.
- Always be alert to the position of the equipment around you.
- Always approach heavy equipment with an awareness of the swing radius and traffic routes of each piece of equipment and never go beneath a hoisted load.
- Avoid fumes created by heavy equipment exhaust.
- Understand the site traffic pattern and position yourself accordingly.

Line of Fire

Line of fire refers to the path an object will travel. Examples of line of fire typically observed on project sites include lifting/hoisting, lines under tension, objects that can fall or roll, pressurized objects, springs or stored energy, work overhead, and vehicles and heavy equipment.

Controls

The following precautions should be observed for work overhead:

- Never walk under a suspended load.
- Communicate to other workers when entering a lifting/hoisting zone, even if for a short period.
- Balance the load prior to lifting.
- Rigging equipment shall never be loaded in excess of its maximum safe loading limit.
- Establish a drop zone, an area below any work being performed aloft. Drop zone size depends on work scope and potential for falling tools and equipment. Keep the drop zone clear of people.
- If work at the structure base is unavoidable, inform the worker above. Make sure work stops and they secure tools and equipment prior to performing the work below.
- Materials should never be dropped from height. Use tool bags and hand lines when providing tools and equipment to the employee aloft

The following precautions should be observed for tension and pressure:

- Be aware and stay clear of tensioned lines such as cable, chain and rope.
- Use only correct gripping devices. Select proper equipment based on size and load limit.
- Be cautious of torque stresses that drilling equipment and truck augers can generate. Equipment can rotate unexpectedly long after applied torque force has been stopped.

- Springs come in a variety of shapes and sizes, and can release tremendous energy if compression as tension is suddenly released.
- Ensure tanks are stored upright and are in good condition, and be aware of potential failures or pressurized lines and fittings
- Items under tension and pressure can release tremendous energy if it is suddenly released.

The following precautions should be observed for objects that can fall or roll:

- Not all objects may be overhead; be especially mindful of top-heavy items and items being transported by forklift or flatbed.
- Secure objects that can roll such as tools, cylinders and pipes.
- Stay well clear of soil cuttings, soil stockpiles generated during drilling operations and excavations, be aware that chunks of dirt, rocks, and debris can fall or roll.
- Establish a drop zone that is free of any tools and/or debris.

The following precautions should be observed for working in proximity to vehicles and heavy equipment:

- Use parking brakes and wheel chocks for any vehicle or equipment parked on an incline.
- When working near moving, heavy equipment such as line trucks and cranes, remain in operator's full view. Obtain operator's attention prior to approaching equipment.
- Vacate the back of the bucket truck when the boom is being moved or cradled. Get the operator's attention if you must get into the back of the truck so he or she can stop boom movement.

Take precautions for all pedestrian and vehicle traffic when positioning vehicles and equipment at a job site.

Posture/Ergonomics

Most Work-related Musculoskeletal Disorders (WMSDs) are caused by Ergonomic Stressors. Ergonomic Stressors are caused by poor workplace practices and/or insufficient design, which may present ergonomic risk factors. These stressors include, but are not limited to, repetition, force, extreme postures, static postures, quick motions, contact pressure, vibration, and cold temperatures.

WMSDs are injuries to the musculoskeletal system, which involves bones, muscles, tendons, ligaments, and other tissues in the system. Symptoms may include numbness, tightness, tingling, swelling, pain, stiffness, fatigue, and/or redness. WMSD are usually caused by one or more Ergonomic Stressors. There may be individual differences in susceptibility and symptoms among employees performing similar tasks. Any symptoms are to be taken seriously and reported immediately.

Controls

Recommended controls, including Administrative, Work Practice, and/or Engineering Controls, will be put in place based on the interview results and/or after an ergonomic assessment. H&S and/or HP will work with staff members and their staff managers to implement Administrative and Work Practice Controls to control risk associated with ergonomic stressors. In addition, simple Engineering Controls may be implemented, such as use of a keyboard and/or mouse tray, replacing a mouse with a more ergonomic model, and/or changing workstation set up.

Generated Waste

Excess sample solids, decontamination materials, rags, brushes, poly sheeting, etc. that are determined to be free of contamination through field or laboratory screening can usually be disposed into client-approved, on-site trash receptacles. Uncontaminated wash water may be discarded onto the ground surface away from surface water bodies in areas where infiltration can occur. Contaminated materials must be segregated into liquids or solids and drummed separately for off-site disposal.

All wastes generated shall be containerized in an appropriate container (i.e. open or closed top 55-gallon drum, roll-off container, poly tote, cardboard box, etc.) as directed by the PM. Prior to putting waste containers into service, the containers should be inspected for damages or defects. Waste containers should be appropriately labeled indicating the contents, date the container was filled, owner of the material (including address) and any unique identification number, if necessary. Upon completion of filling the waste container, the container should be inspected for leaks and an appropriate seal.

Slippery Surfaces

Both slips and trips result from some a kind of unintended or unexpected change in the contact between the feet and the ground or walking surface. This shows that good housekeeping, quality of walking surfaces (flooring), selection of proper footwear, and appropriate pace of walking are critical for preventing fall accidents.

Slips happen where there is too little friction or traction between the footwear and the walking surface. Common causes of slips are:

- wet or oily surfaces
- occasional spills
- weather hazards
- loose, unanchored rugs or mats
- flooring or other walking surfaces that do not have same degree of traction in all areas

Weather-related slips and falls become a serious hazard as winter conditions often make for wet or icy surfaces outdoors. Even wet leaves or mud can create treacherous walking conditions. Spills and leaks inside can also lead to slips and falls.

- Evaluate the work area to identify any conditions that may pose a slip hazard.
- Address any spills, drips or leaks immediately.
- Mark areas where slippery conditions exist.
- Select proper footwear or enhance traction with additional PPE.

Where conditions are uncertain or environmental conditions result in slippery surfaces walk slowly, take small steps, and slide feet on wet or slippery surfaces.

Congested Area

- Provide barricades, fencing, warning signs or signals and adequate lighting to protect people while working in or around congested areas.

- Vehicles and heavy equipment with restricted views to the rear should have functioning back-up alarms that are audible above the surrounding noise levels. Whenever possible, use a signaler to assist heavy equipment operators and/or drivers in backing up or maneuvering in congested areas.
- Lay out traffic control patterns to eliminate excessive congestion.
- Workers in congested areas must wear high visibility clothing at all times.
- Be aware of Line of Fire hazards when performing work activities in congested areas.
- Hazards associated with SIMOPs should be discussed daily at Tailgate Safety Meetings.

AIR MONITORING

Community air monitoring may be conducted in compliance with the NYSDOH Generic CAMP outlined below:

Monitoring for VOCs and dust and odors will be conducted during all ground intrusive activities by the FTL. Continuous monitoring on the perimeter of the work zones for VOCs and dust by visual observations and instrumentation measurements will be required for all ground intrusive activities such as soil excavation and handling activities. The work zone is defined as the general area in which machinery is operating in support of remediation activities. A portable PID will be used to monitor the work zone and for periodic monitoring for VOCs during activities such as soil and groundwater sampling and soil excavation. When required, particulate or dust will be monitored continuously with real-time field instrumentation that will meet, at a minimum, the performance standards from DER-10 Appendix 1B.

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

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

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

- If the downwind particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression must be employed. Work may continue with dust suppression techniques provided that downwind PM10 levels do not exceed 150 $\mu g/m^3$ above the background level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM10 levels are greater than 150 $\mu g/m^3$ above the background level, work must be stopped and a reevaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM10 concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration.

VAPOR EMISSION RESPONSE

If the ambient air concentration of organic vapors exceeds 5 ppm above background, activities will be halted or odor controls will be employed, and monitoring continued. Work practices to minimize odors and vapors include limiting the time that the excavations remain open, minimizing stockpiling of contaminated-source soil, and minimizing the handling of contaminated material. Offending odor and organic vapor controls may include the application of foam suppressants or tarps over the odor or VOC source areas. Foam suppressants may include biodegradable foams applied over the source material for short-term control of the odor and VOCs.

If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: direct load-out of soils to trucks for off-site disposal; use of chemical odorants in spray or misting systems; and, use of staff to monitor odors in surrounding neighborhoods.

If the organic vapor level decreases below 5 ppm above background, sampling and boring and well installation can resume, provided:

- The organic vapor level 200 feet downwind of the hot zone or half the distance to the nearest residential or commercial structure, whichever is less, is below 1 ppm over background, and
- More frequent intervals of monitoring, as directed by the HSO or FTL, are conducted

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work site, or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted or odor controls must be implemented.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the hot zone, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone). If either of the following criteria is exceeded in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be implemented.

- Sustained organic vapor levels approaching 5 ppm above background for a period of more than 30 minutes, or
- Organic vapor levels greater than 5 ppm above background for any time period.

Upon activation, the following tasks will occur:

- The local police authorities will immediately be contacted by the HSO or FTL and advised of the situation;
- Frequent air monitoring will be conducted at 30-minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the HSO or FTL; and
- All Emergency contacts will go into effect as appropriate.

DUST SUPPRESSION TECHNIQUES

Preventative measures for dust generation may include wetting site fill and soil, construction of an engineered construction entrance with gravel pad, a truck wash area, covering soils with tarps, and limiting vehicle speeds to five miles per hour.

PERSONAL EXPOSURE MONITORING

No asbestos, lead-based paint, or radiological hazards have been identified within the vicinity of the proposed excavation area at the Site (see Section 2.0). Therefore, personal exposure monitoring is not required during excavation.

PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) will be donned as detailed below for the activities covered by this CHASP. Based on available analytical data and the proposed intrusive activities, the contractor anticipates the following levels of PPE will be required.

GENERAL SITE WORK

General Site work conducted outside the soil excavation areas, operators of heavy equipment, and non-intrusive activities which do not generate dust will require Level D protective equipment. Level D is defined as:

- Steel-toed boots
- Hardhat
- Eye protection
- Hearing protection (carried on person at all time and donned when appropriate)
- Work clothes (sleeved shirts and pants)

Workers shall wear appropriate hearing protection during designated hearing protection-required tasks (such as, jack hammering, pile driving etc.). To reduce the exposure to noise, personnel working in areas of excessive noise must use hearing protectors (earplugs or earmuffs) in accordance with the CSMP. When lacking actual data from sound level meters or noise dosimeters is unavailable, if it is necessary to raise one's voice above a normal conversational level to communicate with others within 3 to 5 feet away, hearing protection should be worn.

EXCAVATION AREAS AND OTHER SOIL HANDLING

Personnel working in the areas of excavation, but not operating heavy equipment, and any other personnel potentially contacting contaminated materials will be required to wear Level C PPE. Level c PPE provides minimal skin protection (i.e., hand/glove protection along with standard work clothes with optional coveralls). Level C is defined as:

- Full-face air purifying respirators (fit testing will be required prior to donning respirators)
- Inner and outer chemical-resistant gloves
- Chemical resistant clothing (one piece coverall, hooded two piece chemical splash suit, chemical resistant hood and apron, disposable chemical resistant coveralls.)
- Steel-toed boots and disposable chemical-resistant outer boots
- Hardhat
- Eye Protection
- Hearing Protection (carried on person at all time and donned when appropriate)

Increased PPE, such as Level B, may be required if PID readings exceed 5 ppm above background sustained for 1 minute.

SITE CONTROL

The overall purpose of site control is to minimize potential contamination of workers, protect the public from the site's hazards, and prevent vandalism. Site control is especially important in emergency situations. The degree of site control necessary depends on site characteristics, site size, and the surrounding community. The following information identifies the elements used to control the activities and movements of people and equipment at the project site.

Communication

Internal

H&A site personnel will communicate with other H&A staff member and/or subcontractors or contractors with:

- Face-to-Face Communication at a minimum of 6ft distance

External

H&S site personnel will use the following means to communicate with off-site personnel or emergency services.

- Cell Phones

Visitors

Project Site

Will visitors be required to check-in prior to accessing the project site?

- Yes
- All Visitors shall be briefed on COVID-19 protocols and PPE. Visitors not briefed, or that do not have the appropriate PPE will be asked to leave the site.

Visitor Access

Authorized visitors that require access to the project site need to be provided with known information with respect to the site operations and hazards as applicable to the purpose of their site visit. Authorized visitors must have the required PPE and appropriate training to access the project site.

Zoning

Work Zone

The work zone will be clearly delineated to ensure that the general public or unauthorized worker access is prevented. The following will be used:

- Flagging tape
- Cones
- Proper Signage

Project Site - Access

Work Hours

The following measure(s) will be used to control site entry and exit during site hours.

- Site is gated a fenced

After Hours
The following measure(s) will be used to control site entry and exit during hours that the site is not operating.

- None

Site Traffic Control
Is the work planned to be conducted on a public roadway or a public right-of-way?

- No

DECONTAMINATION AND WORK ZONES

Work zones are intended to control the potential spread of contamination throughout the site and to assure that only authorized individuals are permitted into potentially hazardous areas. Any person working in an area where the potential for exposure to site contaminants exists will only be allowed access after providing the HSO with proper training and medical documentation.

Work zones on Site will be temporary or dynamic, encompassing the work area(s) actively being worked in on that particular day(s). Site personnel will be advised of the current work area(s) as part of site safety meetings.

Exclusion Zone (EZ) is the area where contamination does or could occur. Decontamination of field equipment will also be conducted in the Contaminant Reduction Zone (CRZ) which will be located on the perimeter of the EZ. The EZ and the CRZ will be clearly delineated by cones, tapes or other means.

Support zone will consist of an area outside the areas of excavation and soil handling, where equipment and support vehicles will be located. Eating, drinking and smoking will be permitted only in this area and not in the work zone. Sanitary facilities will be located on Site. In addition, potable water and water and soap for hand washing will be available on Site.

OTHER SITE CONTROL AND SAFETY MEASURES

The following measures are designed to augment the specific health and safety guidelines provided in this plan. These issues will form the basis of the Site coordination and daily safety meetings discussed (Section 7.4).

- The Site hazards will be evaluated by the Client's Project Superintendent using the Site Safety Checklist as defined by the CSMP.
- No one is to perform field work alone. Team members must be intimately familiar with the procedures for initiating an emergency response.
- Avoidance of contamination is of the utmost importance. Whenever possible, avoid contact with contaminated (or potentially contaminated) surfaces or materials. Walk around (not through) puddles and dis-colored surfaces. Do not kneel on the ground or set equipment on the ground.
- Eating, drinking, chewing gum or tobacco, smoking or any practice that increases the probability of hand-to-mouth transfer and ingestion of materials is prohibited except in the support zone after proper decontamination as defined in Section 6.0.
- The use of alcohol or drugs is prohibited during the conduct or field operations.
- Safety equipment (PPE) will be required for all field personnel unless otherwise approved by the subcontractor's health and safety representatives and/or the Project Superintendent.

SITE SECURITY

The Site shall be unoccupied during Site work except for Contractor personnel and subcontractors. If possible, access to the work areas during field work will be limited by closing site gates to reduce unauthorized pedestrian traffic. The Client's Project Superintendent is responsible for identifying the presence of all employees on Site.

Equipment left on Site during off hours must be locked, immobilized and/or otherwise secured to prevent theft or unauthorized use or access. The Contractor and subcontractors' employees will not be permitted on Site during off-hours without specific client approval.

PERSONAL DECONTAMINATION STATION

Personal decontamination will be conducted by following a systematic procedure of cleaning and removal of PPE. The Contractor will supply decontamination equipment to allow PPE to be brushed to remove gross contamination and then scrubbed clean in a detergent solution and then rinsed clean. To facilitate this, a three-basin wash system will be set up on site by the Contractor.

Disposable PPE, such as Tyvek coveralls, gloves, and hearing protection, etc. will be placed in trash bags in an on-Site container pending a disposal. Alternative chemical decontamination procedures, such as steam-cleaning reusable rubber outer boots, may be used if necessary. Steps required in a decontamination sequence will depend on the level of protection worn in accordance with Section 4.0:

1. Remove and wipe clean hard hat
2. Brush boots and gloves of gross contamination
3. Scrub boots and gloves clean
4. Rinse boots and gloves
5. Dry non-disposable equipment with paper towels
6. Remove Tyvek coveralls
7. Remove eye protection
8. Remove chemically resistant gloves

EQUIPMENT DECONTAMINATION

Hand tools and portable equipment will be decontaminated upon leaving the site using the same procedures for personal decontamination. Wooden tools are difficult to decontaminate because they absorb chemicals. Wooden hand tools will be kept on Site for the project duration and handled only by protected workers. At the end of the Site activities, wooden tools will be discarded if they cannot be decontaminated properly.

Large equipment (i.e. trucks, vehicles, etc.) will be decontaminated in an area near the entrance to the Site. Decontamination of large equipment will mitigate the risk of spreading potentially-contaminated soil off-Site. The contractor will use a combination of long-handled brushed, rods and shovels for general exterior cleaning and dislodging contaminated soil caught in tires and the undersides of vehicles and equipment.

Prior to leaving the Site, large equipment will be inspected to assure that excess material has not adhered to the equipment. If needed, the contractor will clean the large equipment, including washing tires and undercarriages with a hose to remove excess adhered soil prior to leaving the Site.
Exposed excavated material will be covered on each truck after loading. The cover will be secured and remain in place until the container has reached the disposal facility.

MEDICAL MONITORING AND TRAINING REQUIREMENTS

Training records for Site personnel and subcontractors shall be provided by the Contractor prior to on-Site work, and will be maintained on Site.

MEDICAL MONITORING

Respiratory protection is not required by the levels of soil contamination. Therefore, no medical monitoring requirements will be instituted for this project.

TRAINING

All personnel covered by this CHASP must have completed the appropriate training requirements specified in 29 CFR 1910.1200 Hazard Communication and 29 CFR 1910.120(e).

Completion of the 40-hour HAZWOPER training program as detailed in OSHA's 29 CFR 1910.120(e) is required for all employees as well as an annual 8-hour refresher training required to maintain competency and ensure a safe work environment. In addition, all employees must complete the OSHA 10 hour Construction Safety and Health training. Site specific training will also be provided including summary of the site hazards, chemical hazards, site layout, rally points, etc. for all new employees entering the site.

Also, at least one contractor employee must be on Site during all activities to act as the Site Foreman and will be responsible for identifying existing and predictable hazards in surroundings or working conditions that are unsanitary, hazardous, or dangerous to Site workers and or the community, and will have the authorization to take prompt corrective measures to eliminate them. This individual must have documentation of at least three days of supervised field experience as well as completion of the specified 8-hour training course for managers and supervisors. Records of certifications and training should be kept by the Contractor.

SUBCONTRACTORS

Subcontractors will be required to provide to the Contractor Project (Site) Manager specific written documentation that each individual assigned to this project has completed the medical monitoring and training requirements specified above. This information must be provided prior to their performing any work on site.

SITE SAFETY MEETINGS

Prior to the commencement of on-Site investigative activities, a Site safety meeting will be held to review the specific requirements of this CHASP. Sign-off sheets will be collected at this meeting (see Appendix A). Short safety refresher meetings will be conducted daily or as conditions or work activates change. In addition, the Project Superintendent will document that Site visitors have had the required training in accordance with 29 CFR 1910.120 and will provide documented pre-entry safety briefings.

EMERGENCY ACTION

OSHA defines emergency response as any "response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual-aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result in an uncontrolled release of a hazardous substance." The Contractor personnel covered by this CHASP may not participate in any emergency response where there are potential safety or health hazards (i.e., fire, explosion, or chemical exposure). The Contractor response actions will be limited to evacuation and medical/first aid as described within this section below.

The basic elements of an emergency evacuation plan include employee training, alarm systems, escape routes, escape procedures, critical operations or equipment, rescue and medical duty assignments, designation of responsible parties, emergency reporting procedures, and methods to account for all employees after evacuation.

EMPLOYEE INFORMATION

General training regarding emergency evacuation procedures are included in the Contractor initial and refresher training courses. Also as described, employees must be instructed in the specific aspects of emergency evacuation applicable to the Site as part of the site safety meeting prior to the commencement of all on-site activities. On-Site refresher or update training is required anytime escape routes or procedures are modified or personnel assignments are changed. This information will be provided during the Site safety meetings (see Section 7.4) will be documented by the contractor.

EMERGENCY SIGNAL AND ALARM SYSTEM

An emergency communication system must be in effect at all sites. The most simple and effective emergency communication system in many situations will be direct verbal communications. Each site must be assessed at the time of initial Site activity and periodically as the work progresses. Verbal communications must be supplemented anytime voices cannot be clearly perceived above ambient noise levels (i.e., noise from heavy equipment, trucks, etc.) and anytime a clear line-of-sight cannot be easily maintained amongst all personnel because of distance, terrain or other obstructions. The Contractor will maintain an air horn (or whistle) on-Site that will be used to signal an emergency so that it can be heard over other construction noises on-Site.

EMERGENCY CONTACTS

Police:	911
Fire:	911
Ambulance:	911
NYC Health + Hospitals/Woodhull:	718-975-2270 (non-emergency)

HOSPITAL LOCATION

Lincoln Medical Center is located at 234 E 149th Street, Bronx, NY 10451. Appendix B presents a hospital route map.

INCIDENT REPORTING PROCEDURES

Any incident (other than minor first aid treatment) resulting in injury, illness or property damage requires an accident investigation and report. The investigation should be initiated as soon as emergency conditions are under control. The purpose of this investigation is not to attribute blame but to determine the pertinent facts so that repeat or similar occurrences can be avoided.

The investigation should begin while details are still fresh in the mind of anyone involved. The person administering first aid may be able to start the fact gathering process if the injured are able to speak. Pertinent facts must be determined. Questions beginning with who, what, when, where, and how are usually most effective to discover ways to improve job performance in terms of efficiency and quality of work, as well as safety and health concerns.

SPILL CONTROL

Small spills/releases will be contained as close to the source as possible and an MSDS will be reviewed to determine the proper containment and clean up procedures. Procedures for containment can include sorbent materials such as sorbent pads and sand. Contractors should maintain spill kits for potential releases from on site vehicles. In the event a spill cannot be contained and is above the reportable requirements, NYSDEC will be notified.

APPENDICES

Appendix A – Emergency Response Plan

Appendix B – Acknowledgement Form

APPENDIX A: EMERGENCY RESPONSE PLAN

Medical

If there is an injury or illness associated with an H&A staff member on the job-site stop work, stabilize the situation and secure the site. Assess the severity of the injury or illness to determine the appropriate course of action as listed below.

First Aid Injury

First aid will be addressed using the on-site first aid kit. H&A employees are not required or expected to administer first aid/CPR to any H&A staff member, Contractor, or Civilian personnel at any time and it is H&A´s position that those who do are doing it do so on their behalf and not as a function of their job.

- Injury or illness requiring clinic/hospital visit **WITHOUT** ambulance service

  Injuries or illnesses requiring hospital service without ambulance services include minor lacerations, minor sprains, etc. The following action will be taken:

  - The H&A SSO will ensure prompt transportation of the injured person to the clinic or hospital identified in the safety plan.
  - Another H&A staff member, or contractor on-site, will always drive the injured staff member to the medical facility and remain at the facility until the staff member has been discharged. Staff members will not self-transport to the clinic or hospital.
  - If the injured staff member is able to return to the job site the same day, he/she will bring with him/her a statement from the doctor containing such information as:

- Date
- Employee´s name
- Diagnosis
- Date he/she is able to return to work, regular or light duty

- Date he/she is to return to doctor for follow-up appointment, if necessary
- Signature and address of doctor

Injury or illness requiring a hospital visit **WITH** ambulance service

Injuries or illnesses requiring hospital service with ambulance services include severe head injuries, severe lacerations, heart attacks, heat stroke, etc. The following steps will be taken immediately:

- Call for ambulance service and notify the H&A SSO.
- Comfort the individual until ambulance service arrives.
- While the injured employee is being transported, the H&A SSO will contact the medical facility to be utilized.
- One designated representative will accompany the injured employee to the medical facility and remain at the facility until final diagnosis and other relevant information is obtained.

Notifications

For all injuries or illness notify the SSO and PM who in turn will contact Corporate H&S. Within 24 hours the injured staff member or PM will complete the H&S Reporting Form found on HANK. Minor cuts, scratches, and bruises shall also be reported through the H&S Reporting Form. Notify the client in accordance with their notification protocol. Depending on severity, Human Potential will as promptly as possible following an injury or illness, ensure appropriate notification has been made to the family of the individual involved.

Severe Weather

Where the threat of electrical storms and the hazard of lightning exist, staff shall ensure that there is the ability to detect when lightning is in the near vicinity and when there is a potential for lightning and to notify appropriate site personnel of these conditions. The weather forecast will be checked on a daily basis and communicated at the daily safety tailgate meetings.

When lightning is detected or observed the information will be communicated to all crews in the field for appropriate action. Field supervisors will make the decision to stay put or to leave the work site. A location will be identified to marshal field staff in the event that staff are required to leave the job site. A similar decision process will be used during heavy rain events.

Staff shall seek appropriate shelter and not stay in the open

Evacuation Alarms

Verbal Communication will be used to communicate the evacuation alarm.

Emergency Services

Cellular phone will be used to contact Emergency Services.

Emergency Evacuation Plan

The site evacuation plan is as follows:

1. Establish a designated meeting area to conduct a head count in the event of an emergency evacuation.
2. If the work area is not near an emergency exit, exit via the closest route and meet at the designated meeting area.
3. Notify emergency response personnel (fire, police and ambulance) of the number of missing or unaccounted for employees and their suspected location.
4. Administer first aid will in the meeting area as necessary.

Under no circumstances should any personnel re-enter the site area without the approval of the corporate H&S manager, the H&S coordinator, and the fire department official in charge.

ROLES AND RESPONSIBILITIES

REGIONAL HEALTH AND SAFETY MANAGER (RHSM)

The Haley & Aldrich RHSM, Jeremy Miller, is a full-time Haley & Aldrich staff member, trained as a safety and health professional, who is responsible for the interpretation and approval of this Safety Plan. Modifications to this Safety Plan cannot be undertaken by the PM or the SSO without the approval of the RHSM.
Specific duties of the RHSM include:

- Approving and amending the Safety Plan for this project
- Advising the PM and SSOs on matter relating to health and safety
- Recommending appropriate personal protective equipment (PPE) and air monitoring instrumentation
- Maintaining regular contact with the PM and SSO to evaluate the conditions at the property and new information which might require modifications to the HASP and
- Reviewing and approving JSAs developed for the site-specific hazards.

PROJECT MANAGER (PM)

The Haley & Aldrich PM, Mari Cate Conlon, is responsible for ensuring that the requirements of this HASP are implemented at that project location. Some of the PM´s specific responsibilities include:

- Assuring that all personnel to whom this HASP applies have received a copy of it;
- Providing the RHSM with updated information regarding environmental conditions at the site and the scope of site work;
- Providing adequate authority and resources to the on-site SSO to allow for the successful implementation of all necessary safety procedures;
- Supporting the decisions made by the SSO;
- Maintaining regular communications with the SSO and, if necessary, the RHSM;
- Coordinating the activities of all subcontractors and ensuring that they are aware of the pertinent health and safety requirements for this project;
- Providing project scheduling and planning activities; and
- Providing guidance to field personnel in the development of appropriate Job Safety Analysis (JSA) relative to the site conditions and hazard assessment.

SITE SAFETY OFFICER

The SSO, Zach Simmel, is responsible for field implementation of this HASP and enforcement of safety rules and regulations. SSO functions may include some or all:

- Act as H&A´s liaison for health and safety issues with client, staff, subcontractors, and agencies.
- Verify that utility clearance has been performed by H&A subcontractors.
- Oversee day-to-day implementation of the Safety Plan by H&A personnel on site.
- Interact with subcontractor project personnel on health and safety matters.
- Verify use of required PPE as outlined in the safety plan.
- Inspect and maintain H&A safety equipment, including calibration of air monitoring instrumentation used by H&A.

- Perform changes to HASP and document as needed and notify appropriate persons of changes.
- Investigate and report on-site accidents and incidents involving H&A and its subcontractors.
- Verify that site personnel are familiar with site safety requirements (e.g., the hospital route and emergency contact numbers).
- Report accidents, injuries, and near misses to the H&A PM and Regional Health and Safety Manager (RHSM) as needed.

The SSO will conduct initial site safety orientations with site personnel (including subcontractors) and conduct toolbox and safety meetings thereafter with H&A employees and H&A subcontractors at regular intervals and in accordance with H&A policy and contractual obligations. The SSO will track the attendance of site personnel at H&A orientations, toolbox talks, and safety meetings.

FIELD PERSONNEL

Haley & Aldrich personnel are responsible for following the health and safety procedures specified in this HASP and for performing their work in a safe and responsible manner. Some of the specific responsibilities of the field personnel are as follows:

- Reading the HASP in its entirety prior to the start of on-site work;
- Submitting a completed Safety Plan Acceptance Form and documentation of medical surveillance and training to the SSO prior to the start of work;
- Attending the pre-entry briefing prior to beginning on-site work;
- Bringing forth any questions or concerns regarding the content of the Safety Plan to the PM or the SSO prior to the start of work;
- Stopping work when it is not believed it can be performed safely;
- Reporting all accidents, injuries and illnesses, regardless of their severity, to the SSO;
- Complying with the requirements of this safety plan and the requests of the SSO; and
- Reviewing the established JSAs for the site-specific hazards on a daily basis and prior to each shift change, if applicable.

VISITORS

Authorized visitors (e.g., Client Representatives, Regulators, Haley & Aldrich management staff, etc.) requiring entry to any work location on the site will be briefed by the Site Supervisor on the hazards present at that location. Visitors will be escorted at all times at the work location and will be responsible for compliance with their employer´s health and safety policies. In addition, this safety plan specifies the minimum acceptable qualifications, training and personal protective equipment which are required for entry to any controlled work area; visitors must comply with these requirements at all times. Unauthorized visitors, and visitors not meeting the specified qualifications, will not be permitted within established controlled work areas.

APPENDIX B: HEALTH & SAFETY PLAN ACKNOWLEDGEMENT FORM

Note: Only H&A employees sign this page.

I hereby acknowledge receipt and briefing on this Health & Safety Plan prior to the start of on-site work and declare that I understand and agree to follow the provisions and procedures set forth herein while working on this site.

PRINTED NAME	SIGNATURE	DATE

APPENDIX C

Community Air Monitoring Plan

www.haleyaldrich.com

COMMUNITY AIR MONITORING PLAN
8 WALWORTH STREET
BROOKLYN, NEW YORK

by Haley & Aldrich of New York
New York, New York

File No. 134860-002
November 2021

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1. Introduction

This Community Air Monitoring Plan (CAMP) has been prepared for the proposed activities to be performed under the Remedial Action Work Plan (RAWP) at the 8 Walworth Street Site. The CAMP details measures for protection of the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the investigation activities) from potential airborne contaminant releases resulting from sampling activities at the site.

Compliance with this CAMP is required during all activities associated with intrusive activities such as drilling, excavation, stockpiling, equipment idling, transport, etc. that have the potential to generate airborne particulate matter and volatile organic compounds (VOCs). These activities include drilling and monitoring well installation. This CAMP is specific to the Site and was developed in accordance with the New York State Department of Health Generic Community Air Monitoring Plan and the New York State Department of Environmental Conservation (NYSDEC) DER-10 Technical Guidance for Site Investigation and Remediation.

2. Community Air Monitoring Program

Real-time air monitoring will be conducted in two locations during ground intrusive activities including 1) at the egress of the ground intrusive work zone (permanent station) and 2) at a downwind location, to be evaluated daily and logistically biased towards nearby sensitive receptors and occupied structures within 20 feet, to prevent potential exposure to the surrounding community (Figure 1).

Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, drilling, excavation, stockpiling, equipment idling, transport, etc. Monitoring equipment will be set up to connect to a cloud-based data management system where data will be stored on a real time basis.

2.1 VOC MONITORING, RESPONSE LEVELS, AND ACTIONS

VOCs will be monitored at CAMP stations at the egress of the ground intrusive work zone (permanent station) and at a downwind location biased towards nearby sensitive receptors and occupied structures within 20 feet. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. Roaming equipment to assess VOCs will be carried by the field support overseeing implementation of the RAWP. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown.

All 15-minute readings must be recorded and be available for OER personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded. Proactive measures will be taken to control VOCs such as use of rusmar foaming agent and wintergreen misting to prevent offsite migration of VOCs and to suppress odors.

2.2 PARTICULATE MONITORING, RESPONSE LEVELS AND ACTIONS

Dust particulates will be monitored at CAMP stations at the egress of the ground intrusive work zone (permanent station) and at a downwind location biased towards nearby sensitive receptors and occupied structures within 20 feet. Particulate concentrations will be evaluated through particulate monitoring via real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10). In the event this equipment is implemented, the equipment will be capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level discussed below:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 greater than the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All 15-minute readings must be recorded and be available for OER personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded. Proactive measures will be taken to control dust particulates such as use of water prayers to suppress dust generation and migration offsite.

2.3 SPECIAL CONSIDERATIONS

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.
- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m3, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m3 or less at the monitoring point.
- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

3. Reporting

Exceedances of action levels observed during performance of the CAMP will be reported to the NYSDEC and NYSDOH via email and included in the daily report to be submitted to NYSDEC the morning after site activities are completed along with actions and responses. Daily reports will include the following information:

- Date
- Personnel
- Wind direction
- Meteorological Data (i.e. temperature, weather, atmospheric pressure)
- Site Map
- CAMP station locations
- Notes regarding any equipment malfunctions
- Notes regarding any mitigation efforts or work stoppage due to CAMP exceedances

Full CAMP data sets collected in the cloud-based system will be included with each monthly report to be submitted to NYSDEC by the 10th day of each month.

4. Data Quality Assurance

To ensure data quality, instrument calibration will be completed as required by the manufacturer and recorded daily. Calibration checks and duplicate readings may be completed as needed to confirm instrument response and accuracy. All instruments will be operated in accordance with manufacturer's specifications, copies of which will be kept on site.

The onsite field engineers will review monitoring data throughout the day and evaluate in comparison to the action levels. The project manager will review monitoring data periodically and/or when action levels are triggered.

Oriental World Corp.

Vacant Lot

CAMP Station #1: permanent monitoring point at egress

CAMP Station #2: Perimeter of the exclusion zone or work area & biased towards downwind receptors

WALWORTH STREET

LEGEND

SITE BOUNDARY

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. KINGS COUNTY PARCELS RETRIEVED FROM GIS.NY.GOV
3. ASSUMING WIND DIRECTION TO THE SOUTHEAST.
4. ADDITIONAL ROAMING EQUIPMENT TO MEASURE VOCS TO BE USED IN THE WORK AREA BY FIELD PERSONNEL OVERSEEING IMPLEMENTATION OF THE RAWP.

N

0 10 20

SCALE IN FEET

HALEY ALDRICH

8 WALWORTH STREET
BROOKLYN, NEW YORK

COMMUNITY AIR MONITORING PLAN

JUNE 2021

FIGURE 1

APPENDIX D

Vapor Barrier Specifications

BUILDING TRUST

PRODUCT DATA SHEET

SikaProof® A-12

FPO SHEET MEMBRANE FOR PRE-APPLIED FULLY BONDED BELOW GROUND WATERPROOFING

PRODUCT DESCRIPTION

SikaProof® A-12 is an embossed polyolefin FPO sheet membrane for pre-applied fully bonded below ground waterproofing of reinforced concrete structures. Membrane thickness 1,2 mm. SikaProof® A-12 is cold-applied without heat or open flames to prepared substrates or onto formwork before fixing reinforcement and concrete placement. The membrane has self-adhesive longitudinal strips for bonding overlap joints and is laminated with a unique sealant and a non-woven fleece backing layer which creates a bond with the cast concrete.

USES

SikaProof® A-12 may only be used by experienced professionals.
Waterproofing and concrete protection for basements and other below ground concrete structures against ground water ingress. Suitable for use on:

- Reinforced concrete base slabs
- Reinforced concrete walls with both single and double-faced formwork
- Extension and reconstruction works
- Prefabricated structures
- Shotcrete structures

CHARACTERISTICS / ADVANTAGES

- Fully bonded to the reinforced concrete structure
- No lateral water underflow between the concrete structure and the membrane system
- Validated high watertightness
- High flexibility and crack-bridging
- Pre-applied, before fixing reinforcement and concrete placement
- Easy to install with fully adhered joints (no welding required)
- Cold-applied (no pre-heating or open flames)
- Good tear and impact resistant properties
- Temporarily resistant to weathering and UV-light during construction
- Highly durable and resistant to aging
- Resistant to aggressive elements in natural ground water and soil
- Can be combined with other approved Sika Waterproofing / Joint Sealing Systems

PRODUCT INFORMATION

Chemical Base	Membrane Layer	Flexible Polyolefin (FPO)
	Sealant grid	Polyolefin (PO)
	Fleece layer	Polypropylene (PP)

Packaging

Rolls wrapped individually in a yellow PE-film.

Product	Roll width	Roll length
SikaProof® A-12	1.00 m (3.28 ft) or 2.00 m (6.56 ft)	20 m (65 ft)

Appearance / Color	Light yellow sheet membrane, laminated with a white fleece layer		
Shelf Life	18 months from date of production		
Storage Conditions	Product must be stored in original unopened and undamaged sealed packaging in dry conditions and temperatures between + 40 °F and + 85 °F. Store in a horizontal position. Do not stack pallets of the rolls on top of each other, or under pallets of any other materials during transport or storage. Always refer to packaging.		
Effective Thickness	Total Thickness (-5% / +10%)	1.60 mm (0.06 in)	(ASTM D3767)
	Membrane Thickness	1.20 mm (0.05 in)	
Mass per Unit Area	0.31 lb/ft² (-5 % / +10 %)		

TECHNICAL INFORMATION

Impact Strength	200 lbs (no puncture)		(ASTM E154)
Resistance to Root Penetration	Pass		(CEN/TS 14416)
Tensile Strength	Machine direction	1200 psi	(ASTM D412)
	Cross direction	1100 psi	
Elongation	Machine direction	≥700 %	(ASTM D412)
	Cross direction	≥1000 %	
Adhesion in Peel	55 lbs/in		(ASTM D903)
Joint Peel Resistance	50 lbs/in		(ASTM D1876)
Low Temperature Bend	Pass - no cracking at -29 ºC (-20 ºF)		(ASTM D1970)
Water Vapor Transmission	3.45 x 10^{-9} g/Pa.S.m² (0.06 perms)		(ASTM E96)
Water Tightness	Pass, up to 7 bar (234 ft)		(ASTM D 5385)
Resistance to lateral water migration	Pass, up to 7 bar (234 ft)		(ASTM D 5385 modified)
Durability of Water Tightness against Chemicals	Pass (28 d / +23 °C) Pass (Method B, 24 h / 60 kPa)		(EN 1847) (EN 1928)
Permeability to Radon	5,3±0,7 × 10^{-12} m²/s		(Certificate E-214/2011)
Permeability to Methane	140 ml/(m²·d) (±10 %)		(ISO 7229)

SYSTEM INFORMATION

System Structure	The following system components must be used: ▪ SikaProof® A-12 sheet membrane ▪ SikaProof® Tape-150 A self-adhesive tape for internal jointing ▪ SikaProof® ExTape-150 self-adhesive tape for external jointing Ancillary products: ▪ SikaProof® A-12 Edge pre-formed L-shaped sheet membrane ▪ Accessories and complementary products are available to provide detailing and connection solutions.

APPLICATION INFORMATION

Substrate Moisture Content	No Standing Water (refer to important considerations for more information)

APPLICATION INSTRUCTIONS

EQUIPMENT

- Tape measure
- Marking pen
- Razor knife
- Scissors
- Pressure roller
- Clean lint-free cloth
- Metal straight edge for cutting
- Protective sheet for cutting

SUBSTRATE QUALITY

SikaProof® A-12 membrane must be applied on a sufficiently stable substrate to avoid movement during the construction works. Substrate surface must be smooth, uniform and clean. Large gaps and voids (> 12–15 mm) must be filled before membrane installation. Substrate can be damp or slightly wet, ponding water must be avoided. Suitable membrane fixing substrates include:

- Concrete blinding
- Formwork
- Rigid thermal insulation
- Plywood sheets / forms
- Sika Drainage Mat

APPLICATION METHOD / TOOLS

Installation procedure
Refer to current SikaProof® A Method Statement or Application Manual.
Installation method - General
After substrate conditions have been fulfilled, the waterproofing membrane is installed by loose laying with the fleece facing upwards or inwards onto horizontal / inclined substrates or fastening onto vertical substrates. Pre-formed L-shaped SikaProof® A-12 Edge sheets are used for corner and edge details. Overlap joints are sealed using cold-applied self-adhesive strips or tapes. No heat or open flames are required for installing any part of the membrane system.
Overlap and transverse joints
All overlap and transverse joints must be bonded and sealed either with self-adhesive strips lengthways on the edge of the membrane sheet or using the SikaProof® ExTape-150 on the outside face and SikaProof® Tape-150 A on the inside face and all transverse joints.
Detailing
Form all details and connections using the appropriate SikaProof® ancillary products outlined in the 'Method Statement - SikaProof® A'
Construction and expansion joints
For sealing these types of joints, use additional Sika® Joint Solutions
Inspection and quality control of installation
A final inspection before placing concrete must be carried out to ensure the complete membrane system has been correctly installed, any damage repaired and fleeced surface is clean.
Concrete placement
Place concrete directly onto or against the membrane within 30 days after installation.
Formwork removal
After removing the formwork, all penetrations such as shuttering anchors, any membrane damage and construction joints must be sealed using the appropriate SikaProof® A-12 ancillary products or complementary Sika Waterproofing Systems.
Backfilling protection
After formwork removal and before backfilling. SikaProof® A-12 system must be protected with an appropriate protection sheet as soon as possible or at the latest within 90 days.

AVAILABILITY/WARRANTY

- Method Statement - SikaProof® A
- Application Manual - SikaProof® A

LIMITATIONS

Installation work must only be carried out by Sika® trained,approved or competent contractors experienced in this type of application.

- Reference must also be made to the 'Method Statement - SikaProof® A' and 'Application Manual -

SikaProof® A' for more detailed information.
- Do not install SikaProof® A-12 membrane during continuous or prolonged rain or snowfall.
- The substrate application surface must be clean with no standing water.
- Do not use SikaProof® A-12 for applications in hot climates. Use the specially designed SikaProof® A-12 HC membrane.
- If SikaProof® A-12 has to be applied under wet conditions or temperatures below +40 °F. Exceptions are possible under special circumstances with appropriate precautions. Contact Sika® Technical Services for more information.
- Additional Sika® Joint Sealing Solutions (minimum Sika Hydrotite®) must be used for connections, around penetrations and for construction and expansion joints.
- Concrete must be placed within 30 days after membrane system installation.
- Adequate concrete quality (mix design and workmanship) is required to achieve optimum adhesion of the membrane system to the concrete.
- SikaProof® A-12 membrane is not permanently UV and weather resistant. Therefore the membrane system must not be installed on structures where it will be permanently exposed to UV light.
- After formwork removal, the membrane system (yellow membrane side) must be protected as soon as possible or at the latest before backfilling or within 90 days after installation.
- To ensure the most suitable type of membrane is selected for the project, refer to section 4 'Project Design' of the 'Method Statement - SikaProof® A System' or contact Sika® Technical Services for more information

BASIS OF PRODUCT DATA

Results may differ based upon statistical variations depending upon mixing methods and equipment, temperature, application methods, test methods, actual site conditions and curing conditions.

OTHER RESTRICTIONS

See Legal Disclaimer.

ENVIRONMENTAL, HEALTH AND SAFETY

REGULATION (EC) NO 1907/2006 - REACH

This product is an article as defined in article 3 of regulation (EC) No 1907/2006 (REACH). It contains no substances which are intended to be released from the article under normal or reasonably foreseeable conditions of use. A safety data sheet following article 31 of the same regulation is not needed to bring the product to the market, to transport or to use it. For safe use follow the instructions given in the product data sheet. Based on our current knowledge, this product does not contain SVHC (substances of very high concern) as listed in Annex XIV of the REACH regulation or on the candidate list published by the European Chemicals Agency in concentrations above 0,1 % (w/w)

LEGAL DISCLAIMER

- **KEEP CONTAINER TIGHTLY CLOSED**
- **KEEP OUT OF REACH OF CHILDREN**
- **NOT FOR INTERNAL CONSUMPTION**
- **FOR INDUSTRIAL USE ONLY**
- **FOR PROFESSIONAL USE ONLY**

Prior to each use of any product of Sika Corporation, its subsidiaries or affiliates ("SIKA"), the user must always read and follow the warnings and instructions on the product's most current product label, Product Data Sheet and Safety Data Sheet which are available at usa.sika.com or by calling SIKA's Technical Service Department at 1-800-933-7452. Nothing contained in any SIKA literature or materials relieves the user of the obligation to read and follow the warnings and instructions for each SIKA product as set forth in the current product label, Product Data Sheet and Safety Data Sheet prior to use of the SIKA product.

SIKA warrants this product for one year from date of installation to be free from manufacturing defects and to meet the technical properties on the current Product Data Sheet if used as directed within the product's shelf life. User determines suitability of product for intended use and assumes all risks. User's and/or buyer's sole remedy shall be limited to the purchase price or replacement of this product exclusive of any labor costs. **NO OTHER WARRANTIES EXPRESS OR IMPLIED SHALL APPLY INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SIKA SHALL NOT BE LIABLE UNDER ANY LEGAL THEORY FOR SPECIAL OR CONSEQUENTIAL DAMAGES. SIKA SHALL NOT BE RESPONSIBLE FOR THE USE OF THIS PRODUCT IN A MANNER TO INFRINGE ON ANY PATENT OR ANY OTHER INTELLECTUAL PROPERTY RIGHTS HELD BY OTHERS.**

Sale of SIKA products are subject to the Terms and Conditions of Sale which are available at https://usa.sika.com/en/group/SikaCorp/termsandcondi

tions.html or by calling 1-800-933-7452.

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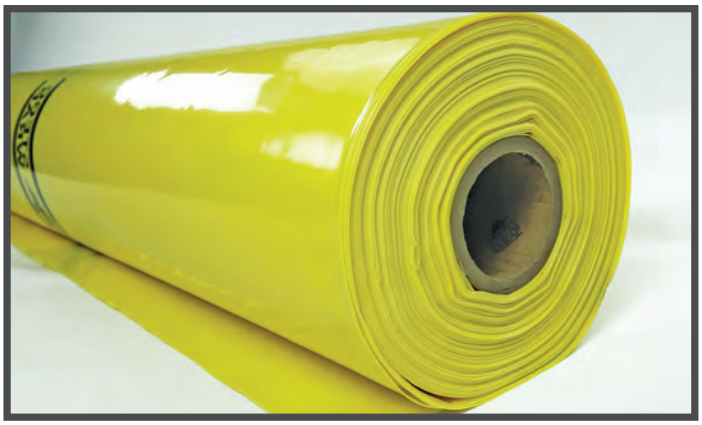
Phone: 52 442 2385800
Fax: 52 442 2250537

STEGO® WRAP 20-MIL VAPOR BARRIER

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: FEB 18, 2020

1. PRODUCT NAME

STEGO WRAP 20-MIL VAPOR BARRIER



2. MANUFACTURER

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672 USA
Sales, Technical Assistance
Ph: (877) 464-7834
contact@stegoindustries.com
www.stegoindustries.com

3. PRODUCT DESCRIPTION

USES: Stego Wrap 20-Mil Vapor Barrier is used as a below-slab vapor barrier.

COMPOSITION: Stego Wrap 20-Mil Vapor Barrier is a multi-layer plastic extrusion manufactured with only the highest grade of prime, virgin, polyolefin resins.

ENVIRONMENTAL FACTORS: Stego Wrap 20-Mil Vapor Barrier can be used in systems for the control of soil gases (radon, methane), soil poisons (oil by-products) and sulfates.

4. TECHNICAL DATA

TABLE 4.1: PHYSICAL PROPERTIES OF STEGO WRAP 20-MIL VAPOR BARRIER

PROPERTY	TEST	RESULTS
Under Slab Vapor Retarders	ASTM E1745 Class A, B & C – Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs	Exceeds Class A, B & C
Water Vapor Permeance	ASTM F1249 – Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor	0.0071 perms
Permeance After Conditioning (ASTM E1745 Sections 7.1.2 - 7.1.5)	ASTM E154 Section 8, F1249 – Permeance after wetting, drying, and soaking ASTM E154 Section 11, F1249 – Permeance after heat conditioning ASTM E154 Section 12, F1249 – Permeance after low temperature conditioning ASTM E154 Section 13, F1249 – Permeance after soil organism exposure	0.0088 perms 0.0081 perms 0.0084 perms 0.0077 perms
Methane Transmission Rate	ASTM D1434 - Standard Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting	152.2 GTR* (mL(STP)/m^2*day)
Radon Diffusion Coefficient	K124/02/95	9.9 x 10^{-12} m^2/second
Puncture Resistance	ASTM D1709 – Test Method for Impact Resistance of Plastic Film by Free-Falling Dart Method	3500+ grams**
Tensile Strength	ASTM D882 – Test Method for Tensile Properties of Thin Plastic Sheeting	97.7 lbf/in
Thickness		20 mil
Roll Dimensions	width x length: area:	14' x 105' 1470 ft^2
Roll Weight		140 lb

Note: perm unit = grains/(ft^2*hr*in-Hg)
*GTR = Gas Transmission Rate
**The material maxed out the testing equipment and did not fail at 3746 grams.

Continued...
Note – legal notice on page 2.

STEGO® WRAP 20-MIL VAPOR WRAP BARRIER

A STEGO INDUSTRIES, LLC INNOVATION | VAPOR RETARDERS 07 26 00, 03 30 00 | VERSION: FEB 18, 2020

5. INSTALLATION

UNDER SLAB: Unroll Stego Wrap 20-Mil Vapor Barrier over an aggregate, sand or tamped earth base. Overlap all seams a minimum of 6 inches and tape using Stego® Tape or Stego® Crete Claw® Tape. All penetrations must be sealed using a combination of Stego Wrap and Stego Accessories.

For additional information, please refer to Stego's complete installation instructions.

6. AVAILABILITY & COST

Stego Wrap 20-Mil Vapor Barrier is available through our network of building supply distributors. For current cost information, contact your local Stego distributor or Stego Industries' Sales Representative.

7. WARRANTY

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided herein. Stego Industries, LLC does offer a limited warranty on Stego Wrap. Please see www.stegoindustries.com/legal.

8. MAINTENANCE

None required.

9. TECHNICAL SERVICES

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries or by visiting the website.

Contact Number: (877) 464-7834
Website: www.stegoindustries.com

10. FILING SYSTEMS

- www.stegoindustries.com

APPENDIX E

Citizen Participation Plan

Brownfield Cleanup Program - Citizen Participation Plan Template Instructions

Note: This template is to be used to prepare the site Citizen Participation (CP) Plan. The CP Plan template was designed for the typical scenario of a site that would be investigated and remediated under the BCP.

The draft site CP Plan must be reviewed and approved by NYSDEC. The NYSDEC project manager determines when a draft site CP Plan is final, regardless of who prepares draft versions of the document. The site CP Plan may be revised during the implementation of the brownfield site's remedial program. This determination will be made by the NYSDEC project manager, in consultation with the assigned NYSDEC Citizen Participation Specialist and other NYSDEC staff as appropriate.

Preparation:

- Unless directed otherwise, the Applicant will submit to NYSDEC for review and approval the site CP Plan within 20 days after the effective date of the site's Brownfield Cleanup Agreement.

- Insert or delete information within brackets as appropriate, then delete the brackets and any accompanying instructions, including each "Instruction to preparer:". Unless instructed otherwise, remove **bolding** from text that is inserted or contained within brackets.

- Assume the reader does not have specialized technical and environmental knowledge. **Insert plain, understandable language into the template.** Avoid jargon and acronyms. Don't "cut and paste" from technical reports -- they are not written for a general audience. Explain/define any technical terms that must be used. For example, don't assume the reader knows what a "non-aqueous phase liquid (NAPL)" is, or what "air sparging" means. An NYSDEC Citizen Participation Specialist, in consultation with the NYSDEC project manager, may revise or identify portions of the draft that require revision before it can be approved.

- Do not delete or alter "boilerplate" language unless the activity referenced (e.g. investigation, cleanup) does not apply to the BCP site and project.

- When the site CP Plan has been drafted, address page breaks, heading locations and other formatting issues as needed.

- When final edits have been made to the draft site CP Plan, insert or edit page numbers in the Contents page. Recheck page breaks, heading locations and other formatting issues. Be sure to format and print the site CP Plan double-sided.

Distribution:

- The NYSDEC project manager will notify the Applicant when to distribute the approved site CP Plan to the site's document repository(ies). Alternately, NYSDEC may distribute the site CP Plan to the repository(ies).

- **External distribution:** The site CP Plan can be distributed to the site's document repository(ies) in paper form and/or electronic form (such as on disc). Be sure the repository(ies) have the means to provide the public with electronic access to the site CP Plan if this format is selected.

  Additional distribution may be considered if the BCP site or its remedial program is comprehensive and/or there is significant public interest. One option is to post the site CP Plan electronically on the DER public web site. Another option is to distribute the site CP Plan to a subset of the site contact list that includes community leaders and others as appropriate. Such distribution should be done electronically through email, if possible.

  The method(s) and extent of external distribution is determined by the NYSDEC project manager, following consultation with others as appropriate.

- **Internal distribution:** NYSDEC and NYSDOH staff always should receive electronic copies of the site CP Plan, whether NYSDEC staff are managing the distribution or the distribution is being managed by the Applicant or a contractor. Hard copies should not be distributed internally. NYSDEC staff should provide the Applicant or contractor with appropriate NYSDEC and NYSDOH email addresses when the Applicant or contractor is managing the distribution.

- Place electronic copy of the site CP Plan in the appropriate folder of DecDocs.

An Applicant preparing a draft BCP CP Plan should direct related questions and requests for additional information to the NYSDEC project manager.

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
8 Walworth Street Site

March 2018

Site # C224239
8 Walworth Street
Kings County, NY 11205

Contents

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Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the site's investigation and cleanup process.

Applicant: Toldos Yehuda LLC **("Applicant")**
Site Name: **8 Walworth ("Site")**
Site Address: **8 Walworth Street, Brooklyn, NY**
Site County: **Kings**
Site Number: C224239

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as "brownfields" so that they can be reused and developed. These uses include recreation, housing, and business.

A *brownfield* is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal, and financial burdens on a community. If a brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants who conduct brownfield site investigation and cleanup activities. An Applicant is a person who has requested to participate in the BCP and has been accepted by NYSDEC. The BCP contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at:
http://www.dec.ny.gov/chemical/8450.html .

2. Citizen Participation Activities

Why NYSDEC Involves the Public and Why It Is Important

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well-being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision-makers form or adopt final positions.

Involving citizens affected and interested in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment

- Improving public access to, and understanding of, issues and information related to a particular site and that site's investigation and cleanup process

- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process

- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community

- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision-making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the Site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's investigation and cleanup program. The public's suggestions about this CP Plan and the CP program for the Site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Locations of Reports and Information

The locations of the reports and information related to the site's investigation and cleanup program also are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some documents may be placed on the NYSDEC web site. If this occurs, NYSDEC will inform the public in fact sheets distributed about the Site and by other means, as appropriate.

Site Contact List

Appendix B contains the site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and cleanup process. The site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at the Site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.
The site contact list includes, at a minimum:

- Chief executive officer and planning board chairperson of each county, city, town and village in which the Site is located;
- Residents, owners, and occupants of the Site and properties adjacent to the Site;
- The public water supplier which services the area in which the Site is located;
- Any person who has requested to be placed on the site contact list;
- The administrator of any school or day care facility located on or near the Site for purposes of posting and/or dissemination of information at the facility;
- Location(s) of reports and information.

The site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

Note: The first site fact sheet (usually related to the draft Remedial Investigation Work Plan) is distributed both by paper mailing through the postal service and through DEC Delivers, its email listserv service. The fact sheet includes instructions for signing up with the appropriate county listserv to receive future notifications about the site. See http://www.dec.ny.gov/chemical/61092.html .

Subsequent fact sheets about the site will be distributed exclusively through the listserv, except for households without internet access that have indicated the need to continue to receive site information in paper form. Please advise the NYSDEC site project manager identified in Appendix A if that is the case. Paper mailings may continue during the investigation and cleanup process for some sites, based on public interest and need.

CP Activities

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the site's investigation and cleanup program. The flowchart in Appendix D shows how these CP activities integrate with the site investigation and cleanup process. The public is informed about these CP activities

through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site.

- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the site's investigation and cleanup process with questions, comments, or requests for information.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of investigation and cleanup activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

Technical Assistance Grant

NYSDEC must determine if the Site poses a significant threat to public health or the environment. This determination generally is made using information developed during the investigation of the Site, as described in Section 5.

If the Site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the Site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the site.

As of the date the declaration (page 2) was signed by the NYSDEC project manager, **the significant threat determination for the site had not yet been made.**

To verify the significant threat status of the Site, the interested public may contact the NYSDEC project manager identified in Appendix A.

For more information about TAGs, go online at
http://www.dec.ny.gov/regulations/2590.html
Note: The table identifying the citizen participation activities related to the site's investigation and cleanup program follows on the next page:

Citizen Participation Activities	Timing of CP Activity(ies)
Application Process:	
• Prepare site contact list • Establish document repository(ies)	At time of preparation of application to participate in the BCP.
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period • Publish above ENB content in local newspaper • Mail above ENB content to site contact list • Conduct 30-day public comment period	When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement (BCA):	
• Prepare Citizen Participation (CP) Plan	Before start of Remedial Investigation **Note:** Applicant must submit CP Plan to NYSDEC for review and approval within 20 days of the effective date of the BCA.
Before NYSDEC Approves Remedial Investigation (RI) Work Plan:	
• Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan • Conduct 30-day public comment period	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.
After Applicant Completes Remedial Investigation:	
• Distribute fact sheet to site contact list that describes RI results	Before NYSDEC approves RI Report
Before NYSDEC Approves Remedial Work Plan (RWP):	
• Distribute fact sheet to site contact list about draft RWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period	Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period.
Before Applicant Starts Cleanup Action:	
• Distribute fact sheet to site contact list that describes upcoming cleanup action	Before the start of cleanup action.
After Applicant Completes Cleanup Action:	
• Distribute fact sheet to site contact list that announces that cleanup action has been completed	At the time the cleanup action has been completed.

Citizen Participation Activities	Timing of CP Activity(ies)
and that NYSDEC is reviewing the Final Engineering Report • Distribute fact sheet to site contact list announcing NYSDEC approval of Final Engineering Report and issuance of Certificate of Completion (COC)	**Note:** The two fact sheets are combined when possible if there is not a delay in issuing the COC.

3. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern that relate to the site. Additional major issues of public concern may be identified during the course of the site's investigation and cleanup process.

The major issues of concern to the public will be potential impacts of vapors, nuisance odors and dust during the removal of affected soil at the Site. Another example of a major issue of public concern would be the impact of increased truck traffic on the surrounding neighborhood. Construction safety issues will also be addressed.

This work will be performed in accordance with procedures which will be specified under a detailed Remedial Program which considers and takes preventive measures for exposures to future residents of the property and those on adjacent properties during construction. Detailed plans to monitor the potential for exposure including a Health and Safety Plan (HASP) and a Community Air Monitoring Plan (CAMP) are required components of the remedial program. Implementation of these plans will be under the direct oversight of the NYSDEC and the New York State Department of Health (NYSDOH).

These plans will specify the following worker and community health and safety activities during remedial activity at the Site:

- On-Site air monitoring for worker protection;
- Perimeter air monitoring for community protection;
- The use of odor, vapor, and dust controls, such as water or foam sprays, as needed;
- Monitoring and control of soil, sediments, and water generated during remediation; and
- Truck routes which avoid residential streets.

The HASP and the CAMP will be prepared as part of the Remedial Action Work Plan (RAWP) and will be available for public review at the document repository as identified in Appendix A.

Experience from similar projects, 311 complaints and other construction projects in the area will help in identifying such issues.

The Site is located in an Environmental Justice Area, but there is no need to translate future fact sheets into another language. In addition, the Applicant needs to be aware of impacts related to odor, noise and truck traffic.

Environmental justice is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Environmental justice efforts focus on improving the environment in communities, specifically minority and low-income communities, and addressing disproportionate adverse environmental impacts that may exist in those communities.

4. Site Information

Appendix C contains a map identifying the location of the site.

Site Description

The Site to be remediated and redeveloped is located in the Bedford Stuyvesant section of Brooklyn and is comprised of a single tax parcel (Figure 2) totaling 3,910 square feet (0.089 acres). The Site is rectangular shaped with 78 feet of frontage along Walworth Street. Currently the property is developed with a 1-story warehouse building constructed in 1982. Historically the property was used for paint mixing and storage.

The elevation of the Site is approximately 14 feet above the National Geodetic Vertical Datum (NGVD). The topographic gradient of the surrounding area sloped gently downward to the to the north. The depth to groundwater beneath the Site, is approximately 12 feet below grade. Based on measurements made on adjacent properties, groundwater flows to the east toward Walworth Street.

The area surrounding the Site includes a mixed-use building to the north, industrial properties to the south, east across Walworth Street and west. Commercial and mixed-use properties are also present further to the northwest and southwest. There are no identified daycare centers of schools in the immediate area of the Site, however there is a religious facility located approximately 125 feet south of the Site on Walworth Street.

History of Site Use, Investigation, and Cleanup

The Site was originally developed with two residences, a retail store and associated accessory structures by at least 1887. Several structures were demolished between the late-1930s and late-1940s, with only one residence and several sheds remaining by 1950. By 1965, northern portions of the Site were developed with a one-story warehouse utilized for chemical drum storage.

The residence was demolished in mid-1970s. In 1982, the Site was redeveloped with the existing one-story warehouse building, occupied by Techtonics Ecological Corp. and utilized for the mixing and storage of paints and other coatings.

Accoding to waste manifest reported by Techtonics, materials handled at the Site included ignitable waste, Chlorinated Volatile Organic Compounds (CVOCs), chlorinated fluorocarbons, halogenated solvents, acetone and petroleum-based materials. Techtronics Ecological Corp. was listed as a large quantity generator (LQG) for a few years in the early 1980s, but for all other years did not generate significant quantities of potentially hazardous materials and remained a NonGen site since that time.

The Site is also listed on the NYSPILLS database related to one open/active spill incident (No. 07-10116), which was reported on December 21, 2007, when chlorinated solvent contamination was identified in soil and groundwater by PW Grosser Consulting, Inc. (PWGC) during a remedial investigation. The contaminants identified were thought to be associated with the historic manufacturing of lacquer and paints at the Site.

5. Investigation and Cleanup Process

Application

The Applicant has applied for and been accepted into New York's Brownfield Cleanup Program (BCP) as a Participant. This means that the Applicant has taken responsibility for the discharge of the contaminants and will address both on-site and off-site issues. The Applicant must fully characterize the nature and extent of contamination on-site and off-site, and must conduct a qualitative exposure assessment, a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the Site and to contamination that has migrated from the Site.

The Applicant has not finalized plans with respect to reuse, though both commercial and residential are possible goals.

To achieve this goal, the Applicant will conduct investigation and cleanup activities at the Site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement (BCA) executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the Site.

Investigation

The Applicant will conduct an investigation of the Site officially called a "remedial investigation" (RI). This investigation will be performed with NYSDEC oversight. Upon

receipt of the RI, the NYSDEC will determine if the investigation goals and requirements of the BCP have been met or if additional work is needed before a remedy can be selected.

The site investigation has several goals:

1) Define the nature and extent of contamination in soil, surface water, groundwater and any other parts of the environment that may be affected;
2) Identify the source(s) of the contamination;
3) Assess the impact of the contamination on public health and the environment; and
4) Provide information to support the development of a proposed remedy to address the contamination or the determination that cleanup is not necessary.

When the investigation is complete, the Applicant will prepare and submit a report that summarizes the results. This report also will recommend whether cleanup action is needed to address site-related contamination. The investigation report is subject to review and approval by NYSDEC.

NYSDEC will use the information in the investigation report to determine if the Site poses a significant threat to public health or the environment. If the Site is a significant threat, it must be cleaned up using a remedy selected by NYSDEC from an analysis of alternatives prepared by the Applicant and approved by NYSDEC. If the Site does not pose a significant threat, the Applicant may select the remedy from the approved analysis of alternatives.

Interim Remedial Measures

An Interim Remedial Measure (IRM) is an action that can be undertaken at a site when a source of contamination or exposure pathway can be effectively addressed before the site investigation and analysis of alternatives are completed. If an IRM is likely to represent all or a significant part of the final remedy, NYSDEC will require a 30-day public comment period.

Remedy Selection

When the investigation of the Site has been determined to be complete, the project likely would proceed in one of two directions:

1. The Applicant may recommend in its investigation report that no action is necessary at the Site. In this case, NYSDEC would make the investigation report available for public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a “Certificate of Completion” (described below) to the Applicant.

or

2. The Applicant may recommend in its investigation report that action needs to be taken to address site contamination. After NYSDEC approves the investigation report, the Applicant may then develop a cleanup plan, officially called a “Remedial Work Plan”. The Remedial Work Plan describes the Applicant’s proposed remedy for addressing contamination related to the site.
When the Applicant submits a draft Remedial Work Plan for approval, NYSDEC would announce the availability of the draft plan for public review during a 45-day public comment period.

Cleanup Action

NYSDEC will consider public comments, and revise the draft cleanup plan if necessary, before approving the proposed remedy. The New York State Department of Health (NYSDOH) must concur with the proposed remedy. After approval, the proposed remedy becomes the selected remedy. The selected remedy is formalized in the site Decision Document.

The Applicant may then design and perform the cleanup action to address the site contamination. NYSDEC and NYSDOH oversee the activities. When the Applicant completes cleanup activities, it will prepare a Final Engineering Report (FER) that certifies that cleanup requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the cleanup is protective of public health and the environment for the intended use of the Site.

Certificate of Completion

When NYSDEC is satisfied that cleanup requirements have been achieved or will be achieved for the site, it will approve the FER. NYSDEC then will issue a Certificate of Completion (COC) to the Applicant. The COC states that cleanup goals have been achieved, and relieves the Applicant from future liability for site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the site after it receives a COC.

Site Management

The purpose of site management is to ensure the safe reuse of the property if contamination will remain in place. Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management incorporates any institutional and engineering controls required to ensure that the

remedy implemented for the site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan.

An *institutional control* is a non-physical restriction on use of the Site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional control may be used when the cleanup action leaves some contamination that makes the site suitable for some, but not all uses.

An *engineering control* is a physical barrier or method to manage contamination. Examples include: caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that pumps and treats groundwater. Site management continues until NYSDEC determines that it is no longer needed.

Appendix A -
Project Contacts and Locations of Reports and Information

Project Contacts

For information about the site's investigation and cleanup program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

Aaron Fischer
Project Manager
NYSDEC
Division of Environmental Remediation
625 Broadway
Albany, NY 12233-7016
Phone: (518) 402-9805 |
Email: aaron.fischer@dec.ny.gov

Thomas V. Panzone
Public Participation Specialist
NYSDEC Region 2
Office of Communications Services
1 Hunter's Point Plaza
47-40 21st Street
Long Island City, NY 11101
Phone: (718) 482-4953
Email: Thomas.panzone@dec.ny.gov

New York State Department of Health (NYSDOH):

Kristin Kulow
Project Manager
NYSDOH
Empire State Plaza
Corning Tower Room 1782
Albany, NY 12237
Phone: (518) 402-7860
Email: BEEI@health.ny.gov

Locations of Reports and Information

The facilities identified below are being used to provide the public with convenient access to important project documents:

Brooklyn Public Library - Bushwick Branch
340 Bushwick Ave
Brooklyn, NY 11206
718-602-1348

Brooklyn 3 Community Board
1360 Fulton Street Rm. 202
Brooklyn, NY, 11216
Phone: (718) 622-6601

Appendix B - Site Contact List

Local Government Contacts

City of New York
Hon. William de Blasio
Mayor of New York City
City Hall
New York, NY 10007

Hon. Eric Adams
Brooklyn Borough President
209 Joralemon Street
New York, NY 11201

Mr. Richard Flateau
Chairman, Brooklyn Community Board 3
1360 Fulton Street, 2nd Floor
Brooklyn, NY, 11216

Mr. Henry Butler
District Manager, Brooklyn Community Board 3
1360 Fulton Street, 2nd Floor
Brooklyn, NY, 11216

Mr. Gregory Glasgow
Environmental Committee Chairman
1360 Fulton Street, 2nd Floor
Brooklyn, NY, 11216

Hon. Stephen Levin
NYC Council Member
33rd District
410 Atlantic Avenue
Brooklyn, NY 11217

Marisa Lago, Commissioner
NYC Department of City Planning 120 Broadway, 31st Floor
New York, NY 10007

Dalila Hall
New York City Department of Transportation

Brooklyn Borough Commissioner
55 Water Street, 9th Floor
New York, NY 10041

Kings County Clerk's Office
Nancy Sunshine, County Clerk
360 Adams Street, Room 189
Brooklyn, NY 11201

Ms. Letitia James
Public Advocate
1 Centre Street, 15th Floor
New York, NY 10007
Email: kjfoy@pubadvocate.nyc.gov

Hon. Scott M. Stringer
Office of the Comptroller
1 Centre Street
New York, NY 10007
Email: intergov@comptroller.nyc.gov

Hon. Martin Malave Dilan
NYS Senator
3215 Fulton Street
Brooklyn, NY 11208

Hon. Joseph R. Lentol
NYS Assemblyman
619 Lorimer Street
Brooklyn, NY 11211

Hon. Charles Schumer
U.S. Senator
780 Third Avenue, Suite 2301
New York, NY 10017

Hon. Kirsten Gillibrand
U.S. Senator
780 Third Avenue, Suite 2601
New York, NY 10017

Hon. Nydia M. Velazquez
U.S. House of Representatives

266 Broadway, Suite 201
Brooklyn, NY 11211

Julie Stein
Office of Environmental Planning & Assessment
NYC Dept. of Environmental Protection
96-05 Horace Harding Expressway
Flushing, NY 11373

Daniel Walsh
NYC Department of Environmental Remediation
100 Gold Street – 2nd Floor
New York, NY 10038

Adjacent Property Owner Contacts

North

1. OWNER
   480 FLUSHING LLC
   17 KEAP ST.
   BROOKLYN NY 11249-7518

   OCCUPANT / TENANT
   480 FLUSHING AVENUE
   BROOKLYN NY 11205

West

2. OWNER
   THE W GROUP OF BROOKLYN LLC
   2 SKILLMAN ST. STE 213
   BROOKLYN NY 11205-1549

   OCCUPANT / TENANT
   11 SPENCER STREET
   BROOKLYN NY 11205

Flushing Avenue Condominiums

461 Flushing Ave
Brooklyn, NY 11205

South

3. OWNER
ORIENTAL WORLD CORP.
276 GRAND ST. APT. OWNER
NEW YORK NY 10002-4453

OCCUPANT / TENANT
17 SPENCER STREET
BROOKLYN NY 11205

East

4. OWNER
FLUSHING WALWORTH RE
30 WARSOFF PL.
BROOKLYN NY 11205-1638

OCCUPANT / TENANT
39 WALWORTH STREET
BROOKLYN NY 11205

5. OWNER
490 FLUSHING AVENUE LLC
490 FLUSHING AVE.
BROOKLYN NY 11205-1615

OCCUPANT / TENANT
9 WALWORTH STREET
BROOKLYN NY 11205

6. OWNER
490 FLUSHING AVENUE LLC
490 FLUSHING AVE.
BROOKLYN NY 11205-1615

OCCUPANT / TENANT
486 FLUSHING AVENUE
BROOKLYN NY 11205

Local News Media

The Brooklyn Paper
One Metrotech Center, Suite 1001
Brooklyn, NY 11201
(718) 260-4504

New York Daily News
4 New York PlazaNew York, NY 10004

New York Post
1211 Avenue of the Americas
New York, NY 10036-8790

Spectrum NY 1 News
75 Ninth Avenue
New York, NY 10011

Courier-Life Publications
1 Metro-Tech Center North - 10th Floor
Brooklyn, NY 11201

Brooklyn Daily Eagle
16 Court Street, Suite 1208
Brooklyn, NY 11241

Public Water Supplier

Vincent Sapienza, Commissioner
New York City Department of Environmental Protection
59-17 Junction BoulevardFlushing, NY 11373

Requested Contacts

No requests have been made at this time.

Schools and Daycare Facilities

BAbove 35
Attn: Director
40 Lynch Street
Brooklyn, NY 11206

Yeled v' Yalda **712**
Attn: Director
712 BEDFORD AVENUE
Brooklyn, NY11206

BAbove 34
Attn: Director
8 SKILLMAN STREET
Brooklyn, NY 11205

CHILD DEVELOPMENT SUPPORT CORPORATION
Attn: Director
802 KENT AVENUE
BROOKLYN, NY11205

BAbove 32
Attn: Director
799 KENT AVENUE
Brooklyn, NY11205

P.S. 157
Attn: Principal
850 KENT AVENUE
Brooklyn, NY11205

Marcy Children's Center
Attn: Executive Director
494 MARCY AVENUE
Brooklyn, NY11206

PS 380 John Wayne Elem.
Attn: Principal
370 MARCY AVENUE
Brooklyn, NY11206

Bnei Shimon Yisroel of Sopron
18 Warsoff Place
Brooklyn, New York 11205
Attn: Ms. Rosa Friedman - Principal
718-855-4092

Cong Ahavas Shulem - School
237 Lee Ave,
Brooklyn, NY 11206
Attn: Enashe Leifer - Principal
(718) 599-0660

Congregation OHR Chodosh
Attn: Rabbi
713 Bedford Avenue
Brooklyn, NY 11206

Mosdos Chasidei Square - Private School
105 Heyward St,
Brooklyn, NY 11206
Attn: Manuel Kalisch - Principal
(718) 852-0502

Beth Chana School for Girls
712 Bedford Avenue,
Brooklyn, NY 11206-5406
Attn: Esther Salamon - Principal
(718) 858-5267

Hychel Hatorah of Williamsburg
70 Franklin Avenue,
Brooklyn, NY 11205-1504
Attn: Moses Friedman
(718) 250-9982

Central UTA
76 Rutledge Street,
Brooklyn, NY 11205

Attn: Isaac Mandel - Principal
(718) 797-2888

Eis Laasois - Preschool
22 Middleton St,
Brooklyn, NY 11206
Attn: David Lichtman - Executive Director
(718) 782-4426

Community, Civic, Religious and Environmental Organizations:

Consolidated Edison Corporate Affairs
Antonia Yuille, Director
30 Flatbush Avenue
Brooklyn, NY 11217

79th NYPD Police Precinct Council
Kim Best, President
263 Tompkins Avenue
Brooklyn, NY 11216

FDNY
Ladder 102
850 Bedford Avenue
Brooklyn, NY 11205

WILLIAMSBURG SATMAR NEIGHBORHOOD SR CTR
Attn: Executive Director
125 HEYWARD STREET
BROOKLYN, NY11206

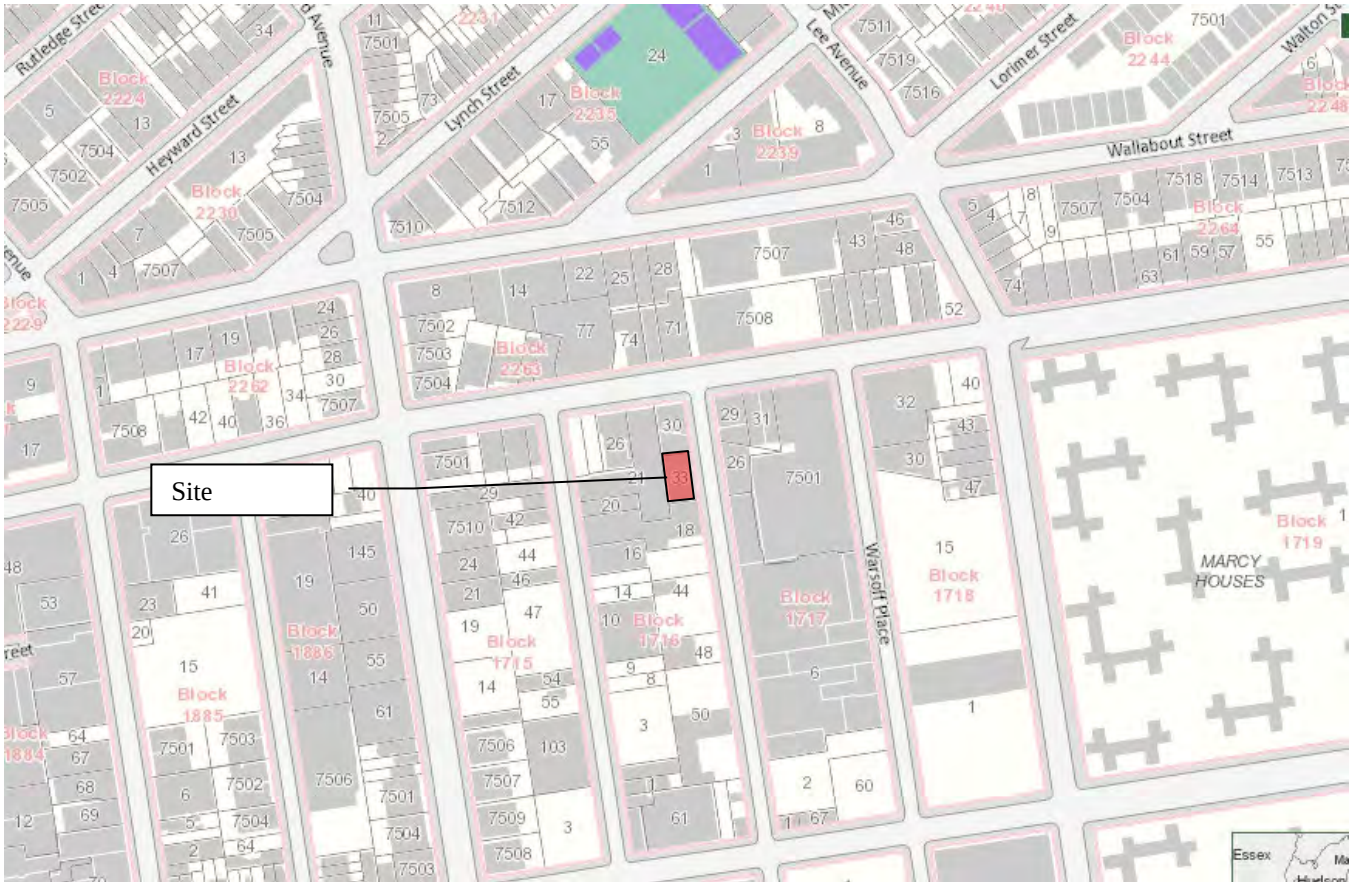
Marcy Houses
NYCHA
Attn: Management Development
452 Marcy Avenue
Brooklyn, NY 11206

Marcy Houses
NYCHA
Attn: President – Resident Association
452 Marcy Avenue
Brooklyn, NY 11206

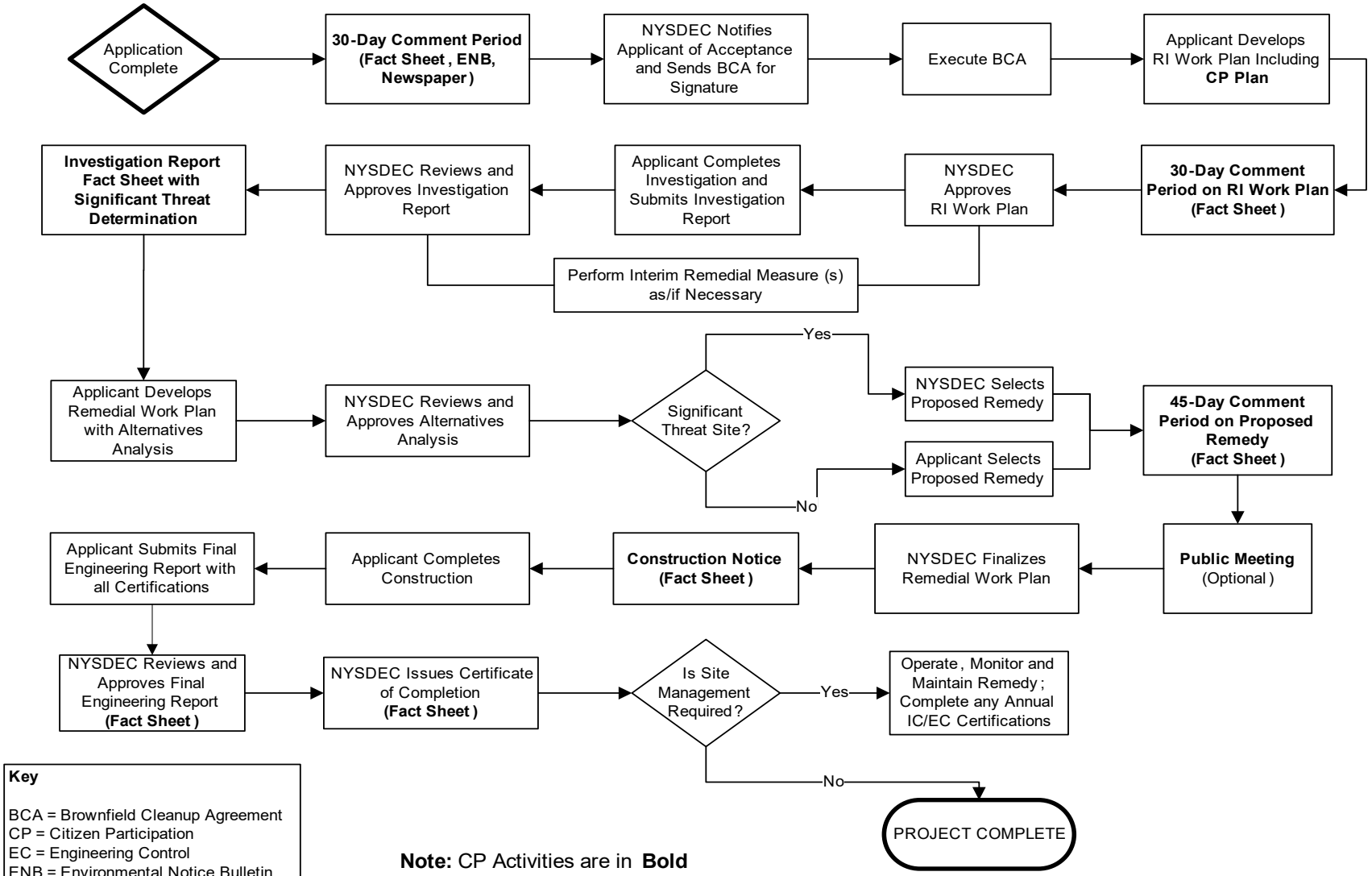
St Lucy's Roman Catholic Church
Attn: Pastor
344 E 104th St
New York, NY 10029

Clinton Hill CSA
Email: web@clintonhillcsa.org
P.O. Box 050377
Brooklyn, NY 11205

Appendix C - Site Location Map



Appendix D– Brownfield Cleanup Program Process



Key

BCA = Brownfield Cleanup Agreement
CP = Citizen Participation
EC = Engineering Control
ENB = Environmental Notice Bulletin
IC = Institutional Control
RI = Remedial Investigation

Note: CP Activities are in **Bold**

Division of Environmental Remediation

Remedial Programs
Scoping Sheet for Major Issues of Public Concern

Instructions

This Scoping Sheet assesses major issues of public concern; impacts of the site and its remedial program on the community; community interest in the site; information the public needs; and information needed from the public.

The information generated helps to plan and conduct required citizen participation (CP) activities, and to choose and conduct additional CP activities, if appropriate. The scoping sheet can be revisited and updated as appropriate during the site's remedial process to more effectively implement the site's CP program.

Note: Use the information as an aid to prepare and update the Major Issues of Public Concern section of the site CP Plan.

General Instructions

- When to prepare: During preparation of the CP Plan for the site. It can be revisited and updated anytime during the site remedial process.
- Fill in site name and other information as appropriate.
- The Scoping Sheet may be prepared by DEC or a remedial party, but must be reviewed and approved by the DER site project manager or his/her designee.

Instructions for Numbered Parts

Consider the bulleted issues and questions below and any others that may be unique or appropriate to the site and the community to help complete the five Parts of this Scoping Sheet. Identify the issue stakeholders in Parts 1 through 3 and adjust the site's contact list accordingly.

Part 1. List Major Issues of Public Concern and Information the Community Wants.

- Is our health being impacted? (e.g. Are there problems with our drinking water or air? Are you going to test our water, yards, sumps, basements? Have health studies been done?)
- There are odors in the neighborhood. Do they come from the site and are they hazardous?
- Are there restrictions on what we may do (e.g. Can our children play outside? Can we garden? Must we avoid certain areas? Can we recreate (fish, hunt, hike, etc. on/around the site?)
- How and when were the site's contamination problems created?
- What contaminants are of concern and why? How will you look for contamination and find out where it is going? What is the schedule for doing that?
- The site is affecting our property values!
- How can we get more information (e.g. who are the project contacts?)
- How will we be kept informed and involved during the site remedial process?
- Who has been contacted in the community about site remedial activities?
- What has been done to this point? What happens next and when?
- The site is going to be cleaned up for restricted use. What does that mean? We don't want redevelopment on a "dirty" site.

Part 2. List Important Information Needed From the Community, if Applicable.

- Can the community supplement knowledge about past/current uses of the site?
- Does the community have knowledge that the site may be significantly impacting nearby people, properties, natural resources, etc.?
- Are activities currently taking place at the site or at nearby properties that may need to be restricted?
- Who may be interested or affected by the site that has not yet been identified?
- Are there unique community characteristics that could affect how information is exchanged?
- Does the community and/or individuals have any concerns they want monitored?
- Does the community have information about other sources in the area for the contamination?

Part 3. List Major Issues and Information That Need to be Communicated to the Community.

- Specific site investigation or remediation activities currently underway, or that will begin in the near future.
- The process and general schedule to investigate, remediate and, if applicable, redevelop the site.
- Current understanding about the site contamination and effects, if any, on public health and the environment.
- Site impacts on the community and any restrictions on the public's use of the site and/or nearby properties.
- Planned CP activities, their schedule, and how they relate to the site's remedial process.
- Ways for the community to obtain/provide information (document repositories, contacts, etc.).

Part 4. Community Characteristics

a. - e. Obtain information from local officials, property owners and residents, site reports, site visits, "windshield surveys," other staff, etc.

f. Has the affected community experienced other **significant** present or past environmental problems unrelated to this site? Such experiences could significantly affect public concerns and perspectives about the site; how the community will relate to project staff; the image and credibility of project staff within the community; and the ways in which project staff communicate with the community.

g. In its remedial programs, DER seeks to integrate, and be consistent with, environmental justice principles set forth in *DEC Commissioner Policy 29 on Environmental Justice* and *DER 23 – Citizen Participation Handbook for Remedial Programs*. Is the site and/or affected community wholly or partly in an Environmental Justice (EJ) Area? Use the Search feature on DEC's public web site for "environmental justice". DEC's EJ pages define an EJ area, and link to county maps to help determine if the site and/or community are in an EJ area.

h. Consider factors such as:

- Is English the primary language of the affected community? If not, provisions should be considered regarding public outreach activities such as fact sheets, meetings, door-to-door visits and other activities to ensure their effectiveness.
- The age demographics of the community. For example, is there a significant number of senior citizens in the community? It may be difficult for some to attend public meetings and use document repositories. This may suggest adopting more direct interaction with the community with activities such as door-to-door visits, additional fact sheets, visits to community and church centers, nursing homes, etc.
- How do people travel about the community? Would most people drive to a public meeting or document repository? Is there adequate public transportation?

Part 5. Affected/Interested Public.

Individuals and organizations who need or want information and input can change during the site's remedial process. This need is influenced by real, potential, or perceived impacts of the site or the remedial process. Some people may want information and input throughout the remedial process. Others may participate only during specific remedial stages, or may only be interested in particular issues.

It is important to revisit this question when reviewing this scoping sheet. Knowing who is interested in the site – and the issues that are important to them – will help to select and conduct appropriate outreach activities, and to identify their timing and the information to be exchanged.

Check all affected/interested parties that apply to the site. **Note: Adjust the site's contact list appropriately.** The following are some ways to identify affected/interested parties:

- Tax maps of adjacent property owners
- Attendees at public meetings
- Telephone discussions
- Letters and e-mails to DER, the remedial party, and other agencies
- Political jurisdictions and boundaries
- Media coverage
- Current/proposed uses of site and/or nearby properties (recreational, commercial, industrial)
- Discussions with community organizations: grass roots organizations, local environmental groups, environmental justice groups, churches, and neighborhood advisory groups

Division of Environmental Remediation

Remedial Programs
Scoping Sheet for Major Issues of Public Concern (see instructions)

Site Name: 8 Walworth Street

Site Number: C224239

Site Address and County: 8 Walworth Street, Brooklyn

Remedial Party(ies): Toldos Yehuda LLC

Note: For Parts 1. – 3. the individuals, groups, organizations, businesses and units of government identified should be added to the site contact list as appropriate.

Part 1. List major issues of public concern and information the community wants. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and information needs. **Use this information as an aid to prepare or update the Major Issues of Public Concern section of the site Citizen Participation Plan.**
Vapors, odors, dust, truck traffic, and noise.

How were these issues and/or information needs identified?
Experience on similar projects in the area

Part 2. List important information needed **from** the community, if applicable. Identify individuals, groups, organizations, businesses and/or units of government related to the information needed.
N/A

How were these information needs identified?
NA

Part 3. List major issues and information that need to be communicated **to** the community. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and/or information.
See BCP CPP milestones and Site Contact list

How were these issues and/or information needs identified?
Applicable guidance

Part 4. Identify the following characteristics of the affected/interested community. This knowledge will help to identify and understand issues and information important to the community, and ways to effectively develop and implement the site citizen participation plan (mark all that apply):

a. Land use/zoning at and around site:
Residential ☐ **Agricultural** ☐ **Recreational** X **Commercial** ☐ **Industrial**

b. Residential type around site:
X **Urban** ☐ **Suburban** ☐ **Rural**

c. Population density around site:
X **High** ☐ **Medium** ☐ **Low**

d. Water supply of nearby residences:
X **Public** ☐ **Private Wells** ☐ **Mixed**

e. Is part or all of the water supply of the affected/interested community currently impacted by the site?
☐ **Yes** X **No**

Provide details if appropriate:
Click here to enter text.

f. Other environmental issues significantly impacted/impacting the affected community?
☐ **Yes** X **No**

Provide details if appropriate:
Click here to enter text.

g. Is the site and/or the affected/interested community wholly or partly in an Environmental Justice Area?
X **Yes** ☐ **No**

h. Special considerations:
☐ **Language** ☐ **Age** ☐ **Transportation** ☐ **Other**
None
Explain any marked categories in **h:**
NA

Part 5. The site contact list must include, at a minimum, the individuals, groups, and organizations identified in Part 2. of the Citizen Participation Plan under 'Site Contact List'. Are *other* individuals, groups, organizations, and units of government affected by, or interested in, the site, or its remedial program? (Mark and identify all that apply, then adjust the site contact list as appropriate.)

X **Non-Adjacent Residents/Property Owners:** Click here to enter text.

X **Local Officials:** Click here to enter text.

X **Media:** Click here to enter text.

☐ **Business/Commercial Interests:** Click here to enter text.

☐ **Labor Group(s)/Employees:** Click here to enter text.

☐ **Indian Nation:** Click here to enter text.

☐X **Citizens/Community Group(s):** Click here to enter text.

☐X **Environmental Justice Group(s):** Click here to enter text.

☐X **Environmental Group(s):** Click here to enter text.

☐X **Civic Group(s):** Click here to enter text.

☐ **Recreational Group(s):** Click here to enter text.

☐ **Other(s):** Click here to enter text.

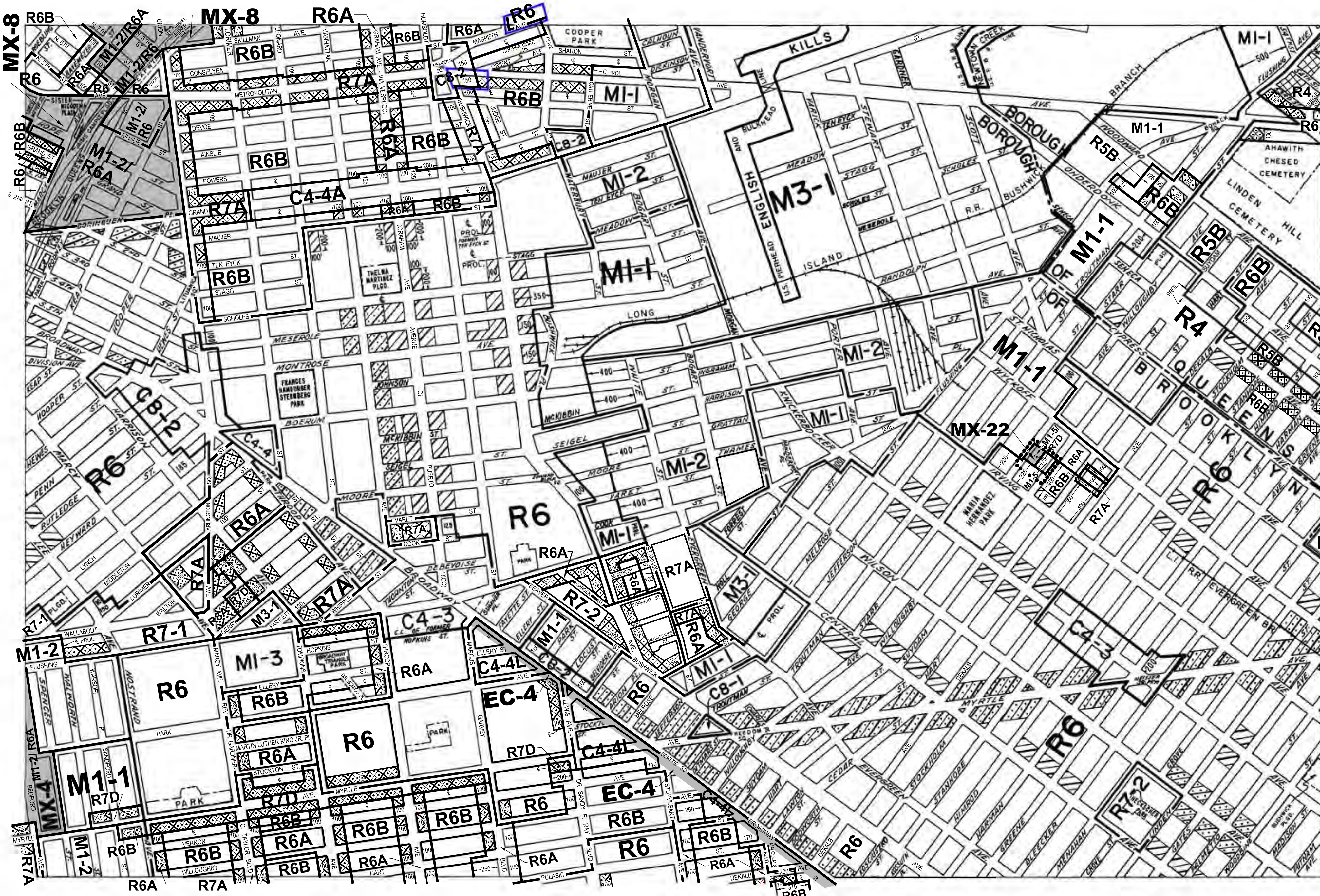
Prepared/Updated By: Charles Sosik **Date:** 3/22/18

Reviewed/Approved By: Thomas V. Panzone **Date:** 5/2/18

APPENDIX F

Zoning Map

Click blue outline on map to view diagram of **proposed** zoning change



600 0 600 1200 1800 FEET

C1-1 C1-2 C1-3 C1-4 C1-5 C2-1 C2-2 C2-3 C2-4 C2-5

NOTE: Where no dimensions for zoning district boundaries appear on the zoning maps, such dimensions are determined in Article VII, Chapter 6 (Location of District Boundaries) of the Zoning Resolution.

APPENDIX G

Project Personnel Resumes

HALEY ALDRICH

SCOTT A. UNDERHILL, P.E.

Senior Environmental Remediation Engineer

EDUCATION

M.S., Environmental Engineering, State University of New York
B.S., Civil Engineering, State University of New York

PROFESSIONAL REGISTRATIONS

1998/ NY: Professional Engineer (Reg. No. 075332)

SPECIAL STUDIES AND COURSES

40-Hour OSHA Hazardous Waste Operations and Emergency Response Training (29 CFR 1910.120)
8-Hour Hazardous Waste Operations and Emergency Response Supervisor Training
Project Management Training
8-Hour Hazardous Waste Operations and Emergency Response Refresher

Scott has 25 years of experience as an environmental engineer. His diverse background includes the investigation, design, installation, and operation of remediation systems for soil, water, and air; design of water and wastewater treatment facilities; energy studies; and numerical modeling of environmental media. Scott has worked for federal, state and industrial clients throughout the United States, most recently working on the remediation of contaminated sites, such as manufactured gas plant (MGP) and chlorinated solvent, in the Northeast and Midwest.

RELEVANT PROJECT EXPERIENCE

New Jersey Natural Gas, Former MGP Remediation, Toms River, New Jersey. Construction project manager for the construction inspection oversight of a former MGP that consists of the removal and off-site disposal of 6,800 cubic yards of impacted soils, dewatering during excavation that produced over 12,000,000 gallons of water to handle, treat and dispose, and in situ solidification (ISS) of 85,000 cubic yards of soil to depths of 45 feet. Engineering oversight services provided during construction included attending weekly meetings, reviewing contractor submittals, issuing field orders and work change directives, reviewing and responding to change order requests, developing change orders, responding to request for information, and documenting remediation activities in a remedial action report.

Duke Energy, Former MGP Remediation, Cincinnati, Ohio. Lead design engineer for a design/build remediation project at a former MGP that consists of the removal and off-site disposal of 75,000 cubic yards of impacted soils, dewatering during excavations, and ISS of over 150,000 cubic yards of soil to depths of 60 feet below ground surface. Engineering services provided during construction included weekly engineering calls, working with contractor to develop engineering solutions to changes in field conditions, reviewing contractor submittals, issuing field orders, developing change orders, and documenting remediation activities in a construction completion report.

AEP, Former MGP Remediation, Three Rivers, Michigan. Lead design engineer for a design/build remediation project at a former manufactured gas plant (MGP) that consists of the installation of a four-cell sheeting system, installation and operation of a dewatering system that removed and discharged 420,000 gallons of water, and removal and off-site disposal of 5,400 cubic yards of impacted soils. Engineering services included developing full set of design drawings and specifications and provided engineering oversight during construction included weekly engineering calls, working to develop engineering solutions to changes in field conditions, and documenting remediation activities in a construction completion report.

American Electric Power, Former MGP Remediation, Dowagiac, Michigan. Lead design engineer for a design/build remediation project at a former manufactured gas plant (MGP) that consists of the removal and off-site disposal of 1,000 tons of impacted soils. Engineering services included developing full set of design drawings and specifications

and provided engineering oversight during construction included weekly engineering calls, working to develop engineering solutions to changes in field conditions, and documenting remediation activities in a construction completion report.

New York State Energy and Gas, Former MGP Remediation, Lockport, New York. Project manager for the remedial design of a former MGP that consists of the removal of 4,000 cubic yards of impacted soils, overburden non-aqueous phase liquid (NAPL) collection trench, 600 linear feet of bedrock grout wall, bedrock NAPL collection wells and the removal of 1,200 cubic yards of impacted sediment from the NYS Barge Canal. Design required submission of work plan, pilot test for grout wall implementation, and New York State Department of Environmental Conservation (NYSDEC) approval of final design drawing, report and specifications. Program director for the engineering oversight services provided during construction which included attending weekly meetings, reviewing contractor submittals, reviewing and approving change orders, responding to request for information, and certifying the construction completion report.

New York State Energy and Gas, Former MGP Remediation, Norwich, New York. Project manager for design and construction management, including design of an ISS system of 52,000 cubic yards of soil and NAPL recovery, in situ chemical oxidation (ISCO) and enhanced in situ bioremediation systems for the off-site groundwater plume. Scott managed preparation of work plans for submission to the NYSDEC and on-site construction management services during remediation of the on-site ISS services. Scott managed the operation and maintenance of the NAPL recovery system from 2009-2016 which resulted in the recovery of almost 100,000 gallons of total fluids or 40,000 gallons of NAPL. Due to the large quantities of NAPL encountered off-site, initiated and obtained NYSDEC approval in 2015 for a modification to the Record of Decision to all for ISS of the off-site soils rather than NAPL recovery and ISCO. Program director for the design package for the ISS treatment of 11,500 cubic yards of soil and NAPL.

New York State Energy and Gas, Former MGP Remediation, Ithaca, New York. Project manager for remedial design of a former MGP plant that consisted of the removal of 11,000 tons of impacted soils within sheet piling down to a depth of 18 feet, temporary relocation of a sewer main, and three injection events for in situ chemical oxidation (ISCO) treatment of coal tar stringers. Design requires submission of work plan, pilot test for ISCO implementation, and NYSDEC approval of final design drawing, report and specifications. Program director for the engineering oversight services provided during construction which included attending weekly meetings, reviewing contractor submittals, reviewing and approving change orders, responding to request for information, and certifying the construction completion report.

New York State Department of Environmental Conservation, New York. Program manager of three standby engineering services contracts issued by the NYSDEC for the investigation, design, construction oversight, and site management of inactive hazardous waste sites within New York. Responsible for overall program management, including budgeting, schedule and quality deliverable to the NYSDEC for over 100 individual work assignments valued at over $35,000,000, which was managed by a team of over 12 project managers. As required, acted as engineer-of-record for many sites, which required approval of feasibility studies, remedial designs, construction completion reports, and periodic review reports.

United States Army Corps of Engineers, Former Scotia Naval Depot, Scotia, New York. Project manager for the design and installation of a 900-foot-long, 45-foot-high and 0.25-foot-thick permeable reactive barrier (PRB) wall containing zero valent iron. The PRB was installed to treat a chlorinated solvent groundwater plume. In addition, four large commercial buildings (80,000 square feet) over a portion of the groundwater plume were fitted with sub-slab depressurization systems to mitigate indoor air concerns. As project manager, Scott was responsible for project deliverables, costs, schedule and quality for the $10MM remediation project.

New York State Department of Environmental Conservation, Scotia New York. Remedial design lead and engineer of record for the development and issuance of two feasibility studies (on-site and off-site) for a large, complex inactive hazardous waste site. An estimated 7,000 gallons of tetrachloroethylene (PCE) released to the environment created a groundwater plume almost ¾ mile in length and impacting numerous residential supply wells. The on-site feasibility

study evaluated remedial technologies selecting excavation and in situ thermal treatment for a present worth cost of $14,000,000. The off-site feasibility study selected ISCO/bioremediation and downgradient permeable reactive barrier wall to treat the plume with concentrations greater than 100 μg/L with a present worth cost of $13,000,000. Also designed an aeration system as an interim remedial measure to treat PCE impacts to local surface water detention pond and stream.

New York State Department of Environmental Conservation, Scotia New York. Project manager for the design and construction oversight of the installation of water line to a residential neighborhood affected by a PCE plume. The design consisted of engineering calculations, basis of design, drawings, and specifications for the installation of 8,800 linear feet of water main and 100 residential connections. Construction services included reviewing contractor submittals and invoices, overseeing contractor work, responding to request for information and attending weekly construction meetings.

New York State Energy and Gas, Former MGP Remediation, Homer, New York. Project manager for design and construction management, including design of a permanent watertight barrier wall system, in situ stabilization system within the utility corridor and a temporary water treatment plant as part of the remediation of 25,000 cubic yards of soil. Scott managed preparation of work plans for submission to the NYSDEC and on-site construction management services during remediation. Scott managed air monitoring, scheduling of trucks for off-site disposal of impacted soil, and preparation of daily reports and a final closure report.

New York State Energy and Gas, Former MGP Remediation, Mechanicville, New York. Project manager for design and construction management, including the design of a temporary watertight barrier wall system and temporary water treatment system as part of a remediation of 10,000 cubic yards of soil. The project also included the evaluation and development of alternatives for the recovery of coal tar contamination in the fractured bedrock underlying the site, which included performing multiple long-term NAPL recovery pump tests. Project manager for the engineering oversight services provided during construction which included attending weekly meetings, reviewing contractor submittals, reviewing and approving change orders, responding to request for information, and certifying the construction completion report.

New York State Department of Environmental Conservation, Poughkeepsie, New York. Engineer of record for the design and construction oversight of the thermal treatment of soil and groundwater at an inactive hazardous waste site impacted with chlorinated solvents. The design consisted of engineering calculations, basis of design, drawings, and specifications for the installation 100 electrodes to treat the 0.5-acre plume. Construction services included reviewing contractor submittals and invoices, overseeing contractor work, responding to request for information and attending regular construction meetings.

New York State Department of Environmental Conservation, Poughkeepsie, New York. Project engineer for the design and implementation of a full-scale pilot test of in situ enhanced bioremediation to treatment of soil and groundwater at an inactive hazardous waste site impacted with chlorinated solvents. The pilot study consisted of direct injection of approximately 4,150 gallons of 60% edible vegetable oil (EVO) and 7,825 pounds zero-valent iron (ZVI) at 75 points. Scott managed development of design and bid package, selected and oversaw injection contractor, and reviewed follow-on sampling reports.

United States Army Corps of Engineers, Griffiss Air Force Base, Rome, New York. Project engineer for land farming treatment of over 50,000 cubic yards of petroleum impacted soils. Activities included design of a land farming approach in a performance based contract to successfully remediate the soils within a three-year contract period. Due to an aggressive remediation approach, all soils were remediated within two years.

New York State Electric and Gas, Cortland Homer Manufactured Gas Plant Demolition Procurement, Homer, New York. Project manager for procuring a contractor to demolish the southern portion of the MGP building as defined by the demolition drawings. Work included developing a request for proposal with final demolition drawings, specifications, and bid schedule and overseeing successful completion of the building demolition.

New York State Energy and Gas, Former MGP Remediation, Oneonta, New York. Project engineer for the design of temporary water treatment system as part of the remediation of a former MGP site.

US Air National Guard, Site Management and Project Close-Out for Site 2 – Pesticide Burial Pit, Stewart ANGB, Newburg, New York. Project manager for preparation of a site management plan (SMP) and periodic review report (PRR) for Site 2 - Pesticide Burial Pit Area at the 105th Airlift Wing (AW), New York Air National Guard (ANG), and Stewart International Airport. Due to negotiations with the NYSDEC, Site 2 was delisted.

US Air National Guard, Remedial Design and Remedial Action, Site 15, Hancock ANGB, New York. Project engineer for the bioremediation of a petroleum groundwater plume. The project included the design, installation and operation of a 15 well biosparing system for the on-site source area and the injection of calcium peroxide for the downgradient plume. Responsible for the remedial action work plan, construction completion report and annual periodic review reports.

US Air National Guard, Interim Remedial Action and Focused Feasibility Study, Sites 3 and 6, Stratton ANGB, New York. Project manager for an interim remedial measure and focused feasibility study at Site 3 contaminated with chlorinated solvents, and Site 6 contaminated with petroleum hydrocarbons. At Site 6, managed removal of 6,200 tons of contaminated soil, installation of a horizontal well network below the water table, and injection of a substrate into the groundwater to enhance biodegradation of the contaminants. At Site 3, managing removal of 600 tons of contaminated soils from four hot spots, delineation of the nature and extent of groundwater contamination by installing and sampling new wells.

BP, Pilot-Scale Soil Thermal Treatment, Rumaila, Iraq. Primary author of a pilot scale work plan for the treatment of heavily-impacted soils at the Rumaila Well Field. Work plan included the evaluation of several thermal desorption units capable of being shipped to the location, transportation logistics, compound design for placement of the unit and utility requirements to operate the TDU.

Confidential Client, Lagoon Biocell Design, Maybrook, New York. Project engineer for the design of a membrane lined biocell for the treatment of 25,000 cubic yards of soils impacted with petroleum and pyridine compounds associated with former waste lagoons. Design also included the use of enhanced bioremediation for the contaminants of concern in groundwater. Scott managed development of a design in accordance with the remedial design and remedial action framework developed by the United States Environmental Protection Agency (USEPA).

Chevron, Malabalay Remediation Project, Philippines. Project engineer for remedial design sub-slab depressurization system and vapor barrier for the redevelopment of a gasoline station for a Jolibee Store in Malabalay. Project was completed within budget and on-time given challenging field conditions.

Confidential Client, Solid Waste Disposal Area, Kisladag, Turkey. Project engineer responsible for the development of a feasibility study to evaluate 1,250 cubic meters of petroleum impacted soil as a waste storage area at an active mining facility in Turkey. Remedial alternatives evaluated included land farming, windrow composting, bioremediation in piles, in situ solidification, and capping.

Chevron, Remedial Design and construction Oversight, Service Station/Residential House, Manila, Philippines. Project engineer for the design and implementation of a sub-slab barrier system and vapor collection system at a residential home downgradient from a gas station. Travelled to site to oversee installation and quality control of the first sub-slab barrier system to be installed in the Philippines. Project was recognized by Chevron for being completed with zero accidents.

BEM Systems, Remedial Design and Remedial Action, Site 6, Schenectady ANGB, New York. Project manager for the design and implementation of the in situ chemical oxidation of chlorinated hydrocarbon impacted groundwater at Site 6. Project included supporting the development and issuance of the Record of Decision (ROD), submission and approval of the remedial design and implementation of the injection of sodium permanganate to treat the residual groundwater plume at Site 6.

Navy, Light Non-Aqueous Phase Liquid (LNAPL) Modeling Effort, Pearl Harbor, HI. Provided technical support for investigation and modeling of several large LNAPL plumes at the Shipyard GSA at Pearl Harbor. The modeling effort included applying the van Genuchten method to properly estimating the LNAPL plume size, volume, distribution, transport, and potential release to the harbor.

New York State Department of Environmental Conservation, Remediation System Installation, National Heatset Printing, East Farmingdale, New York. Project engineer supporting the installation and evaluation of a pilot study evaluating the use of an innovative technology - density driven convection (DDC) and in-well stripping – for the treatment of a large chlorinated solvent plume in a sandy aquifer on Long Island.

NYSDEC, Remedial Design and Construction Oversight, North East Alloy and Metals Site, Utica, New York. Project engineer for the design of a sub-slab depressurization system (SSDS) at a residential house above a chlorinated solvent plume. The design utilized two fans and six vacuum points installed over a concrete slab. Oversaw contractor's installation of the system including sealing of the concrete floor cracks and documented installed system met the performance requirements of the design.

Confidential Client, Remediation System Pilot Study and Evaluation, Schenectady, New York. Project engineer responsible for technical evaluation and comparison of a traditional and an innovative thermal enhanced soil vapor extraction system below a concrete slab. The innovative thermal enhanced soil vapor extraction (TESVE) system removed over 99.99% of the volatile compounds and over 96% of the semi volatile compounds in the unsaturated zone and outperformed the traditional TESVE system.

NYSDEC, Remedial Design and Construction Oversight, Utility Manufacturing Site, New Hampstead, New York. Project engineer for the design of nine SSDSs at three industrial buildings above a chlorinated solvent plume. The design utilized 30 fans and 30 vacuum points installed over a concrete slab. Oversaw contractor's installation of the system and documented that the installed system met the performance requirements of the design.

NYSDEC, Remediation System Optimization, Multiple Sites, New York. Provided technical support for the optimization and improvements of a number of remediation systems currently operated under the NYSDEC contract (D004445). System evaluations and improvements included the Becker Electronic pump-and treat system; NOW Corporation pump-and-treat system; SMS Industries biosparge (PhoSTER) system; Kingsbury Landfill pump and treat system, Fort Edward phytoremediation system; and Korkay soil vapor extraction/air sparging system.

NYSDEC, Site Management, Multiple Sites, New York. Provided technical support, final review and engineering certification for periodic reviews on the following sites: Armonk; Becker Electronics; Dzus Fasteners; Fort Edward Landfill; Kingsbury Landfill; Korkay; Liberty Industries; Now Corporation; Old Agway; ServeAll; and SMS Industries.

NYSDEC, Remedial Design, BB&S Treated Lumber Site, Southampton, New York. Project engineer reviewing preliminary design concepts of the groundwater remedy selected in the ROD for this former wood pressure treating site. The site was contaminated primarily with chromium, which was associated with the former wood preservative chromated copper arsenate (CCA). Using results from the pre-design investigations, prepared a Supplemental Feasibility Study (FS) that formed the basis for NYSDEC to amend the ROD for the site. The Amended ROD revised the groundwater remedy for the site from groundwater pump and treat to providing an alternative water-supply to authorized homes and businesses, and ongoing monitoring of plume attenuation.

New York State Department of Environmental Conservation, Construction Oversight, Freeman's Bridge Site, Scotia, New York. Quality assurance/quality control (QA/QC) manager for the certification report of completion for the remediation of contaminated soils using low-temperature thermal desorption at the 34 Freeman's Bridge Road site.

New York State Office of General Services (NYSOGS), Remediation System Optimization, Multiple Sites, New York. Provided technical support for optimization and improvements of a number of remediation systems operated under the NYSOGS contract. System evaluations and improvements included the Bedford Hills pump-and-treat system and the Highland Residential pump-and-treat system.

Bank of New York, Brownfield Remediation Monthly Site Visits, Flushing, New York. Project manager for periodic site visits to review progress of work performed by Creamer Environmental, Inc., the remedial contractor working on behalf of Muss Development. Scott managed the review of the remedial progress in relation to the proposed schedule, budget, and New York State Department of Environmental Conservation approved work plans. Scott managed preparation of a site observation report with information pertaining to construction status; permits, tests, and certifications; subcontracts; change orders; and contractor's completion schedule.

Remediation System Design, Fort Drum Military Reservation, New York. Scott designed a 150-well multiphase extraction and air sparging system for remediation of a 200,000-gallon gasoline-contaminated area and oversaw installation, start-up, and operation of the complex remedial systems.

Solvent Site Remediation, Batavia, New York. Scott designed and implemented injection of whey powder solution for the bioremediation of a chlorinated solvent site.

Railyard, Oneonta, New York. Scott designed, installed, and operated two 8-well soil vapor extraction and air sparging system at an industrial facility.

Railyard Site, North Creek, New York. Scott implemented an innovative application of Fenton's reagent to remediate diesel-contaminated soil at a historic railyard. Was awarded an Engineering Excellence Award by the American Consulting Engineering Council.

Toluene Site, Pittsburgh, Pennsylvania. Scott optimized a 20-well soil vapor extraction and air sparge system at an industrial facility in an urban area.

Town of Windham, Wastewater Treatment Plant, Windham, New York. Scott designed a new 250,000-gpd wastewater treatment plant that used tertiary filtration, microfiltration, and ultraviolet disinfection.

Ski Windham, Wastewater Treatment Plant, Windham, New York. Scott designed tertiary filtration, microfiltration, and ultraviolet disinfection for a treatment plant upgrade.

Wastewater Treatment Plant Upgrade, Endicott, New York. Scott designed solids contact tanks, secondary clarifiers, ultraviolet disinfection system, and pumping station as part of the upgrade of the 10-mgd wastewater treatment plant.

New York State, Gas-to-Energy Studies, New York. Scott evaluated the potential of using landfill gas from Colonie Landfill at Mohawk Paper mills boilers.

New York State, Sludge-to-Energy Study, Glens Falls, New York. Scott evaluated the potential of using dried paper sludge from a paper manufacturer as feed material and energy source at a cement kiln.

Groundwater and Soil Vapor Treatment, Pease AFB, NH, and Loring AFB, Maine. Scott designed, installed, and operated in-situ treatment systems at the former bases, including two groundwater pump-and-treat systems, four soil vapor extraction and air sparging systems, and 16 bioventing systems.

Hydrocarbon Cleanup, Pease AFB, New Hampshire. Scott evaluated and implemented the use of natural attenuation to remediate more than 60 petroleum hydrocarbon plumes.

Remedial Action, Loring AFB, Maine. Field engineer responsible for eight remedial actions including oversight of three subcontractors.

Oak Ridge National Laboratory, RI Report, Oak Ridge, Tennessee. Scott prepared remedial investigation report for a radioactive waste burial.

Radioactive Waste Disposal Sitting Study, Nebraska. Scott provided hydrologic modeling support for the safety analysis and license application permit for siting a low-level radioactive waste disposal site.

PUBLICATIONS

"Subsurface Solution," with C.H. Floess, T. Blazicek, M. Thorpe, S. McDonough and R. Doshi, *American Society of Civil Engineering Magazine*, pp. 76-81,86. September 2012.

"In Situ Chemical Oxidation of Saturated and Unsaturated Petroleum-Containing Soils at a Historic Railroad Site," with A.R. Vitolins, B.R. Nelson, L.M. Thomas, *Contaminated Soil Sediment and Water, International Issue*, pp. 38-40, 2001.

"Development and Application of a Geographically-Based Groundwater Flow and Solute Transport Model," Master's Thesis, State University of New York at Buffalo, 1993.

INVITED LECTURER OR SPEAKER

"Developing a Water Supply System in Rural Haiti," Albany, New York Celebration of Engineer's Week. February 16, 2012.

"Remediation of a Former MGP Site in Norwich, New York: A Case Study," with C. Floess and T. Blazicek, 27th Annual Conference on Contaminated Soils, Amherst, Massachusetts, October 17-20, 2011.

"Developing a Water Supply System in Rural Zimbabwe,". Albany, 7 June 2016, New York Celebration of Engineer's Week. February 15, 2008.

"Remediation of Petroleum-Containing Soil and Groundwater at a Former Rail Yard Locomotive Fueling Area," with S. Compston, B.R. Nelson, L.M. Thomas, 20th Annual Conference on Contaminated Soils, Amherst, Massachusetts, October 18-21, 2004.

"Optimization of an LNAPL Recovery System Based on the Observational Approach," with S. Taylor and A. Ditto, ASCE International Water Resources Engineering Conference in Seattle, Washington, August 8-11, 1999.

"Natural Attenuation of 60 Petroleum Groundwater Plumes at Pease Air Force Base, New Hampshire, USA," with S. Szojka and J. Flagg, 6th FZK/TNO International Conference on Contaminated Soils, Edinburgh, Scotland. May 17-21, 1998.

"Bioremediation of Petroleum Contaminated Soils at Loring Air Force Base, Maine," with P. Forbes and J.A. Mueller, Fourth International Conference on Bioremediation, New Orleans, Louisiana, April 28-May 2, 1997.

"Expedited CERCLA Removal Actions at Loring AFB," with T.R. Wood, D. St. Peter, D.S. Hopkins and J.A. Mueller, Maine. 11th Annual Conference on Contaminated Soils, Amherst, Massachusetts, October 21-24, 1996.

"Innovative Investigative Technique for Characterization of Radioactive Disposal Trenches," with J.B. Cange and S.A. Blair, Superfund XVI Conference, Washington D.C., November 6-8, 1995.

"Development of a Geographically Based Groundwater Flow and Solute Transport Model," with S.W. Taylor and J.V. DePinto, ASCE International Groundwater Symposium, San Antonio, Texas, August 14-18, 1995.

"Modeling Surface Water Flow and Contaminant Flux from a Mixed Waste Burial Ground," with R.A. Lambert and J.B. Cange, 21st Environmental Symposium. San Diego, California, April 18-21, 1995.

"Who's Taking Out the Garbage?", ASCE Environmental Engineering Division Conference. Reno, Nevada, July 6-10, 1991.

JAMES BELLEW

Senior Client Leader

EDUCATION

M.S., Environmental Geology, Queens College
B.S., Geology, Pre-Law, Environmental Science, Binghamton University

PROFESSIONAL SOCIETIES

American Council of Engineering Companies, Member, 2017
Urban Land Institute, Member, 2016
Business Council of New York, Member, 2018

SPECIAL STUDIES AND COURSES

40-Hour OSHA Hazardous Waste Operations and Emergency Response Training (29 CFR 1910.120)
30-Hour OSHA Construction Safety and Heath
8-hour OSHA Site Supervisor Certification
OSHA Confined Space Entry Training Certification
Erosion and Sediment Control, New York, No. 006925
USDOT/IATA Training on the Shipping and/or Transportation of Hazardous Materials

James Bellew is a senior client leader and geologist with experience in bedrock, soil and groundwater investigation and an emphasis on remedial design and implementation and will focus his time at Haley & Aldrich serving the Buildings and Infrastructure markets. His experience also includes completion of numerous Phase I Environmental Site Assessments and Phase II Environmental Site Investigations, development of conceptual site models, site characterization, environmental permitting, environmental compliance reports as well as remedial design and implementation. He has been involved with numerous projects within the New York State Superfund Program, New York State Brownfield Clean-up Program and New York City Office of Environmental Remediation E-Designation Program.

James has designed, estimated and managed large-scale remediation jobs in a variety of settings in the New York/New Jersey metropolitan area. He has performed construction management services on large scale projects requiring abatement of asbestos-containing materials and polychlorinated biphenyls (PCBs). He has direct experience developing and implementing operation, maintenance and monitoring programs for groundwater and soil remediation systems.

James has also worked on large scale remediation projects for Manufactured Gas Product (MGP) in the lower New York Region from former operations associated with National Grid and Con Edison. He has also designed, installed, operated and maintained remedial systems at retail petroleum stations for Hess Amerada, British Petroleum, Sunoco and Shell in addition to providing operation and maintenance programs for chemical injection and petroleum systems for New York State Department of Environmental Conservation (NYSDEC) Superfund and Environmental Protection Agency (EPA) Superfund Sites.

RELEVANT PROJECT EXPERIENCE

Development, Former BP Station, Elmhurst Queens, NY. James was responsible for the preparation of a full environmental impact statement with respect to a mixed-use development proposed in Elmhurst Queens. The work includes a full impact assessment of the proposed construction with respect to the neighborhood, evaluation of green/open spaces for the community and environmental site investigation and remediation services.

New York State Superfund Site, Former Nuhart Plastics Site, New York State Superfund Site, Brooklyn, NY. Senior Project Manager for a feasibility study and remedial planning for a former plasticizer facility with on- and off-site pollutant concerns. Project was a high-profile New York State Superfund Site that required compliance with the

NYSDEC, the New York City Office of Environmental Remediation (NYCOER), and local regulatory agencies. Ongoing work was the operation and maintenance (O&M) activities related to two large groundwater plumes impacted by light non-aqueous liquids (LNAPL) with phthalates and trichloroethene (TCE), which extend downgradient of the Site. Completed the first remedial action design for Lot 57 with is enrolled in the NYCOER E-Designation program. The Site will include two additional developments within the former manufacturing building footprint.

New York State Brownfield Site, Former Delta Metals Site, Brooklyn, NY. Senior Project manager for the remedial investigation and remedial action design for the former Delta Metal Products Company. Project is under the New York State Brownfield Cleanup program as a Participant where TCE and tetrachloroethene (PCE) were encountered in soil and groundwater. James successfully delineated the vertical and lateral extents of the plumes which were identified as an upgradient, on-site and downgradient plume. Investigation results triggered the NYSDEC to utilize its call-out contract to perform a plume trackdown for the immediate area and identify additional Potentially Responsible Parties. The design for an Air Sparge Soil Vapor Extraction system has been accepted and the project is currently in construction.

Manufacturing-Industrial, Hess Amerada, Bogota and Edgewater, NJ. James provided construction management services for the demolition of two waterfront terminals, one each on the Hackensack and Hudson rivers. Demolition included oversight, planning and coordination of activities related to asbestos abatement, demolition of buildings, thirty holding tanks, piping structures, containment structures and storm water structures.

Manufacturing-Industrial, PQ Corporation, Northeastern United States. James designed and implemented a three phased program for handling PCBs containing materials on approximately 100 tank structures at large, active industrial sites, which included coating removal, encapsulation, demolition, and Toxic Substances Control Act (TSCA) remediation. He was responsible for development of the overall program, specifications, drawings, bid packages, construction oversight and project administration until closure. Program also included design and oversight of a new façade and roof upgrades completed concurrently to client operations.

Development, New York State Brownfield Site, Former Cascade Laundry, Brooklyn, NY. James was responsible for environmental and construction management services required to successfully navigate seven-building redevelopment project through the NYSDEC Brownfield Cleanup Program (BCP). Project included site investigation, design, and remediation for development of seven buildings within a 2-acre site in Brooklyn, New York. Remediation included excavation of approximately 40,000 cubic yards of soil, groundwater extraction and treatment, underground storage tank (UST) removal, design and installation of a Sub Slab Depressurization System (SSDS) and ex situ chemical oxidation of groundwater impacted by petroleum.

Development, New York City Brownfield Site - 520-534 West 29th Street, New York, NY. James was responsible for environmental site investigation and remediation activities required to successfully navigate the project through the New York City Office of Environmental Remediation's (NYCOER's) E-Designation and Voluntary Cleanup Programs. Project included demolition of for existing buildings and development of two separate mixed-use buildings.

Development, New York State Brownfield Site, BJ's Wholesale, Brooklyn, NY. James managed construction oversight activities at an 8-acre peninsula in Gravesend Bay being redeveloped by BJ's Wholesale Club (BJ's) into a "big-box" warehouse and parking garage, and a publicly accessible, waterfront open space. Implemented a comprehensive community air monitoring plan (CAMP), managed the design and installation of a passive sub slab depressurization system, and oversaw handling and off-site disposal of impacted material generated by BJ's (the Lessee for the subject site) during their foundation construction activities.

Development, New York State Brownfield Site, Coney Island, Brooklyn, NY. James provided environmental services during the rehabilitation and expansion of a 1970s-era mixed-use complex, which covers an area equivalent to three city block. He facilitated the BCP applications for two adjacent parcels within the complex impacted by historic dry-cleaning uses. Site investigations performed had documented the presence of PCE in soil gas and was delineated over three separate structural slabs in commercial and residential space utilizing a mobile laboratory. He designed and installed two sub-slab depressurization systems and prepared Remedial Investigation Work Plan which outlined work

required to delineate the vertical and horizontal extent of the impacted soils, soil vapor and groundwater at both BCP sites. The system was designed with below slab suction pits, remote sensing vacuum monitoring points, and a variable frequency drive blower tied into the monitoring points for optimization and power savings.

Development, New York City Brownfield Site, Hospitals, Memorial Sloan Kettering Cancer Center (MSKCC), New York, NY. Project Manager for environmental remediation for this MSKCC development project. James was directly responsible for subsurface investigation and remediation activities, large MGP gas holder removal (from former Con Edison Operations), UST removal, daily status updates to the NYCOER, implementation of the CAMP and the management, handling, characterization, and off-site disposal of MGP impacted soil and dewatering fluids.

New York State Spill Remediation, Metropolitan Transportation Agency Bridges and Tunnels, New York, NY. James managed investigation for underground storage tank removal, excavation of 600 cubic yards of petroleum impacted soil, design and installation of a groundwater extraction and treatment system and post remediation samples. Implemented the In Situ Chemical Oxidation program for the injection of 54,000 gallons of 8 percent solution Fenton's Reagent and the O&M of the petroleum spill with respect to the Fenton's performance and the plume migration.

Various Public Schools, New York City School Construction Authority, New York, NY. James oversaw environmental remediation proposed for several school development sites, including PS 312, P.S. 281 and PS 27K. Assisted in the design and implementation of the remediation programs for the sites for petroleum spills, PCB TSCA contamination and hazardous lead hot spots.

Development, i.Park Edgewater, Edgewater, NJ. James designed and oversaw the environmental remediation on-site. Implemented the construction plan for remediation of arsenic, pitch- and PCB-impacted soil for excavation and off-site disposal of 20,000 tons. He managed the air monitoring system on-site which consisted of four permanent stations set upwind and downwind on-site for volatile organic compound (VOC) and particulate migration off-site. Also, James performed redesigns throughout the project to keep within the current schedule and budget.

Development, New York State Brownfield, Queens West, Long Island City, NY. Assistant Project Manager for oversight of the Environmental Remediation on-site. James implemented the construction plan for remediation of 20,000 cubic yards of LNAPL on the Site; he assisted in design and oversight of the In Situ Chemical Oxidation mixing on-site. The project was eventually developed into three large towers and a new school.

Manufactured Gas Plant, National Grid, Rockaway, NY. James aided in the design and implementation of the soil characterization plan for MGP impacted sands. After delineation of the contamination plume, helped draft work plans and site layout of the negative pressure tent. He performed and trained the on-site staff on the use of personal air monitoring equipment and provided assistance with design considerations on the installation of a waterloo barrier to be advanced to minus 80 feet below grade surface. James also helped with the design and permitting for the groundwater treatment system installed on-site.

Manufactured Gas Plant, Con Edison, New York, NY. Environmental engineer for responsible party for all environmental issues associated with this job, including transportation and disposal of 8,000 tons of MGP contaminated soil from former Con Edison operations. James scheduled weekly work for all civil and environmental tasks on the job. He was responsible for the design and installation of the dewatering treatment system with a daily discharge of 25,000 gallons per day of MGP-impacted water.

New York State Superfund Project, NYSDEC, Hicksville, NY. James performed O&M and reporting on the Site's Potassium Permanganate Injection system, which was on a timed system; maintained the system, troubleshooting problems and ensuring that the proper ratios were being injected. He performed the fieldwork for analysis and drafted interim reports for the project manager.

Retail Petroleum, New York State Spills Program, Hess Amerada, Various Locations, NY. James designed installed and maintained groundwater and soil vapor remedial systems at over 30 retail petroleum stations for Hess. Responsible for ensuring that the remedial systems were operating properly and performing repairs as necessary

during operation. He performed groundwater and soil vapor monitoring and drafted O&M reports for the NYSDEC. Plume size ranged from within the retail station property with monitoring off-site impacts in local neighborhoods greater than a 3-mile radius.

Retail Petroleum, New York State Spills Program, British Petroleum, Various Locations, NY. James designed installed and maintained groundwater and soil vapor remedial systems at over 10 retail petroleum stations for BP. He was responsible for ensuring that the remedial systems were operating properly and performing repairs necessary during operation. He performed groundwater and soil vapor monitoring and drafted O&M reports for the NYSDEC. Plume size ranged from within the retail station property with monitoring off-site impacts in local neighborhoods greater than a 2-mile radius.

Development, 524 West 19th Street, New York, NY (Metal Shutter Homes). Responsible party for all environmental and civil issues associated with this job, including transportation and disposal of 5,000 tons of MGP contaminated soil from former Con Edison operations. James scheduled weekly work for all civil and environmental tasks on the job. He successfully redesigned the grout cutoff wall connections to the installed steel sheeting with a secant wall installed off-site. He provided technical guidance for drilling 4-foot diameter exploratory casings for subsurface anomalies. Additionally, James was responsible for the design and installation of the dewatering treatment system with a daily discharge of 25,000 gallons per day of MGP impacted water.

EPA Superfund Site, Newtown Creek Superfund, Brooklyn, NY. James aided in the design of the pump and treat system installed at Peerless Importers. He also aided in the design and installation of the harbor boom set up. Operated and Maintained groundwater/LNAPL extraction systems on-site and performed monthly site gauging as part of the O&M plan.

MARI C. CONLON

Project Manager

EDUCATION

M.S., Geology, Boston College
B.S., Geology with a minor in Economics and Business, Lafayette College

PROFESSIONAL REGISTRATIONS

NY: Professional Geologist (License No. 000769)

PROFESSIONAL SOCIETIES

Big Apple Brownfield Awards, Co-Chair, 2018-2019
Big Apple Brownfield Awards Nomination Committee, 2016-2017

SPECIAL STUDIES AND COURSES

40-Hour OSHA Hazardous Waste Operations and Emergency Response Training (29 CFR 1910.120)
10-Hour OSHA Construction Safety
8-Hour OSHA Supervisor of Hazardous Waste (29 CFR 1910.120 & 29 CFR 1926.65)

Mari is a project manager with experience in soil, groundwater and soil vapor investigation and a focus on remedial design and implementation, and will focus her time at Haley & Aldrich serving the environmental and real estate markets. She is also experienced in completion of numerous Phase I Environmental Site Assessments and Phase II Environmental Site Investigations, site characterization, hazardous materials analysis, regulatory closure reports as well as remedial design and implementation.

Mari has experience in composing site closure documentation including Remedial Closure Reports and Noise Installation Reports reviewed by the Office of Environmental Remediation as well as Final Engineering Reports reviewed by the New York State Department of Environmental Conservation. Her background includes developing and complying with approved site management plans overseeing the operation and maintenance of on-site engineering controls and ensuring the protection of human health and the environment.

Mari has also worked on city rezoning proposals by performing work associated with and composing the Hazardous Materials Analysis chapter included in Final Environmental Impact Statements published by New York City Department of Planning. Analysis methods were performed in accordance with the City Environmental Quality Review (CEQR) guidelines for neighborhoods including East New York, Brooklyn, Jerome Avenue, Brooklyn, Inwood, and Manhattan.

RELEVANT PROJECT EXPERIENCE

State and City Agencies

School Construction Authority, Waste Characterization and Excavation Materials Disposal Plan, Brooklyn, New York. Project manager for consulting services for New York Public School 127. Services included composition of an Excavated Materials Disposal Plan, collection of waste characterization samples and preparation of and preparation of a findings and recommendations report.

Department of City Planning, Rezoning Environmental Impact Statement, Bronx, New York. Project lead for analysis and composing the Hazardous Materials Chapter as per City Environmental Quality Review (CEQR) Technical Manual guidelines included in the Final Environmental Impact Statement (FEIS) for an approximately 92-block area primarily along Jerome Avenue and its east-west commercial corridors in the Bronx. The review assessed the potential for the presence of hazardous materials in soil and/or groundwater at both the projected and potential development sites identified in the reasonable worst-case development scenario under the proposed East New York Rezoning Proposal. Procedures involved site inspections and review of historic Sanborn fire insurance maps, city directories and city/state regulatory databases. The assessment identified that each of the 146 projected and potential development sites has

some associated concern regarding environmental conditions. As a result, the proposed zoning map actions include (E) designations (E-366) for all privately-held projected and potential development sites.

Department of City Planning, Rezoning Environmental Impact Statement, Brooklyn, New York. Project lead for performance analysis and composing the Hazardous Materials Chapter as per CEQR Technical Manual guidelines included in the FEIS for an approximately 190-block area of East New York, Cypress Hills, and Ocean Hill neighborhoods of Brooklyn, New York. The review assessed the potential for the presence of hazardous materials in soil and/or groundwater at both the projected and potential development sites identified in the reasonable worst-case development scenario under the proposed East New York Rezoning Proposal. Procedures involved site inspections and review of historic Sanborn fire insurance maps, city directories and city/state regulatory databases. The assessment identified that each of the 186 projected and potential development sites has some associated concern regarding environmental conditions. As a result, the proposed zoning map actions include (E) designations (E-366) for all privately-held projected and potential development sites.

Redevelopment and Remediation

Hotel Redevelopment, Bronx, New York. Project manager for a hotel redevelopment in the south Bronx. The site has been assigned New York City Office of Environmental Remediation (NYC OER) E-Designation status for hazardous materials, noise and air quality. Services included completion of a remedial investigation, composition of a Remedial Investigation Report and development of Hazardous Material Remedial Action Work Plan and Air Quality/Noise Remedial Action Plan as per NYC OER requirements.

Chelsea Mixed-Use Redevelopment, New York, New York. Field geologist for oversight of the remediation of a mixed-use residential and commercial building, the second of a two-building development on 30th Street. Contaminants of concern included volatile and semi-volatile organic compounds associated with historic operations and underground storage tanks (USTs) located on the Site. The Site was given an E-designation (E-142) for hazardous materials and noise as part of the Highline/West Chelsea rezoning proposal. To satisfy the requirements of the E-designation program, soil was excavated to at least 12 feet below grade and bottom endpoint collected showing no contaminants of concern exceeding the New York State Department of Environmental Conservation (NYSDEC) Unrestricted Use Soil Cleanup Objectives (SCO). By achieving Unrestricted Use SCOs, no engineering controls were necessary, although the building slab was included as part of development, and removal of the hazardous materials E-designation was requested.

Long Island City Residential Development, Long Island City, New York. Field geologist for remedial oversight and implementation of a Community Air Monitoring Program during concurrent remediation and development of three Brownfield Cleanup Program (BCP) sites located in Long Island City, New York. The Sites were grossly contaminated with creosote, a carcinogenic chemical formed from the distillation of various tars. Remediation strategies included soil excavation and in-situ soil stabilization. To prevent migration of groundwater off-site, a temporary and later a permanent capture well system was installed on the western boundary of the property. The BCP site located on the western portion of the property left residual contamination in place requiring installation of a sub-slab depressurization system.

Queens Waterfront Development, Long Island City, New York. Field geologist for performance of site management post remedial action. Services included annual groundwater monitoring, evaluation of engineering and institutional controls completion and Period Review Reports. In addition to conducting annual site management activities, responsibilities included composing a work plan to evaluate the transition from active sub-slab depressurization systems to passive. Upon NYSDEC approval, active systems were shut down for 30 days prior to a sub-slab vapor sampling event evaluation soil vapor, indoor and outdoor air conditions for potential vapor intrusion risk. As results indicated no evidence of vapor intrusion, continued pressure monitoring was conducted for from the existing monitoring ports for one year assessing whether negative pressure was held by the existing slab by stack-effect or other passive processes.

Brownfield Cleanup Program Remediation Site, Long Island City, New York. Field geologist for oversight of the installation of an Electrical Resistive Heating (ERH) system implemented in order to remediate trichloroethylene groundwater plumes in shallow/intermediate and deep groundwater on- and off-site. The Site, a former stapler manufacturing facility, underwent various remedies, including a Soil Vapor Extraction system, air sparging, ozone injection and chemical oxidation using potassium permanganate injections, which resulted in little reduction to contamination levels and rebounding chlorinated solvents. Components of the ERH system installed included electrodes for delivery of steam, vapor recovery wells, and groundwater monitoring wells. The site is currently under remediation in the state BCP program.

Due Diligence and Site Characterization

Manufacturing Plants, Multiple Investors, Environmental and Compliance Assessment Portfolio United States. Project lead for completion of Phase I Environmental Site Assessments (ESAs) and Limited Compliance Reviews for multiple auto parts manufacturing facilities throughout the United States. Services included completion of Phase I ESAs in accordance with the American Society for Testing and Materials E1527-13 requirements and a limited review of each facility's compliance liabilities including issues pertaining to the Resource Conservation and Recovery Act, Greenhouse Gas Emission Standards and Tier II Emergency and Hazardous Chemical Inventory reporting requirements.

Environmental Site Assessment and Subsurface Investigation, Brooklyn, New York. Project manager for site assessment and subsurface investigation of parking facility in Sunset Park neighborhood, Brooklyn, New York. Services included ground penetrating radar survey for former and current petroleum USTs, completion of a subsurface investigation of soils and composition of Limited Subsurface Investigation Report.

Spill Consulting

Spill Consulting Services, New York, New York. Project manager for consulting services provided after incidental release of calcium carbonate ice rink paint to the Central Park Pond from Wollman Rink. Services included liaising with NYSDEC regarding violations, consent order and required corrective action. Corrective action included designing alterations to the existing on-site drainage plans and routing all meltwater containing paint into the combined sewer system. Coordination was required with property owner, operations personnel, New York City Department of Parks and NYSDEC.

Spill Management and Closure Services, Staten Island, New York. Project lead responsible for spill closure activities and reporting for Spill 1105661 located at the Richmond Gardens Apartment Complex in the Richmond neighborhood of Staten Island, New York. The spill was opened in 2011 when several underground storage tanks were identified adjacent to the apartments at Jersey Street and Hendricks Avenue. The tanks were cleaned and removed and impacted soils surrounding the tank area excavated to the extent possible. Excavation of all impacted material was not feasible due to the proximity of the tanks to the apartment buildings. Residual contamination in soil and groundwater remained and was monitored through 2016. Upon reviewing the groundwater monitoring data from over 12 consecutive quarters, it was apparent monitored natural attenuation was not a feasible option and an in situ chemical oxidation (ISCO) remedy was approved by NYSDEC. Due to success of the pilot test, the ISCO injection event was implemented utilizing pressure pulse technology to deliver the alkaline activated persulfate solution to the subsurface.

BRIAN FITZPATRICK, CHMM

Corporate Director, Health and Safety

EDUCATION

M.P.A., Environmental Policy, Syracuse University
B.S., Environmental Science, University of Massachusetts-Amherst
A.S., Chemistry, Valley Forge Military Junior College
Commissioned Officer, United States Army

CERTIFICATIONS

Certified Hazardous Materials Manager (Reg. No. 13454)
Certified Department of Transportation Shipper
Certified International Air Transport Authority Shipper

PROFESSIONAL SOCIETIES

Alliance of Hazardous Materials Professionals
Academy of Certified Hazardous Materials Managers, New England Chapter

SPECIAL STUDIES AND COURSES

Department of Transportation
International Air Transport Authority
Incident Commander
Confined Space Entry and Rescue
Radiation Safety Officer
RCRA Hazardous Waste
Massachusetts Industrial Waste Water Operator Grade 2I (expired)

AWARDS

Presidents Club Award (one million hours worked without a recordable injury), Cabot Corporation
Chancellors Award for Excellence, Syracuse University

Brian ensures the work we do for our clients is done safely – knowing this reduces costs, improves service quality and site conditions, and ultimately protects our clients' reputations. In addition to building the Haley & Aldrich Health & Safety (H&S) culture, Brian is hands-on with clients to help improve their and their partners' safety cultures.

He has extensive expertise in the Occupational Safety and Health Administration (OSHA) general industry, process safety management, and construction safety programs. He is an active member of the Alliance of Hazardous Materials Professionals and the New England chapter of the Academy of Certified Hazardous Materials Managers.

Brian knows an organization's success is predicated on empowering its people to safely work within the complex, living processes in which they operate. He is a student of human factors in the workplace, of the phenomena of human error and drift into failure, and of the safety applications of Lean techniques.

RELEVANT PROJECT EXPERIENCE

Haley & Aldrich, Inc., Burlington, Massachusetts. As Chief Health and Safety Officer, Brian has led and facilitated the development and implementation of corporate health and safety (H&S) improvement plans to enhance compliance and improve H&S performance. In Brian's time with Haley & Aldrich, Inc., the company has realized dramatic improvement on H&S goals and in Key Performance Indicators. Brian is responsible for developing a risk competence culture, where our staff are empowered to look for and engage to address risk before anyone is injured. Brian oversees the development, implementation and continuous improvement of all H&S programs for the company. Additional responsibilities include:

- Developing a safety culture through incident reporting, root cause analysis, behavior-based safety, hazard recognition and risk assessment, communication, and developing leaders;

- Monitoring proposed and existing SH&E regulations and legislation to determine their impact on operations and to ensure continued compliance;
- Overseeing the safety, industrial hygiene, and toxicology programs for over 600 staff members engaged in remediation, construction, health and safety, consulting, and general office work across 28 offices in the United States and on assignment to international project sites;
- Continuously seeks to improve H&S performance as measured by the OSHA Incident Rating (IR) and Worker's Compensation Experience Modification Rating (EMR), as well as Leading Indicators developed with the management team; and
- Participating in the corporate audit program as an auditor or lead auditor;

Energy Client, California. As Chief Health and Safety Officer, Brian led and facilitated the Alliance Partnership Safety Council in 2017, is still an active contributor to the council, and hosts routine contractor safety forums for the client. Brian is actively involved in the development and implementation of program safety, health, and environmental (SH&E) plans to ensure safe operations on project sites. Brian developed permits and Health and Safety Plans for large projects and routinely audits the site safety. Additional responsibilities include:

- Driving reporting and behavior-based safety initiatives to support our internal safety culture and developing monthly summary reports to illustrate performance to our client.
- Develop, assess and continuously improve site safety plans and practices, including specific safety protocols for working safely over and around water.
- Worked as an extension of the client's organization to provide assurance that the remedy was completed safely and consistent with client-specific requirements.
- Support on-site safety personnel in ensuring the health and safety of the general public, our staff, and our sub-contracted employees.
- Audits and visits sites to ensure compliance with our internal policies and client-specific requirements.

Energy Client, Ohio. As Chief Health and Safety Officer, Brian supports the project team in developing and executing client and project specific health and safety measures, such as a site specific Health and Safety Plan, Job Hazard Analyses, Industrial Hygiene program, and site specific training. Brian also routinely visits the site to assess current practices and condition and to ensure continuous improvement. Additional responsibilities include:

- Develop, assess, and continuously improve site safety plans and practices, including specific safety protocols to comply with supplemental EH&S requirements such as the Duke Health and Safety Handbook, Environmental Supplemental, and EHS Keys to Life.
- Develop, assess, and continuously improve site safety plans and practices to address the risks associated with the work being performed on site, as well as the environmental conditions and simultaneous operations, including trenching and excavation, hot work, work over and near water, heavy equipment, HAZWOPER, etc.
- Worked as an extension of the client's organization to provide assurance that the remedy was completed safely and consistent with client-specific requirements.
- Support on-site safety personnel in ensuring the health and safety of the general public, our staff, and our sub-contracted employees.
- Audits and visits site to ensure compliance with our internal policies and client-specific requirements.

BRIAN A. FERGUSON

Senior Engineer

EDUCATION

M.S., Geotechnical Engineering, Tufts University-Medford
B.S., Civil Engineering, State University of New York - Environmental, Science, and Forestry
A.S., Applied Science and Technology (Nuclear Engineering), Thomas A. Edison State College

PROFESSIONAL SOCIETIES

Order of the Engineer – 2000
Boston Society of Civil Engineers (BSCE)
American Society of Civil Engineers (ASCE)

SPECIAL STUDIES AND COURSES

American Concrete Institute – Certified Field Technician Certified Grade 1
Radiation Safety and Operations of Nuclear Testing Equipment – Troxler
40-Hour OSHA Hazardous Waste Operations Training (+ 8-Hour annual refresher)
10-Hour OSHA Construction training
Confined Space Entry Training
16-Hour Asbestos Operations and Maintenance

Brian has over six years of experience serving as project engineer on a variety of real estate development projects. His project experience has included monitoring field investigations and performing construction oversight, performing due diligence and engineering analyses, performing geotechnical analyses and developing geotechnical recommendations, and preparing geotechnical reports and project specifications.

In addition to providing engineering design support, Brian has managed and participated in a number of field service activities. Field work has included construction monitoring and documentation of contractors' deep and shallow foundation related construction, including slurry walls, caissons, pile driving, pile cap installation, earthwork, backfilling and compaction, installation of soldier pile and wood lagging support systems, installation of tie backs, reading inclinometers, conducting in-place field unit weight tests, tie-back load testing, seismograph installation, monitoring, and evaluating, and preparation of footing bearing surfaces. Other responsibilities have included site development activities, including placement of utilities and subgrade preparation for roads; observations and testing to determine that work is completed in compliance with contract documents; on-site soil management; sampling of soil and groundwater for chemical laboratory testing and conducting in situ field screening; maintenance of job records including pile driving logs, results of field density tests, records of caisson and footing installations; preparation of daily field reports; in contact with key personnel; and resolution of field related problems.

RELEVANT PROJECT EXPERIENCE

St. Elizabeth's Hospital – West Campus Forensic Evaluations, Washington, D.C. Project Engineer for forensic evaluations on the adaptive reuse of former hospital buildings. Responsibilities included coordination of a field exploration program, including test borings and test pits to obtain subsurface information for project design and construction, overseeing multiple field personnel, subcontractors, assisting with project management, reviewing subcontractors' invoices, reviewing and summarizing subsurface data and writing data reports.

TUFTS University, New Central Energy Plant, Medford, Massachusetts. Project engineer for a new Central Energy Plant that will house new co-generation steam boilers, centralized chilled water and electrical transformer switchgear that is planned to occupy approximately 20,000 square feet across two or three levels. Responsibilities included coordination of construction monitoring, observing SOE and footing installation, assisting with project management, reviewing weekly field construction reports, reviewing and responding to geotechnical design submittals and attending project meetings.

Lahey Hospital and Medical Center – Stilts Infill Project, Burlington, Massachusetts. Project Engineer for an addition to the existing Stilts building on the Lahey campus. Responsibilities included coordination and overseeing geotechnical and environmental subsurface investigations, coordination of construction monitoring, observing footing installation, assisting with project management, reviewing weekly field construction reports, reviewing and responding to geotechnical design submittals and attending project meetings.

Gloucester Beauport Hotel, Gloucester, Massachusetts. Project engineer for a four story hotel with a seawall constructed adjacent to tidal beach. Responsibilities included coordination and overseeing geotechnical and environmental subsurface investigations, coordination of construction monitoring, assisting with project management, reviewing weekly field construction reports, reviewing and responding to geotechnical design submittals and attending project meetings, design and implementation of a sub-slab gas mitigation system.

275 Wyman Street, New Office Building, Waltham, Massachusetts. Project engineer for a new office building and parking garage founded on a shallow foundation system. Responsibilities included preparing proposals, assisting with management and planning of a subsurface investigation program, summarizing subsurface data and reviewing geotechnical test boring logs, coordination of construction monitoring and instrumentation monitoring programs, reviewing weekly field construction reports, reviewing and responding to specialty geotechnical design submittals and RFIs by others and attending project meetings.

Suffolk University - 20 Somerset Street, Boston, Massachusetts. Project engineer for design of 8-story academic building with two levels of below grade finished space. Responsibilities included coordination of construction monitoring, observing SOE and footing installation, assisting with project management, reviewing weekly field construction reports, reviewing and responding to geotechnical design submittals and attending project meetings.

Worcester State University, New Student Housing, Worcester, Massachusetts. Project engineer for design and construction of a 7-story residence/dining hall with a single level basement and a major site retaining wall structure. Brian's responsibilities included overseeing geotechnical subsurface investigations, provided foundation recommendations and specifications, and prepared a retaining wall contract document. He also coordinated construction monitoring, excavated and constructed footings, and overview of soil reuse and management, assisted with project management, reviewed weekly field construction reports, reviewed and responded to geotechnical design submittals and attended project meetings.

University of Massachusetts Boston, General Academic Building No.1, Boston, Massachusetts. Project engineer responsible for assisting project manager in preliminary foundation engineering recommendations and construction considerations for a new academic building on a part of Columbia Point, a historic landfill area. Assisted in design phase services that included preparing foundation support design recommendations including the use of high allowable stresses for 190-ft long end-bearing H-piles and application of Slickcoat coating to address downdrag concerns and reduce foundation costs.

Waltham Watch Factory, Waltham, Massachusetts. project engineer for redevelopment of former watch factory. Responsibilities included construction oversight of new precast parking garage, utility upgrades, soil remediation and management, installation of gas mitigation systems, assisting with project management, reviewing weekly field construction reports, reviewing and responding to geotechnical design submittals and attending project meetings.

Massachusetts Green High Performance Computing Center, Holyoke, Massachusetts. Project engineer for 60,000 sq. ft high level computing center and associated support utilities. Redevelopment of the site included recycling 50,000 cy of construction debris into the site fills at this historic site along the Connecticut River. Responsibilities included coordinating geotechnical and environmental field investigations, coordination of construction monitoring, seismic analysis, reviewing weekly field construction reports, reviewing and responding to geotechnical design submittals and attending project meetings.

The Shops at Riverwood, Hyde Park, Massachusetts. The project consisted of the redevelopment of a colonial era paper mill. The multi-building complex was demolished and the concrete and brick from the previous buildings were

recycled. The project involved crushing 50,000 cy of brick and concrete and placement of excavated soils and recycled brick and concrete as compacted fill materials to support proposed buildings, pavement areas, and achieve 5 to 9 ft. raises in grade. Field Representative was responsible for management and reuse of brick and concrete stockpiles, in-place density testing, coordination of test pits, installation of soldier pile and versa-lok walls, and backfilling of underground vaults. Remedial activities included: excavation of 5,000 cy of petroleum contaminated soils, on-site cement batching in a pug mill, and placement of compacted recycled materials in roadway areas; delineation, excavation and off-site disposal of TSCA-regulated PCB contaminated soils associated with historical Askarel transformers and dioxin-contaminated soils associated with historical bleaching operations; and disposition of 1,000 tons of paper mill sludge encountered within an abandoned granite-walled sluiceway structure. In addition, assisted with weekly project meetings, maintaining a record of material reuse, and providing weekly field reports.

Harvard Law School, Cambridge, Massachusetts. The Harvard Law School project is located on Massachusetts Avenue in Cambridge. The project consisted of a multistory building above ground with 5 levels below ground for a parking garage. Field Representative was responsible for overseeing the installation of slurry walls into bedrock and LBEs with three installation rigs while monitoring the removal of urban fill and transfer to several different receiving facilities from another portion of the site. The slurry walls were constructed into bedrock. Other Field Representative activities were: testing of the slurry, management of the excavated soils, and record keeping of the Contractor's obstruction and down time of the equipment. In addition, assisted with weekly project meetings, maintaining a record of obstruction and machine time, and providing weekly field reports.

ZACHARY SIMMEL

Environmental Engineer

EDUCATION

B.S., Environmental Engineering, Syracuse University, 2017

SPECIAL STUDIES AND COURSES

40-Hour OSHA Hazardous Waste Operations and Emergency Response Training (29 CFR 1910.120)
8-Hour OSHA HAZWOPER Refresher Training
10-Hour OSHA Construction Safety Training
8-Hour DOT Hazmat Employee & RCRA Hazardous Waste Generator Training
American Red Cross First Aid Training and CPR Course
XRF Training (2019)
Asbestos Inspector Training (2019)

Mr. Simmel is an engineer with experience in remedial site investigations, subsurface investigations, observations of rock blasting/excavation, preparation of technical reports, and data collection and analysis. He also has extensive experience with conducting Phase I environmental site assessments and Phase II environmental site assessments, and other forms of environmental due diligence. He has performed groundwater sampling events, soil gas/vapor surveys, and assisted with preparation of soils management plans. Mr. Simmel regularly utilizes computer programs such as Microsoft Excel, Microsoft Word, and Bluebeam in his daily job functions.

He will focus his time at Haley & Aldrich serving the Building and Infrastructure markets with performing site reconnaissance to observe existing conditions, assess site access for subsurface explorations, and identify important site features. He will also monitor subsurface exploration activities to collect soil, bedrock, groundwater, as well as other pertinent information for project design, and assist in the development of remedial work plans.

RELEVANT PROJECT EXPERIENCE

Environmental

Former Techtronics Facility, 8 Walworth Street, Brooklyn, NY. Field engineer for oversight of soil borings by Direct Push and installation of fifteen permanent groundwater monitoring wells using mud-rotary drilling. Cluster wells installed to vertically delineate CVOC on-site plume and to evaluate other plumes migrating onto the site. Adjusted well locations due to site-specific challenges, specifically shallow refusal. Responsibilities included collecting soil and groundwater environmental samples, gauging wells, overseeing survey performed by license surveyor, and compiling laboratory data and hydrogeologic information to formulate an IRM design involving soil vapor extraction/air sparging systems and implementing a bioremediation injection barrier wall.

297 Wallabout Street, Brooklyn, NY. Field engineer for oversight of soil borings and installation of five permanent groundwater monitoring wells. Responsibilities included classifying soil, developing/purging wells, collecting environmental soil samples, and conducting low-flow groundwater sampling for various analyses.

Excavation Oversight and CAMP Monitoring, Various Sites, Bronx and Brooklyn, NY. Field engineer for several projects under NYCOER program. Responsibilities included performing excavation oversight, air monitoring, vapor barrier installation oversight, and logging trucks for off-site disposal.

Former NuHart Plastics Manufacturing Plant, Brooklyn, NY. Field engineer for multiple monitoring events which consisted of the removal of light non-aqueous-phase liquid (LNAPL) performed in compliance with the site-specific, NYSDEC-approved Operation, Maintenance, and Monitoring Plan (OM&M Plan) for the product recovery system.

Rock Brokerage Environmental Site Assessments, New York City, NY. Field engineer for environmental waste characterization services as required by the disposal facility at several sites throughout the greater New York City area.

Building & Infrastructure Construction/Development

I-95 Express Lanes Fredericksburg Extension, Fredericksburg/Stafford, VA. Field engineer for oversight of geotechnical borings using HSA along Interstate 95. Work areas included both road work and limited access areas (i.e. wetlands, medians). Provided quality real-time data under an intense project deadline and collaborated daily with earthwork firm (i.e. Branch Civil). Logged soils using Virginia Department of Transportation Classification System and collected both split spoon and Shelby tube samples. Equipment used for soil classification included a pocket penetrometer.

Greenwich Country Day School South Campus Addition, Greenwich, CT. As field engineer observed construction activities for south campus addition which included rock removal (line drilling and blasting), installing footings, preparing bearing surfaces, installing underslab and perimeter drainage systems, and earthworks. Project responsibilities also included collecting blast vibration monitoring information from the blaster and regularly checking in with surveyor to maintain elevation control of excavation.

Corbin Avenue Mixed-Use Residential Development, Darien, CT. Field engineer for subsequent site investigation for a mixed-use residential development. The development will consist of several, mixed-use residential buildings, and an underground parking structure. Responsibilities included monitoring of test borings (using HAS and mud rotary) and rock drilling, collecting pertinent information from drill rig crews (monitored two at a time), collecting environmental samples, and gauging previously installed groundwater monitoring wells. Adjusted test boring locations due to site specific challenges including shallow refusal depth, utilities, and other site (i.e. parked vehicles, access restrictions).

Lambert Houses Parcel 5, Bronx, NY. Field engineer for site investigation of proposed development at E 179th Street in Bronx, NY. Responsibilities included the monitoring of 15 test borings and one test it to obtain information on subgrade and depth of bedrock across the site.

Lincoln Avenue Bridge Replacement, Trenton, NJ. Field engineer for site investigation of proposed replacement of Lincoln Avenue bridge. Responsibilities included monitoring test boring to obtain information on subgrade and depth to bedrock. Test boring extended down to approximately 100 feet; 25 feet was rock cored. Both soil and rock cores were collected, observed, and properly identified in logs.

Keeler Brook Force Main Final Design, Connecticut Avenue, Norwalk, CT. Field engineer for site investigation of proposed installation of 2,475 linear feet (lf) of 16 in. dia. HDPE force main running along the south side on Connecticut Avenue. Final design included 1,100 lf HDD and 725 lf pipe jacking area. Responsibilities included monitoring of test borings and rock drilling to obtain information on subgrade and depth to bedrock.

Environmental Remediation Experience

The Stanwich School, Environmental Remediation Investigation, Greenwich, CT. Field engineer for oversight of the remediation of former hiking trails impacted by historical placement of fill material (e.g., primarily ash, coal, slag). Primary contaminants of concern included heavy metals, specifically arsenic and lead. Assisted with preliminary subsurface investigation involving the installation of test pits in order to characterize and assess distribution of fill material. Primary responsibilities included oversight of the removal of fill material, segregating cut stone for re-use, collecting endpoint samples to determine performance of the remedy, compiling laboratory data, oversight of the installation of filter fabric, and preparing a site remediation report with appropriate figures. Acted as liaison between general contractor and both soil brokerage firm and environmental laboratory.

Marc Service Station, Environmental Remediation, Stamford, CT. Field engineer for remedial oversight of former gasoline service station. Conducted both Phase I and Phase II Environmental Site Assessments prior to remediation. Primary responsibilities included oversight of the excavation and removal of two abandoned in-ground hydraulic lifts, an out-of-service oil/water separator, and interior drain lines. Project also called for the removal of historic impacted soil in the vicinity of a former pump island and locations of former underground storage tanks grossly contaminated with primarily Benzene, Toluene, Ethylbenzene and Xylene (BTEX) contaminants and petroleum. Responsible for the collection and analysis of soil samples, verification of completeness of the work, documentation, and preparation of a closure/soil remediation report.

Rubino Brothers Scrap Metal, Environmental Remediation Investigation, Stamford, CT. Field engineer for remedial oversight of former storage lot operated by scrap metal yard. The storage lot was comprised of three different parcels which were formerly operated by a variety of light industrial and commercial businesses including a foundry and lumber yard. Assisted in the development of a grid system across the entirety of the site, each approximately 25 ft x 25 ft. Remediation was conducted in several phases: removal of top layer of asphalt and millings, removal of reinforced concrete slabs across the entirety of the site, and removal of impacted soil (primary contaminants of concern [Extractable Total Petroleum Hydrocarbons], arsenic, and lead). Encountered orphan underground gasoline storage tanks and a waste oil tank. Primary responsibilities included oversight of the removal of impacted soil, segregating non-native material, collecting endpoint samples, and documenting completion of work. Collected composite samples from stockpiles for waste characterization and disposal facility. Created spreadsheet and tables of laboratory results, prepared appropriate site plans, and assisted with compilation of remediation report.

Environmental Investigation Experience

Multiple Confidential Clients, Phase I ESAs and Due Diligence, Multiple Locations, CT, NY, NJ. Conducted Phase I ESAs, for buyer and vendor sides, on a variety of properties including commercial, industrial, and residential sites. Experience with conducting Phase I ESAs and Transaction Screens (in CT) on dry cleaners, auto body shops, and service stations.

Multiple Confidential Clients, Phase II, Multiple Locations, CT. As field engineer, conducted Phase II ESAs and supplemental Phase III ESAs on a variety of different sites. Assisted with the development of sampling plans primarily based off previous environmental investigations and due diligence. Primary responsibilities for Phase II investigations included oversight of the installation of test borings and/or test pits and the installation of groundwater monitoring wells. Some project scopes also called for the completion of a soil gas survey using a photoionization detector as a field instrument. Phase III investigations involved further intrusive environmental media sampling to further delineate the vertical and horizontal extent of contamination.

Other Experience

Spill Management and Closure Services, Multiple Sites, CT. Field engineer responsible for spill closure activities including monitoring removal of underground storage tanks and at times, overseeing excavation of contaminated soil related to leaking underground storage tanks. Primary responsibilities for underground storage tank closure/removal included oversight of the removal of impacted soil, collecting endpoint samples, preparing soil samples for laboratory analysis, and preparing a closure report to be submitted to state agency.

Multiple Dry Cleaners, Stamford, CT. Responsibilities included conducting quarterly groundwater sampling events using low flow sampling technique, preparing data and reports. Air monitoring and routine soil vapor extraction system maintenance checks were also required at several of the dry cleaners.

APPENDIX H

Quality Assurance Project Plan

HALEY ALDRICH

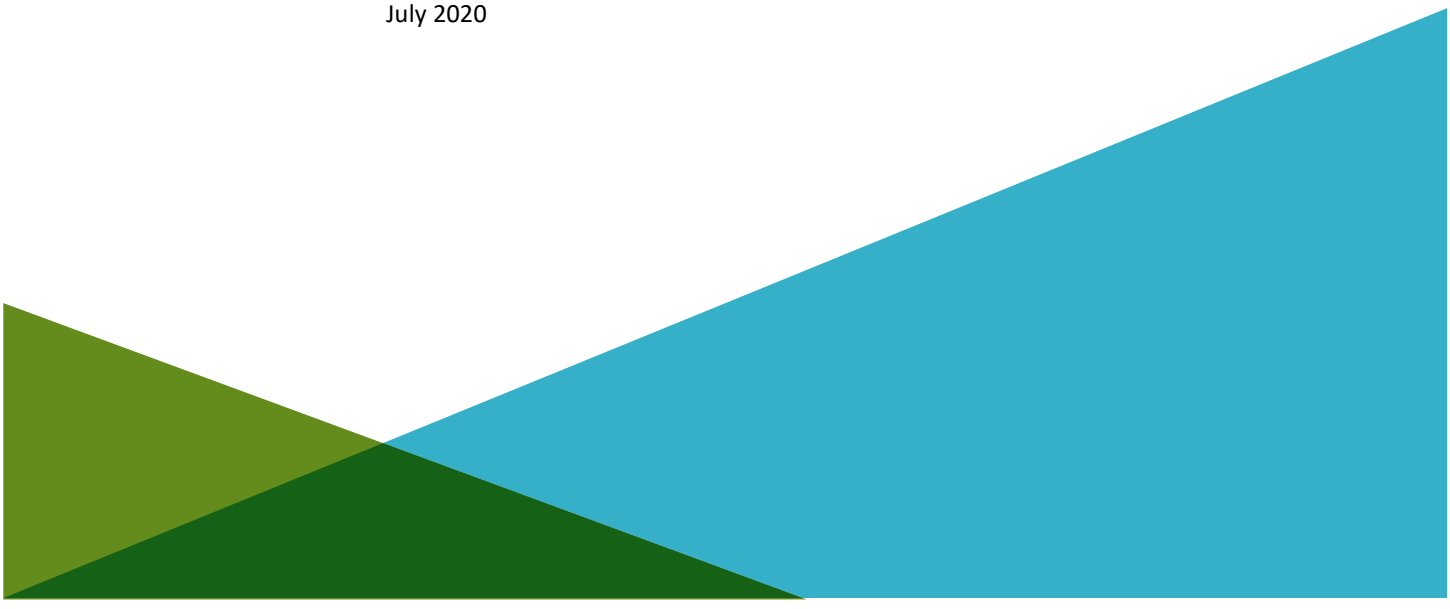
www.haleyaldrich.com

QUALITY ASSURANCE PROJECT PLAN
8 WALWORTH STREET
BROOKLYN, NEW YORK

by
Haley & Aldrich of New York
New York, New York

for
New York State Department of Environmental Conservation
Albany, New York

File No. 134860-002
July 2020



Executive Summary

This Quality Assurance Project Plan (QAPP) outlines the scope of the quality assurance and quality control (QA/QC) activities associated with the site monitoring activities associated with the Remedial Action Work Plan (RAWP) for the portion of 8 Walworth Street (Site) in Brooklyn, New York.

Protocols for sample collection, sample handling and storage, chain-of-custody procedures, and laboratory and field analyses are described herein or specifically referenced to related project documents.

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1. Project Description

This Quality Assurance Project Plan (QAPP) has been prepared as a component of the RAWP for the 8 Walworth Street (Site) in Brooklyn, New York.

1.1 PROJECT OBJECTIVES

The primary objective for data collection activities is to collect sufficient data necessary to monitor the effectiveness of the proposed remedy.

1.2 SITE DESCRIPTION AND HISTORY

The general Site description and Site history is provided in the RAWP.

1.3 LABORATORY PARAMETERS

The laboratory parameters for soil and groundwater include:

- Target Compound List (TCL) volatile organic compounds (VOCs) using EPA method 8260B
- Total Analyte List (TAL) Metals using EPA method 6010
- Polychlorinated biphenyls (PCBs) using EPA method 8082
- NYSDEC and Per- and Polyfluoroalkyl Substances (PFAS) List (21 compounds) by USEPA Method 537; and
- 1,4-dioxane by USEPA Method 8270

During the collection of groundwater samples, pH, specific conductivity, temperature, dissolved oxygen (DO), and oxidation/reduction potential (ORP) will be measured.

Laboratory parameters for disposal samples will be determined by the disposal facility after an approved facility has been determined.

1.4 SAMPLING LOCATIONS

The RAWP provides the locations of soil samples and groundwater monitoring wells that will be sampled.

2. Project Organization and Responsibilities

This section defines the roles and responsibilities of the individuals who will perform the RAWP monitoring activities. A NYSDOH certified analytical laboratory will perform the analyses of environmental samples collected at the Site.

2.1 MANAGEMENT RESPONSIBILITIES

The Project Manager is responsible for managing the implementation of the RAWP and monitoring and coordinating the collection of data. The Project Manager is responsible for technical quality control and project oversight. The Project Manager responsibilities include the following:

- Acquire and apply technical and corporate resources as needed to ensure performance within budget and schedule restraints;
- Review work performed to ensure quality, responsiveness, and timeliness;
- Communicate with the client point of contact concerning the progress of the monitoring activities;
- Assure corrective actions are taken for deficiencies cited during audits of RAWP monitoring activities; and
- Overall Site health and safety plan compliance.

The Remedial Engineer is responsible for implementation of the remedial program at the site. The RE will certify in the Final Engineering Report (FER) that the remedial activities were observed by qualified environmental professionals under her supervision and that the remediation requirements set forth in this RAWP and other relevant provisions of ECL 27-1419 have been achieved in substantial conformance with the RAWP.

2.2 QUALITY ASSURANCE RESPONSIBILITIES

The Quality Assurance team will consist of a Quality Assurance Officer and the Data Validation staff. Quality Assurance responsibilities are described as follows:

2.2.1 Quality Assurance (QA) Officer

The QA Officer reports directly to the Project Manager and will be responsible for overseeing the review of field and laboratory data. Additional responsibilities include the following:

- Assure the application and effectiveness of the QAPP by the analytical laboratory and the project staff;
- Provide input to the Project Manager as to corrective actions that may be required as a result of the above-mentioned evaluations;
- Prepare and/or review data validation and audit reports.

The QA Officer will be assisted by the data validation staff in the evaluation and validation of field and laboratory generated data.

2.2.2 Data Validation Staff

The data validation staff will be independent of the laboratory and familiar with the analytical procedures performed. The validation will include a review of each validation criterion as prescribed by the guidelines presented in Section 9.2 of this document and be presented in a Data Usability Summary Report (DUSR) for submittal to the QA Officer.

2.3 LABORATORY RESPONSIBILITIES

Laboratory services in support of the RAWP include the following personnel:

2.3.1 Laboratory Project Manager

The Laboratory Project Manager will report directly to the QA Officer and Project Manager and will be responsible for ensuring all resources of the laboratory are available on an as-required basis. The Laboratory Project Manager will also be responsible for the approval of the final analytical reports.

2.3.2 Laboratory Operations Manager

The Laboratory Operations Manager will report to the Laboratory Project Manager and will be responsible for coordinating laboratory analysis, supervising in-house chain-of-custody reports, scheduling sample analyses, overseeing data review and overseeing preparation of analytical reports.

2.3.3 Laboratory QA Officer

The Laboratory QA Officer will have sole responsibility for review and validation of the analytical laboratory data. The Laboratory QA Officer will provide Case Narrative descriptions of any data quality issues encountered during the analyses conducted by the laboratory. The QA Officer will also define appropriate QA procedures, overseeing QA/QC documentation.

2.3.4 Laboratory Sample Custodian

The Laboratory Sample Custodian will report to the Laboratory Operations Manager and will be responsible for the following:

- Receive and inspect the incoming sample containers;
- Record the condition of the incoming sample containers;
- Sign appropriate documents;
- Verify chain-of-custody and its correctness;
- Notify the Project Manager and Operations Manager of sample receipt and inspection;
- Assign a unique identification number and enter each into the sample receiving log;
- Initiate transfer of samples to laboratory analytical sections; and
- Control and monitor access/storage of samples and extracts.

2.3.5 Laboratory Technical Personnel

The laboratory technical staff will have the primary responsibility in the performance of sample analysis and the execution of the QA procedures developed to determine the data quality. These activities will

include the proper preparation and analysis of the project samples in accordance with the laboratory's Quality Assurance Manual (QAM) and associated Standard Operating Procedures (SOP).

2.4 FIELD RESPONSIBILITIES

2.4.1 Field Coordinator

The Field Coordinator is responsible for the overall operation of the field team and reports directly to the Project Manager. The Field Coordinator works with the project Health & Safety Officer (HSO) to conduct operations in compliance with the project Construction Health & Safety Plan (CHASP). The Field Coordinator will facilitate communication and coordinate efforts between the Project Manager and the field team members.

Other responsibilities include the following:

- Develop and implement field-related work plans, ensuring schedule compliance, and adhering to management-developed project requirements;
- Coordinate and manage field staff;
- Perform field system audits;
- Oversee quality control for technical data provided by the field staff;
- Prepare and approve text and graphics required for field team efforts;
- Coordinate and oversee technical efforts of subcontractors assisting the field team;
- Identify problems in the field; resolve difficulties in consultation with the Project QAO, and Project Manager; implement and document corrective action procedures; and,
- Participate in preparation of the final reports.

2.4.2 Field Team Personnel

Field Team Personnel will be responsible for the following:

- Perform field activities in compliance with the RAWP and QAPP.
- Immediately report any accidents and/or unsafe conditions to the Site Health & Safety Officer and take reasonable precautions to prevent injury.

3. Sampling Procedures

3.1 SAMPLE CONTAINERS

Sample containers for each sampling task will be provided by the laboratory performing the analysis. The containers will be cleaned by the manufacturer to meet or exceed the analyte specifications established in the U.S. EPA, "Specifications and Guidance for Obtaining Contaminant-Free Sample Containers", April 1992, OSWER Directive #9240.0-0.5A. Certificates of analysis for each lot of sample containers used will be maintained by the laboratory.

The appropriate sample containers, preservation method, maximum holding times, and handling requirements for each sampling task are provided in Table I.

3.2 SAMPLE LABELING

Each sample will be labeled with a unique sample identifier that will facilitate tracking and cross-referencing of sample. Equipment rinse blank and field duplicate samples will be numbered with a unique sample identifier to prevent analytical bias of field QC samples.

3.3 FIELD QC SAMPLE COLLECTION

3.3.1 Field Duplicate Sample Collection

3.3.1.1 Water Samples

Field duplicate samples will be collected by filling the first sample container to the proper level and sealing and then repeated for the second set of sample container.

1. The samples are properly labeled as specified in Section 3.2.
2. The samples are collected in order of decreasing analyte volatility.
3. Chain-of-custody documents are executed.
4. The samples will be handled as specified in Table I.

4. Custody Procedures

Sample custody is addressed in three parts: field sample collection, laboratory analysis and final project files. Custody of a sample begins when it is collected by or transferred to an individual and ends when that individual relinquishes or disposes of the sample.

A sample is under custody if:

1. The item is in actual possession of a person;
2. The item is in the view of the person after being in actual possession of the person;
3. The item was in actual possession and subsequently stored to prevent tampering; or
4. The item is in a designated and identified secure area.

4.1 FIELD CUSTODY PROCEDURES

Field personnel will keep written records of field activities on applicable preprinted field forms or in a bound field notebook to record data collecting activities. These records will be written legibly in ink and will contain pertinent field data and observations. Entry errors or changes will be crossed out with a single line, dated and initialed by the person making the correction. Field forms and notebooks will be periodically reviewed by the Field Coordinator.

The beginning of each entry in the logbook or preprinted field form will contain the following information:

- Date
- Start time
- Weather
- Names of field personnel (including subcontractors)
- Level of personal protection used at the Site
- Names of all visitors and the purpose of their visit.

For each measurement and sample collected, the following information will be recorded:

- Detailed description of sample location,
- Equipment used to collect sample or make measurement and the date equipment was calibrated,
- Time sample was collected,
- Description of the sample conditions,
- Depth sample was collected (if applicable),
- Volume and number of containers filled with the sample; and,
- Sampler's identification.

4.1.1 Field Procedures

The following procedure describes the process to maintain the integrity of the samples:

- Upon collection samples are placed in the proper containers. In general, samples collected for organic analysis will be placed in pre-cleaned glass containers and samples collected for inorganic analysis will be placed in pre-cleaned plastic (polyethylene) bottles.

- Samples will be assigned a unique sample number and will be affixed to a sample label.

- Samples will be properly and appropriately preserved by field personnel in order to minimize loss of the constituent(s) of interest due to physical, chemical or biological mechanisms.

- Appropriate volumes will be collected to ensure that the appropriate reporting limits can be successfully achieved and that the required QC sample analyses can be performed.

4.1.2 Transfer of Custody and Shipment Procedures

- A chain-of-custody (COC) record will be completed at the time of sample collection and will accompany each shipment of project samples to the laboratory. The field personnel collecting the samples will be responsible for the custody of the samples until the samples are relinquished to the laboratory. Sample transfer will require the individuals relinquishing and receiving the samples to sign, date and note the time of sample transfer on the COC record.

- Samples will be shipped or delivered in a timely fashion to the laboratory so that holding-times and/or analysis times as prescribed by the methodology can be met.

- Samples will be transported in containers (coolers) which will maintain the refrigeration temperature for those parameters for which refrigeration is required in the prescribed preservation protocols.

- Samples will be placed in an upright position and limited to one layer of samples per cooler. Additional bubble wrap or packaging material will be added to fill the cooler. Shipping containers will be secured with strapping tape and custody tape for shipment to the laboratory.

- When samples are split with the NYSDEC representatives, a separate chain-of-custody will be prepared and marked to indicate with whom the samples are shared. The person relinquishing the samples will require the representative's signature acknowledging sample receipt.

- If samples are sent by a commercial carrier, a bill of lading will be used. A copy of the bill of lading will be retained as part of the permanent record. Commercial carriers will not sign the custody record as long as the custody record is sealed inside the sample cooler and the custody tape remains intact.

- Samples will be picked up by a laboratory courier or transported to the laboratory the same day they are collected unless collected on a weekend or holiday. In these cases, the samples will be stored in a secure location until delivery to the laboratory. Additional ice will be added to the cooler as needed to maintain proper preservation temperatures.

4.2 LABORATORY CHAIN-OF-CUSTODY PROCEDURES

A sample custodian will be designated by the laboratory and will have the responsibility to receive all incoming samples. Once received, the custodian will document if the sample is received in good condition (i.e., unbroken, cooled, etc.) and that the associated paperwork, such as chain-of-custody forms have been completed. The custodian will sign the chain-of-custody forms.

The custodian will also document if sufficient sample volume has been received to complete the analytical program. The sample custodian will then place the samples into secure, limited access storage (refrigerated storage, if required). The sample custodian will assign a unique number to each incoming sample for use in the laboratory. The unique number will then be entered into the sample-receiving log with the verified time and date of receipt also noted.

Consistent with the analyses requested on the chain-of-custody form, analyses by the laboratory's analysts will begin in accordance with the appropriate methodologies. Samples will be removed from secure storage with internal chain-of-custody sign-out procedures followed.

4.3 STORAGE OF SAMPLES

Empty sample bottles will be returned to secure and limited access storage after the available volume has been consumed by the analysis. Upon completion of the entire analytical work effort, samples will be disposed of by the sample custodian. The length of time that samples are held will be at least thirty (30) days after reports have been submitted. Disposal of remaining samples will be completed in compliance with all Federal, State and local requirements.

4.4 FINAL PROJECT FILES CUSTODY PROCEDURES

The final project files will be the central repository for all documents with information relevant to sampling and analysis activities as described in this QAPP. The Haley & Aldrich Project Manager will be the custodian of the project file. The project files including all relevant records, reports, logs, field notebooks, pictures, subcontractor reports and data reviews will be maintained in a secured, limited access area and under custody of the Project Director or his designee.

The final project file will include the following:

- Project plans and drawings
- Field data records
- Sample identification documents and soil boring/monitoring well logs
- All chain-of-custody documentation
- Correspondence
- References, literature
- Laboratory data deliverables
- Data validation and assessment reports
- Progress reports, QA reports
- Final report

The laboratory will be responsible for maintaining analytical logbooks, laboratory data and sample chain of custody documents. Raw laboratory data files and copies of hard copy reports will be inventoried and maintained by the laboratory for a period of six (6) years at which time the laboratory will contact the Haley & Aldrich Project Manager regarding the disposition of the project related files.

5. Calibration Procedures and Frequency

5.1 FIELD INSTRUMENT CALIBRATION PROCEDURES

Several field instruments will be used for both on-site screening of samples and for health and safety monitoring, as described in the Health and Safety Plan (HASP). On-site air monitoring for health and safety purposes may be accomplished using a vapor detection device, such as a Photo-ionization Detector (PID).

Field instruments will be calibrated at the beginning of each day and checked during field activities to verify performance. Instrument specific calibration procedures will be performed in accordance with the instrument manufacturer's requirements.

5.2 LABORATORY INSTRUMENT CALIBRATION PROCEDURES

Reference materials of known purity and quality will be utilized for the analysis of environmental samples. The laboratory will carefully monitor the preparation and use of reference materials including solutions, standards and reagents through well-documented procedures.

All solid chemicals and acids/bases used by the laboratory will be rated as "reagent grade" or better. All gases will be "high" purity or better. All Standard Reference Materials (SRMs) or Performance Evaluation (PE) materials will be obtained from approved vendors of the National Institute of Standards and Technology (formerly National Bureau of Standards), the U.S. EPA Environmental Monitoring Support Laboratories (EMSL), or reliable Cooperative Research and Development Agreement (CRADA) certified commercial sources.

6. Analytical Procedures

Analytical procedures to be utilized for analysis of environmental samples will be based on referenced USEPA analytical protocols and/or project specific SOP.

6.1 FIELD ANALYTICAL PROCEDURES

Field analytical procedures include the measurement of pH, temperature, ORP, DO and specific conductivity during sampling of groundwater.

6.2 LABORATORY ANALYTICAL PROCEDURES

Laboratory analyses will be based on the U.S. EPA methodology requirements promulgated in:

- Method 8260B – Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

6.2.1 List of Project Target Compounds and Laboratory Detection Limits

The laboratory reporting limits (RLs) and associated method detection limits (MDLs) for the target analytes and compounds for the environmental media to be analyzed are presented in Table I. MDLs have been experimentally determined by the project laboratory using the method provided in 40 CFR, Part 136 Appendix B.

Laboratory parameters for soil samples are listed in the RAWP. Laboratory parameters for disposal samples will be determined by the disposal facility after an approved facility has been determined.

6.2.2 List of Method Specific Quality Control (QC) Criteria

The laboratory SOPs include a section that presents the minimum QC requirements for the project analyses. Section 7.0 references the frequency of the associated QC samples for each sampling effort and matrix.

7. Internal Quality Control Checks

This section presents the internal quality control checks that will be employed for field and laboratory measurements.

7.1 FIELD QUALITY CONTROL

7.1.1 Field Blanks

Internal quality control checks will include analysis of field blanks to validate equipment cleanliness. Whenever possible, dedicated equipment will be employed to reduce the possibility of cross-contamination of samples.

7.1.2 Trip Blanks

Trip blanks samples will be prepared by the project laboratory using ASTM Type II or equivalent water placed within pre-cleaned 40 milliliter (ml) VOC vials equipped with Teflon septa. Trip blanks will accompany each sample delivery group (SDG) of environmental samples collected for analysis of VOCs.

Trip blank samples will be placed in each cooler that stores and transports project samples that are to be analyzed for VOCs.

7.2 LABORATORY PROCEDURES

Procedures which contribute to maintenance of overall laboratory quality assurance and control include appropriately cleaned sample containers, proper sample identification and logging, applicable sample preservation, storage and analysis within prescribed holding times, and use of controlled materials.

7.2.1 Field Duplicate Samples

The precision or reproducibility of the data generated will be monitored through the use of field duplicate samples. Field duplicate analysis will be performed at a frequency of 1 in 20 project samples.

Precision will be measured in terms of the absolute value of the relative percent difference (RPD) as expressed by the following equation:

$$RPD = [|R1-R2|/[(R1+R2)/2]] \; X \; 100\%$$

Acceptance criteria for duplicate analyses performed on solid matrices will be 100% and aqueous matrices will be 35%. RPD values outside these limits will require an evaluation of the sampling and/or analysis procedures by the project QA Officer and/or laboratory QA Director. Corrective actions may include re-analysis of additional sample aliquots and/or qualification of the data for use.

7.2.2 Matrix Spike Samples

Ten percent of each project sample matrix for each analytical method performed will be spiked with known concentrations of the specific target compounds/analytes.

The amount of the compound recovered from the sample compared to the amount added will be expressed as a percent recovery. The percent recovery of an analyte is an indication of the accuracy of an analysis within the site-specific sample matrix. Percent recovery will be calculated for MS/MSD using the following equation.

$$\%\ Recovery = \frac{Spiked\ Sample - Background}{Known\ Value\ of\ Spike} x100\%$$

If the quality control value falls outside the control limits (UCL or LCL) due to sample matrix effects, the results will be reported with appropriate data qualifiers. To determine the effect a non-compliant MS recovery has on the reported results, the recovery data will be evaluated as part of the validation process.

7.2.3 Laboratory Control Sample (LCS) Analyses

The laboratory will perform LCS analyses prepared from Standard Reference Materials (SRMs). The SRMs will be supplied from an independent manufacturer and traceable to NIST materials with known concentrations of each target analyte to be determined by the analytical methods performed. In cases where an independently supplied SRM is not available, the LCS may be prepared by the laboratory from a reagent lot other than that used for instrument calibration.

The laboratory will evaluate LCS analyses in terms of percent recovery using the most recent laboratory generated control limits.

LCS recoveries that do not meet acceptance criteria will be deemed invalid. Analysis of project samples will cease until an acceptable LCS analysis has been performed. If sample analysis is performed in association with an out-of-control LCS sample analysis, the data will be deemed invalid.

Corrective actions will be initiated by the Haley & Aldrich QA Officer and/or Laboratory QA Officer to investigate the problem. After the problem has been identified and corrected, the solution will be noted in the instrument run logbook and re-analysis of project samples will be performed, if possible.

The analytical anomaly will be noted in the sample delivery group (SDG) Case Narrative and reviewed by the data validator. The data validator will confirm that appropriate corrective actions were implemented and recommend the applicable use of the affected data.

7.2.4 Surrogate Compound/Internal Standard Recoveries

For VOCs, surrogates will be added to each sample prior to analysis to establish purge and trap efficiency. Quantitation will be accomplished via internal standardization techniques.

The recovery of surrogate compounds and internal standards will be monitored by laboratory personnel to assess possible site-specific matrix effects on instrument performance.

For semi-volatile organics analyses, surrogates will be added to the raw sample to assess extraction efficiency. Internal standards will be added to all sample extracts and instrument calibration standard immediately before analysis for quantitation via internal standardization techniques.

Method specific quality control (QC) limits are provided in the attached laboratory method SOPs. Surrogate compound/internal standard recoveries that do not fall within accepted QC limits for the analytical methodology performed will have the analytical results flagged with data qualifiers as appropriate by the laboratory and will not be noted in the laboratory report Case Narrative.

To ascertain the effect non-compliant surrogate compound/internal standard recoveries may have on the reported results, the recovery data will be evaluated as part of the validation process. The data validator will provide recommendations for corrective actions including but not limited to additional data qualification.

7.2.5 Calibration Verification Standards

Calibration verification (CV) standards will be utilized to confirm instrument calibrations and performance throughout the analytical process. CV standards will be prepared as prescribed by the respective analytical protocols. Continuing calibration will be verified by compliance with method-specific criteria prior to additional analysis of project samples.

Non-compliant analysis of CV standards will require immediate corrective action by the project laboratory QA officer and/or designated personnel. Corrective action may include re-analysis of each affected project sample, a detailed description of the problem, the corrective action undertaken, the person who performed the action, and the resolution of the problem.

7.2.6 Laboratory Method Blank Analyses

Method blank sample analysis will be performed as part of each analytical batch for each methodology performed. If target compounds are detected in the method blank samples, the reported results will be flagged by the laboratory in accordance with standard operating procedures. The data validator will provide recommendations for corrective actions including but not limited to additional data qualification.

8. Data Quality Objectives

Sampling that will be performed as described in the RAWP is designed to produce data of the quality necessary to achieve the minimum standard requirements of the field and laboratory analytical objectives described below. These data are being obtained with the primary objective to assess levels of contaminants of concern associated with the Site.

The overall project data quality objective (DQO) is to implement procedures for field data collection, sample collection, handling, and laboratory analysis and reporting that achieve the project objectives. The following section is a general discussion of the criteria that will be used to measure achievement of the project DQO.

8.1 PRECISION

8.1.1 Definition

Precision is defined as a quantitative measure of the degree to which two or more measurements are in agreement. Precision will be determined by collecting and analyzing field duplicate samples and by creating and analyzing laboratory duplicates from one or more of the field samples. The overall precision of measurement data is a mixture of sampling and analytical factors. The analytical results from the field duplicate samples will provide data on sampling precision. The results from duplicate samples created by the laboratory will provide data on analytical precision. The measurement of precision will be stated in terms of relative percent difference (RPD).

8.1.2 Field Precision Sample Objectives

Field precision will be assessed through collection and measurement of field duplicate samples at a rate of 1 duplicate per 20 investigative samples. The RPD criteria for the project field duplicate samples will be +/- 100% for soil, +/- 35 % for groundwater for parameters of analysis detected at concentrations greater than 5 times (5X) the laboratory reporting limit (RL).

8.1.3 Laboratory Precision Sample Objectives

Laboratory precision will be assessed through the analysis of laboratory control and laboratory control duplicate samples (LCS/LCSD) and matrix spike and matrix spike duplicate (MS/MSD) samples for groundwater and soil samples and the analysis of laboratory duplicate samples for air and soil vapor samples. Air and soil vapor laboratory duplicate sample analyses will be performed by analyzing the same SUMMA canister twice. The RPD criteria for the air/soil vapor laboratory duplicate samples will be +/- 35 % for parameters of analysis detected at concentrations greater than 5 times (5X) the laboratory reporting limit (RL).

8.2 ACCURACY

8.2.1 Definition

Accuracy relates to the bias in a measurement system. Bias is the difference between the observed and the "true" value. Sources of error are the sampling process, field contamination, preservation techniques, sample handling, sample matrix, sample preparation and analytical procedure limitations.

8.2.2 Field Accuracy Objectives

Sampling bias will be assessed by evaluating the results of field equipment rinse and trip blanks. Equipment rinse and trip blanks will be collected as appropriate based on sampling and analytical methods for each sampling effort.

If non-dedicated sampling equipment is used, equipment rinse blanks will be collected by passing ASTM Type II water over and/or through the respective sampling equipment utilized during each sampling effort. One equipment rinse blank will be collected for each type of non-dedicated sampling equipment used for the sampling effort. Equipment rinse blanks will be analyzed for each target parameter for the respective sampling effort for which environmental media have been collected. (Note: If dedicated or disposable sampling equipment is used, equipment rinse samples will not be collected as part of that field effort.)

Trip blank samples will be prepared by the laboratory and provided with each shipping container that includes containers for the collection of groundwater samples for the analysis of VOC. Trip blank samples will be analyzed for each VOC for which groundwater samples have been collected for analysis.

8.3 LABORATORY ACCURACY OBJECTIVES

Analytical bias will be assessed through the use of laboratory control samples (LCS) and Site-specific matrix spike (MS) sample analyses. LCS analyses will be performed with each analytical batch of project samples to determine the accuracy of the analytical system.

One (1) set of MS/MSD analyses will be performed with each batch of twenty (20) project samples collected for analysis to assess the accuracy of the identification and quantification of analytes within the Site-specific sample matrices. Additional sample volume will be collected at sample locations selected for the preparation of MS/MSD samples so that the standard laboratory reporting limits (RLs) are achieved.

The accuracy of analyses that include a sample extraction procedure will be evaluated through the use of system monitoring or surrogate compounds. Surrogate compounds will be added to each sample, standard, blank, and QC sample prior to sample preparation and analysis. Surrogate compound percent recoveries will provide information on the effect of the sample matrix on the accuracy of the analyses.

8.4 REPRESENTATIVENESS

8.4.1 Definition

Representativeness expresses the degree to which sample data represent a characteristic of a population, a parameter variation at a sampling point or an environmental condition. Representativeness is a qualitative parameter that is dependent upon the design of the sampling program. The representativeness criterion is satisfied through the proper selection of sampling

locations, the quantity of samples and the use of appropriate procedures to collect and analyze the samples.

8.4.2 Measures to Ensure Representativeness of Field Data

Representativeness will be addressed by prescribing sampling techniques and the rationale used to select sampling locations. Sampling locations may be biased (based on existing data, instrument surveys, observations, etc.) or unbiased (completely random or stratified-random approaches).

8.5 COMPLETENESS

8.5.1 Definition

Completeness is a measure of the amount of valid (usable) data obtained from a measuring system compared to the total amount of the anticipated to be obtained. The completeness goal for all data uses is that a sufficient amount of valid data be generated so that determinations can be made related to the intended data use with a sufficient degree of confidence.

8.5.2 Field Completeness Objectives

Completeness is a measure of the amount of valid measurements obtained from measurements taken in this project versus the number planned. Field completeness objective for this project will be greater than (>) 90%.

8.5.3 Laboratory Completeness Objectives

Laboratory data completeness objective is a measure of the amount of valid data obtained from laboratory measurements. The evaluation of the data completeness will be performed at the conclusion of each sampling and analysis effort.

The completeness of the data generated will be determined by comparing the amount of valid data, based on independent validation, with the total laboratory data set. The completeness goal will be >90%.

8.6 COMPARABILITY

8.6.1 Definition

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another.

8.6.2 Measures to Ensure Comparability of Laboratory Data

Comparability of laboratory data will be measured from the analysis of Standard Reference Materials (SRM) obtained from either EPA Cooperative Research and Development Agreement (CRADA) suppliers or the National Institute of Standards and Technology (NIST). The reported analytical data will also be presented in standard units of mass of contaminant within a known volume of environmental media. The standard units for various sample matrices are as follows:

- Solid Matrices – mg/kg of media (Dry Weight).
- Aqueous Matrices – ng/L for PFAS analyses, ug/L of media for organic analyses, and mg/L for inorganic analyses.

8.7 LEVEL OF QUALITY CONTROL EFFORT

If non-dedicated sampling equipment is used, equipment rinse blanks will be prepared by field personnel and submitted for analysis of target parameters. Equipment rinse blank samples will be analyzed to check for potential cross-contamination between sampling locations that may be introduced during the investigation. One (1) equipment rinse blank will be collected per sampling event to the extent that non-dedicated sampling equipment is used.

If necessary, A separate equipment rinse blank sample will be collected for PFAS using the sample collection procedure described in Section 8.1.1 of the NYSDEC-approved Avangrid Field Sampling Plan. (Note: If dedicated or disposable sampling equipment is used, equipment rinse samples will not be collected as part of that field effort.)

Trip blanks will be used to assess the potential for contamination during sample storage and shipment. Trip blanks will be provided with the sample containers to be used for the collection of groundwater samples for the analysis of VOC. Trip blanks will be preserved and handled in the same manner as the project samples. One (1) trip blank will be included along with each shipping container containing project samples to be analyzed for VOC.

Method blank samples will be prepared by the laboratory and analyzed concurrently with all project samples to assess potential contamination introduced during the analytical process.

Field duplicate samples will be collected and analyzed to determine sampling and analytical reproducibility. One (1) field duplicate will be collected for every 20 or fewer investigative samples collected for off-Site laboratory analysis.

Matrix spikes will provide information to assess the precision and accuracy of the analysis of the target parameters within the environmental media collected. One (1) matrix spike/matrix spike duplicate (MS/MSD) will be collected for every 20 or fewer investigative samples per sample matrix.

(Note: Soil MS/MSD samples require triple sample volume for VOC only. Aqueous MS/MSD samples require triple the normal sample volume for VOC analysis and double the volume for the remaining parameters.)

9. Data Reduction, Validation and Reporting

Data generated by the laboratory operation will be reduced and validated prior to reporting in accordance with the following procedures:

9.1 DATA REDUCTION

9.1.1 Field Data Reduction Procedures

Field data reduction procedures will be minimal in scope compared to those implemented in the laboratory setting. The pH, conductivity, temperature, turbidity, DO, ORP and breathing zone VOC readings collected in the field will be generated from direct read instruments. The data will be written into field logbooks immediately after measurements are taken. If errors are made, data will be legibly crossed out, initialed and dated by the field member, and corrected in a space adjacent to the original entry.

9.1.2 Laboratory Data Reduction Procedures

Laboratory data reduction procedures are provided by the appropriate chapter of USEPA, "Test Methods for Evaluating Solid Waste", SW-846, Third Edition. Errors will be noted; corrections made with the original notations crossed out legibly. Analytical results for soil samples will be calculated and reported on a dry weight basis.

9.1.3 Quality Control Data

Quality control data (e.g., laboratory duplicates, surrogates, matrix spikes, and matrix spike duplicates) will be compared to the method acceptance criteria. Data determined to be acceptable will be entered into the laboratory information management system.

Unacceptable data will be appropriately qualified in the project report. Case narratives will be prepared which will include information concerning data that fell outside acceptance limits and any other anomalous conditions encountered during sample analysis.

9.2 DATA VALIDATION

Data validation procedures of the analytical data will be performed by the Haley & Aldrich QA Officer or designee using the following documents as guidance for the review process:

- "U.S. EPA National Functional Guidelines for Organic Data Review", and the "U.S. EPA National Functional Guidelines for Inorganic Data Review".

- The specific data qualifiers used will be applied to the reported results as presented and defined in the EPA National Functional Guidelines. Validation will be performed by qualified personnel at the direction of the Haley & Aldrich QAO. Tier 1 data validation (the equivalent of USEPA's Stage 2A validation) will be performed to evaluate data quality.

- The completeness of each data package will be evaluated by the Data Validator. Completeness checks will be administered on all data to determine that the deliverables are consistent with

the NYSDEC Analytical Services Protocol (ASP) Category A and Category B data package requirements. The validator will determine whether the required items are present and request copies of missing deliverables (if necessary) from the laboratory.

9.3 DATA REPORTING

Data reporting procedures will be carried out for field and laboratory operations as indicated below:

- Field Data Reporting: Field data reporting will be conducted principally through the transmission of report sheets containing tabulated results of measurements made in the field and documentation of field calibration activities.

- Laboratory Data Reporting: The laboratory data reporting package will enable data validation based on the protocols described above. The final laboratory data report format will include the QA/QC sample analysis deliverables to enable the development of a data usability summary report (DUSR).

10. Performance and System Audits

A performance audit is an independent quantitative comparison with data routinely obtained in the field or the laboratory. Performance audits include two separate, independent parts: internal and external audits.

10.1 FIELD PERFORMANCE AND SYSTEM AUDITS

10.1.1 Internal Field Audit Responsibilities

Internal audits of field activities will be initiated at the discretion of the Project Manager and will include the review of sampling and field measurements. The audits will verify that all procedures are being followed. Internal field audits will be conducted periodically during the project. The audits will include examination of the following:

- Field sampling records, screening results, instrument operating records
- Sample collection
- Handling and packaging in compliance with procedures
- Maintenance of QA procedures
- Chain-of-custody reports

10.1.2 External Field Audit Responsibilities

External audits may be conducted by the Project Coordinator at any time during the field operations. These audits may or may not be announced and are at the discretion of the NYSDEC. The external field audits can include (but are not limited to) the following:

- Sampling equipment decontamination procedures
- Sample bottle preparation procedures
- Sampling procedures
- Examination of health and safety plans
- Procedures for verification of field duplicates
- Field screening practices

10.2 LABORATORY PERFORMANCE AND SYSTEM AUDITS

10.2.1 Internal Laboratory Audit Responsibilities

The laboratory system audits are typically conducted by the laboratory QA Officer or designee on an annual basis. The system audit will include an examination of laboratory documentation including sample receiving logs, sample storage, chain-of-custody procedures, sample preparation and analysis and instrument operating records.

At the conclusion of internal system audits, reports will be provided to the laboratory's operating divisions for appropriate comment and remedial/corrective action where necessary. Records of audits and corrective actions will be maintained by the Laboratory QA Officer.

10.2.2 External Laboratory Audit Responsibilities

External audits will be conducted as required, by the NYSDOH or designee. External audits may include any of the following:

- Review of laboratory analytical procedures
- Laboratory on-site visits
- Submission of performance evaluation samples for analysis

Failure of any of the above audit procedures can lead to laboratory de-certification. An audit may consist of but not limited to:

- Sample receipt procedures
- Custody, sample security and log-in procedures
- Review of instrument calibration logs
- Review of QA procedures
- Review of log books
- Review of analytical SOPs
- Personnel interviews

A review of a data package from samples recently analyzed by the laboratory can include (but not be limited to) the following:

- Comparison of resulting data to the SOP or method
- Verification of initial and continuing calibrations within control limits
- Verification of surrogate recoveries and instrument timing results
- Review of extended quantitation reports for comparisons of library spectra to instrument spectra, where applicable
- Assurance that samples are run within holding times

11. Preventive Maintenance

11.1 FIELD INSTRUMENT PREVENTIVE MAINTENANCE

The field equipment preventive maintenance program is designed to ensure the effective completion of the sampling effort and to minimize equipment down time. Program implementation is concentrated in three areas:

- Maintenance responsibilities
- Maintenance schedules
- Inventory of critical spare parts and equipment

The maintenance responsibilities for field equipment will be assigned to the task leaders in charge of specific field operations. Field personnel will be responsible for daily field checks and calibrations and for reporting any problems with the equipment. The maintenance schedule will follow the manufacturer's recommendations. In addition, the field personnel will be responsible for determining that an inventory of spare parts will be maintained with the field equipment. The inventory will primarily contain parts that are subject to frequent failure, have limited useful lifetimes and/or cannot be obtained in a timely manner.

11.2 LABORATORY INSTRUMENT PREVENTIVE MAINTENANCE

Analytical instruments at the laboratory will undergo routine and/or preventive maintenance. The extent of the preventive maintenance will be a function of the complexity of the equipment.

Generally, annual preventive maintenance service will involve cleaning, adjusting, inspecting and testing procedures designed to deduce instrument failure and/or extend useful instrument life. Between visits, routine operator maintenance and cleaning will be performed according to manufacturer's specifications by laboratory personnel.

Maintenance records will be placed on file at the laboratory and can be made available upon request.

12. Specific Routine Procedures Used to Assess Data Precision, Accuracy, and Completeness

12.1 FIELD MEASUREMENTS

Field generated information will be reviewed by the Field Coordinator and typically include evaluation of bound logbooks/forms, data entry and calculation checks. Field data will be assessed by the Project Coordinator who will review the field results for compliance with the established QC criteria that are specified in Section 7.0 of this QAPP. The accuracy of pH and specific conductance will be assessed using daily instrument calibration, calibration check, and blank data. Accuracy will be measured by determining the percent recovery (% R) of calibration check standards. Precision of the pH and specific conductance measurements will be assessed on the basis of the reproducibility of duplicate readings of a field sample and will be measured by determining the relative percent difference (RPD). Accuracy and precision of the soil VOC screening will be determined using duplicate readings of calibration checks. Field data completeness will be calculated using the following equation:

$$\text{Completeness} = \frac{\text{Valid (usable) Data Obtained}}{\text{Total Data Planned}} \text{ X } 100$$

12.2 LABORATORY DATA

Surrogate, internal standard and matrix spike recoveries will be used to evaluate data quality. The laboratory quality assurance/quality control program will include the following elements:

- Precision, in terms of relative percent difference (RPD), will be determined by relative sample analysis at a frequency of one duplicate analysis for each batch of ten project samples or a frequency of 10 percent (10%). RPD is defined as the absolute difference of duplicate measurements divided by the mean of these analyses normalized to percentage.

- Accuracy, in terms of percent recovery (recovery of known constituent additions or surrogate recoveries), will be determined by the analysis of spiked and unspiked samples. MS/MSD will be used to determine analytical accuracy. The frequency of MS/MSD analyses will be one project sample MS/MSD per set of 20 project samples.

- One method blank will be prepared and analyzed with each batch of project samples. The total number of method blank sample analyses will be determined by the laboratory analytical batch size.

- Standard Reference Materials (SRMs) will be used for each analysis. Sources of SRM's include the U.S. EPA, commercially available material from CRADA certified vendors and/or laboratory produced solutions. SRMs, when available and appropriate, will be processed and analyzed on a frequency of one per set of samples.

- Completeness is the evaluation of the amount of valid data generated versus the total set of data produced from a particular sampling and analysis event. Valid data is determined by independent confirmation of compliance with method-specific and project-specific data quality

objectives. The calculation of data set completeness will be performed by the following equation.

$$\frac{Number\ of\ Valid\ Sample\ Results}{Total\ Number\ of\ Samples\ Planned} X\ 100 = \%\ Complete$$

13. Quality Assurance (QA) Reports

Critically important to the successful implementation of the QA Plan is a reporting system that provides the means by which the program can be reviewed, problems identified, and programmatic changes made to improve the plan.

QA reports to management can include:

- Audit reports, internal and external audits with responses
- Performance evaluation sample results; internal and external sources
- Daily QA/QC exception reports/corrective actions

QA/QC corrective action reports will be prepared by the Haley & Aldrich QA Officer when appropriate and presented to the project and/or laboratory management personnel so that performance criteria can be monitored for all analyses from each analytical department. The updated trend/QA charts prepared by the laboratory QA personnel will be distributed and reviewed by various levels of the laboratory management.

References

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4. United States Environmental Protection Agency, (1992). Specifications and Guidance for Contaminant-Free Sample Containers. OSWER Directive 9240.0-05A, April 1992.

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8. New York State Department of Environmental Conservation, NYSDEC Analytical Services Protocol (ASP), Bureau of Environmental Investigation, 1991 with updates.

9. New York State Department of Environmental Conservation, NYSDEC, Division of Environmental Remediation, Technical Guidance for Site Investigation and Remediation, DER-10, May 2010.

TABLES

TABLE I
SUMMARY OF ANALYSIS METHOD, PRESERVATION METHOD, HOLDING TIME, AND SAMPLE CONTAINERS
8 Walworth Street
Brooklyn, NY

Analysis/Method	Sample Type	Preservation	Holding Time	Container
Volatile Organic Compounds/8260C	Soil	1 - 1 Vial MeOH/2 Vial Water	14 days	3 - 40ml glass vials
Polychlorinated Biphenyls/8082A	Soil	Cool, 4 ± 2 °C	14 days	1 - 8 oz Glass
Metals/6010D	Soil	Cool, 4 ± 2 °C	180 days	1 - 2 oz Glass
1,4-Dioxane/8270 SIM	Soil	Cool, 4 ± 2 °C	7 days	1 - 8 oz Glass
PFAS/537	Soil	H2O Cool, 4 ± 2 °C	14 days	1 - 8 oz Glass
Volatile Organic Compounds/8260C	Groundwater	HCl, Cool, 4 ± 2 °C	14 days	3 - 40ml glass vials
Polychlorinated Biphenyls/8082A	Groundwater	Cool, 4 ± 2 °C	14 days	1 - 500 mL plastic bottle
1,4-Dioxane/8270 SIM	Groundwater	Cool, 4 ± 2 °C	7 days	3 - 40ml glass vials
PFAS 537	Groundwater	H2O Cool, 4 ± 2 °C	14 days	2 - teflon free 250 ml plastic containers

Notes:
1. Refer to text for additional information.

APPENDIX I

Estimated Remedial Action Project Schedule

Appendix I
Estimated Remedial Action Project Schedule
8 Walworth Street
Brooklyn, New York
NYSDEC BCP Site C224239

ESTIMATED PROJECT SCHEDULE		2021			2022											
Task	**Description**	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1	NYSDEC RAWP Review															
2	45-Day Public Comment Period															
3	Implementation of RAWP															
4	Continued Groundwater Monitoring															
5	Preparation of FER and SMP															
6	NYSDEC & NYSDOH Review of FER & SMP															
7	Issuance of COC															

Notes:
1. Schedule is estimated and subject to change.
2. Implementation of RAWP does not include completion of building construction
3. NYSDEC - New York State Department of Environmental Conservation
4. NYSDOH - New York State Department of Health
5. BCP - Brownfield Cleanup Program
6. RAWP - Remedial Action Work Plan
7. FER - Final Engineering Report
8. SMP - Site Management Plan
9. COC - Certificate of Completion
10. COC issuance estimated for prior to December 31, 2022
11. The groundwater monitoring program will be ongoing and detailed in the SMP.