DRAFT REMEDIAL ACTION WORK PLAN
65 ECKFORD STREET
BROOKLYN, NY
NYSDEC SITE C224218

PREPARED FOR
65-73 ECKFORD REALTY LLC
266 BROADWAY, SUITE 301
BROOKLYN, NEW YORK

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File No. 0202156-002

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30 March 2022
File No. 0202156-002

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

Attention: Mr. Bob Corcoran

Subject: Draft Remedial Action Work Plan
Former Carter Spray Finishing Corp.
65 Eckford Street
Brooklyn, New York
BCP Site C224218

Dear Mr. Corcoran:

On behalf of 65-73 Eckford Realty LLC, Haley & Aldrich of New York ("Haley & Aldrich") is pleased to submit this draft Remedial Action Work Plan (RAWP) for the above referenced subject site ("Site"). This document is being submitted under a Brownfield Cleanup Program (BCP) Agreement (Site No. #C224218), which was amended in January 2017 between the New York State Department of Environmental Conservation (NYSDEC) and 65-73 Eckford Realty LLC (the Volunteer).

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.

Please contact the undersigned if you have any questions or require additional information regarding this draft RAWP.

Sincerely yours,
HALEY & ALDRICH OF NEW YORK

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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).

Final Submission Will Be Certified

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

I, James M. Bellew, 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).

Final Submission Will Be Certified

James M. Bellew *Date*

Executive Summary

This Remedial Action Work Plan (RAWP) was developed by Haley & Aldrich of New York (Haley & Aldrich) on behalf of 65-73 Eckford Realty LLC (the Volunteer) for the proposed development located at 65 Eckford Street (Block 2266 Lot 39) within the Greenpoint neighborhood of Brooklyn, New York (the Site).

In January 2017, 65-73 Eckford Realty LLC filed an application with the New York State Department of Environmental Conservation (NYSDEC) to amend the existing application (Site No. C224218) which included removal of the previous applicant and addition of new ownership information. The updated Brownfield Cleanup Program (BCP) application was approved by NYSDEC with 65-73 Eckford Realty LLC as the Volunteer. The Volunteer proposes to remediate and redevelop the Site for residential use.

This RAWP summarizes the nature and extent of contamination on the Site as determined from data gathered during the Remedial Investigation (RI) performed by Environmental Business Consultants (EBC) in December 2015 and during the Supplemental Remedial Investigation (SRI) performed by Haley & Aldrich from 27 December 2021 through 14 January 2022. It provides an evaluation of a Track 1 cleanup and other applicable remedial action alternatives, their associated costs, and the recommended and preferred remedy. The remedies described in this document are 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, regulations, and requirements.

SITE DESCRIPTION AND SITE HISTORY

The Site, identified as Block 2698, Lot 26 on the New York City tax map, is 10,200-square feet and is bound to the north by a four-story residential building, to the east by Eckford followed by residential apartment buildings, to the south by a residential apartment building currently in construction (enrolled in the NYSDEC BCP Program as Site Number C224218), and to the west by a four-story residential building and a one-story industrial building. The Site location is shown on Figure 1. Existing Site features are shown on Figure 2. A site survey map is provided in Appendix A.

The Site is located in an urban area surrounded by commercial, residential, and industrial properties served by municipal water. The land is currently located within a MX-8 Special Mixed-Use District (MX) and zoned as M1-2/R6A for “medium-density apartment house districts,” which allows for residential use. The Site owner plans to continue site use for residential purposes consistent with current zoning. A copy of the zoning map is included in Appendix F.

The Site is listed with an environmental E-Designation, E-138 – Greenpoint/Williamsburg rezoning action (CEQR 04DCP003K). The requirements under the E-Designation program are satisfaction of the requirements for Hazardous Material components with the New York City Office of Environmental Remediation (NYCOER).

The Site was developed between 1905 and 1916 and improved with several one-story manufacturing buildings occupied by the Meisel Danowitz & Co. woodworking operation. The Site was redeveloped by 1916 with a 1-2 story building and had been utilized by several industrial operations including a machine shop, wood box manufacturing facility, automobile parking garage, and metal finishing facility. Records

indicate that former operations utilized underground gasoline storage tanks that were located in the northeast portion of the Site. The Site was occupied by the Carter Spray Finishing Corporation from 1960 to 2008 which used the building for metal finishing and spraying. The building was razed in 2015. The Site was subject to multiple subsurface investigations and construction of a five-story hotel on the Site began in 2018. Construction included excavation, transportation of soil for off-site disposal, and the installation of a secant pile wall along the perimeter of the Site. Construction of the hotel was not completed. Currently, the Site is excavated to approximately 5 to 6 feet below grade Site wide and remains vacant. The current owner, 65-73 Eckford Realty LLC, purchased the Site from Z65 Realty LLC in July 2016.

The area surrounding the Site was historically used for residential dwellings, light manufacturing, and warehousing from the late 1800s through the mid-2000s. From the mid-2000s, the area was primarily used for commercial/residential purposes.

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 and the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006 and subsequent updates). The objective of the SRI was to determine the nature and extent of contamination in soil, groundwater, and soil vapor. The SRI was performed from 27 December 2021 through 14 January 2022.

The SRI consisted of the following:

- Advancement of twelve soil borings to 20 to 21 ft below sidewalk grade with samples collected at the current ground surface (approximately 4 to 5 ft below sidewalk grade), from the surface to 2 inches below current grade (variable throughout the Site) and from the native soil layer from 18 to 20 ft below sidewalk grade. A total of 24 soil samples were collected (plus quality assurance/quality control [QA/QC] samples) for laboratory analysis;
- Installation of five two-inch groundwater monitoring wells to a depth of 18 to 20 below sidewalk grade and the collection of five groundwater samples (plus QA/QC samples);
- Installation of five soil vapor probes to a depth of approximately 6 to 7 ft below sidewalk grade and the collection of five soil vapor samples.

A summary of environmental findings of the Supplemental Remedial Investigation includes the following:

1. The Site's stratigraphy, from the current ground surface down, consists of urban fill generally consisting of brown to dark brown, medium to fine silty sand with varying amounts of loose gravel, asphalt, brick, cinders, and plastic was observed from current grade to depths extending approximately 3 to 4 ft (approximately 8 to 9 ft below sidewalk grade). The urban fill layer was underlain by a potential native layer consisting of gray to dark gray medium to fine silty sand with varying amounts of coarse sand and clay to depths extending approximately 11 to 12 ft (16 to 17 ft below sidewalk grade). Following this native layer was an organic/peat layer observed up to the terminus depth of each soil boring, ranging from 15 to 16 ft (20 to 21 ft from sidewalk grade).

2. Groundwater was encountered at depths ranging from 9 to 10 ft from sidewalk grade, and groundwater beneath the Site generally flows to the west-northwest.

3. Soil analytical results were compared to UUSCOs and RRSCOs. Soil analytical results are summarized below:

   Volatile Organic Compounds

   Acetone (maximum concentration 0.8 mg/kg in SB-12 (18-20') was identified above the UUSCO (0.5 mg/kg), but below the RRSCO (100 mg/kg), in eleven soil samples analyzed. 2-Butanone was identified in one soil sample, SB-12 (18-20'), at a concentration of 0.16 mg/kg, which is above the UUSCO (0.12 mg/kg), but below the RRSCO (100 mg/kg).

   Two CVOCs, cis-1,2-dichloroethene and trichloroethene, were identified in SB-04 (0-2") at concentrations of 0.33 mg/kg and 0.5 mg/kg, respectively, which is above the UUSCOs (0.25 mg/kg and 0.47 mg/kg, respectively), but below the RRSCOs (100 mg/kg and 21 mg/kg, respectively).

   No other VOC concentrations exceeded UUSCOs or RRSCOs in soil samples analyzed.

   Semi-Volatile Organic Compounds

   Two SVOCs including 3-methylphenol/4-methylphenol (maximum concentration 1.1 mg/kg in SB-06 (0-2") and indeno(1,2,3-cd)pyrene (maximum concentration of 1.8 mg/kg in SB-10 (18-20') were identified in several soil samples above UUSCOs (0.33 mg/kg and 0.5 mg/kg, respectively) and RRSCOs, (100 mg/kg and 0.5 mg/kg, respectively).

   In addition, 1,2-dichlorobenzene was identified in one soil sample, SB-05 (0-2" at a concentration of 2.3 mg/kg, which is above the UUSCO (1.1 mg/kg), but below the RRSCO (100 mg/kg). Three SVOCs including benzo(a)anthracene (concentration of 3.4 mg/kg), benzo(a)pyrene (concentration of 2.7 mg/kg), and benzo(b)fluoranthene (concentration of 3.7 mg/kg) were identified in SB-10 (18-20') at concentrations above the RRSCOs (all 1 mg/kg). Two SVOCs, benzo(k)fluoranthene and chrysene, were also identified in SB-10 (18-20') at concentrations of 1 mg/kg and 3.4 mg/kg, respectively, which is above the UUSCOs (0.8 mg/kg and 1 mg/kg, respectively), but below the RRSCO (both 3.9 mg/kg). No other SVOC concentrations exceeded UUSCOs or RRSCOS in soil samples analyzed.

   Metals

   Metals including arsenic [maximum concentration of 40.2 mg/kg in SB-06 (0-2")]; lead [maximum concentration of 1,240 mg/kg in SB-01 (0-2")]; and mercury [maximum concentration of 73.1 mg/kg in SB-12 (18-20')] were detected above RRSCOs (16 mg/kg, 400 mg/kg and 0.81 mg/kg, respectively) in three or more soil samples analyzed (both shallow and deep). Copper was detected in SB-06 (0-2") at a concentration of 556 mg/kg exceeding the RRSCO (170 mg/kg) and identified in up to 11 soil samples at concentrations exceeding UUSCOs.

Metals including nickel [maximum concentration of 48.6 mg/kg in SB-11 (18-20')] and zinc [maximum concentration of 576 mg/kg in SB-06 (0-2")] were detected in multiple soil samples analyzed above UUSCOs (30 mg/kg and 109 mg/kg).

Emerging Contaminants

1,4-dioxane was not detected above laboratory detection limits in soil samples analyzed.

Concentrations of PFOA [(maximum 0.175 nanograms per kilogram (ng/g) in SB-09 (18-20')] was detected above detection limits in six soil samples analyzed. PFOS was detected at a concentration of 0.155 ng/g in SB-04 (0-2") only.

The following PFAS compounds were detected above the laboratory detection limits in one or more the twenty-four soil samples analyzed:

- Perfluorobutanoic Acid (PFBA)
- 1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)
- Perfluorodecanesulfonic Acid (PFDS)
- Perfluorohexanesulfonic Acid (PFHxS)
- Perfluorotetradecanoic Acid (PFTA)

Total PFOA/PFAS compounds detected ranged from 0.057 ng/g in SB-05 (0-2") to 0.265 ng/g in SB-04 (0-2").

4. Groundwater analytical results were compared to NYSDEC AWQS.

Volatile Organic Compounds

Five petroleum VOCs including isopropylbenzene (maximum concentration of 40 µg/L in MW-01, AWQS 5 µg/L); n-Propylbenzene (maximum concentration of 50 µg/L in MW-01, AWQS 5 µg/L); sec-Butylbenzene (maximum concentration of 36 µg/L in MW-01, AWQS 5 µg/L); tert-Butylbenzene (maximum concentration of 10 µg/L in MW-01, AWQS 5 µg/L); and 1,2,4,5-Tetramethylbenzene (maximum concentration of 41 µg/L in MW-01, AWQS 5 µg/L) were detected in two or more groundwater samples above their respective NY-AWQS. Two VOCs, n-Butylbenzene and 1,2,4-Trimethylbenzene, were also detected in MW-01 at concentrations of 14 µg/L and 31 µg/L, respectively, above NY-AWQS (both 5 µg/L).

The following five VOCs were identified in MW-05 only at concentrations at or exceeding NY-AWQS: benzene at 1 µg/L (AWQS 1 µg/L), cis-1,2-dichloroethene at 69 µg/L (AWQS 5 µg/L), p/m-xylene at 10 µg/L (AWQS 5 µg/L), trichloroethene at 6.2 µg/L (AWQS 5 µg/L), and vinyl chloride at 51 µg/L (AWQS 2 µg/L).

Semi Volatile Organic Compounds

The following six SVOCS, specifically PAHS, were identified in two groundwater samples, MW-03 and MW-05, at concentrations exceeding NY-AWQS: benzo(a)anthracene (maximum concentration of 0.07 µg/L in MW-05, AWQS 0.002 µg/L); benzo(a)pyrene (maximum concentration of 0.04 µg/L in MW-05, AWQS 0 µg/L); benzo(b)fluoranthene (maximum concentration of 0.06 µg/L in MW-05, AWQS 0.002 µg/L), and chrysene (maximum

concentration of 0.05 µg/L in MW-05, AWQS 0.002 µg/L). Chrysene was also detected in MW-02 and MW-04 at concentrations of 0.01 µg/L and 0.05 µg/L, respectively, exceeding NY-AWQS. The SVOC indeno(1,2,3-cd)pyrene was detected in MW-03 only at a concentration of 0.05 µg/L, exceeding NY-AWQS (0.002 µg/L). Benzo(k)fluoranthene was detected in MW-03 and MW-05 both at a concentration of 0.02 µg/L, exceeding the NY-AWQS (0.002 µg/L). Bis(2-ethylhexyl)phthalate was detected in MW-04 only at a concentration of 5.4 µg/L, exceeding NY-AWQS (5 µg/L).

Metals

Four metals were identified in groundwater samples at concentrations exceeding the NY AWQS in groundwater samples collected at the Site. Arsenic concentrations exceeded the NY AWQS (25 µg/L) in one groundwater sample collected from MW-04 and the field duplicate collected from the same location (maximum concentration of 79.9 µg/L in MW-04); iron exceeded the NY AWQS (300 µg/L) in all five groundwater samples analyzed and the duplicate sample from MW-04 (maximum concentration 21,200 µg/L in MW-04); manganese exceeded the NY AWQS (300 µg/L) in three groundwater samples analyzed (maximum concentration 920.07 µg/L in MW-05); and sodium concentrations exceeded the NY AWQS (20,000 µg/L in all five groundwater samples analyzed plus the duplicate sample of MW-04 (maximum concentration of 94,000 µg/L in MW-03).

Emerging Contaminants

A groundwater cleanup regulatory criterion does not exist for 1,4-dioxane in New York State. Concentrations of 1,4-dioxane were compared to New York State's drinking water MCL of 1 µg/L. PFAS compounds in groundwater are compared to the NYSDEC June 2021 guidance values of 0.01 µg/L for individual PFAS (not PFOA or PFOS) compounds and 0.5 µg/L for total concentrations of PFAS (including PFOA and PFOS).

1,4-dioxane was detected at concentrations exceeding New York State's drinking water MCL of 1 µg/L in groundwater samples MW-01 and MW-05, at concentrations of 2.78 µg/L and 1.2 µg/L, respectively.

Perfluorooctanoic Acid (PFOA) was detected at concentrations exceeding the NYSDEC June 2021 guidance value of 0.01 µg/L in all five groundwater samples collected (plus one duplicate sample collected from MW-04). The maximum concentration of PFOA was identified at a concentration of 0.11 µg/L in MW-05. Total PFOA/PFAS concentrations in groundwater samples ranged from 0.0303 µg/L in MW-02 to 0.113 µg/L in MW-05, below the NYSDEC June 2021 guidance value of 0.5 µg/L.

5. No standard currently exists for soil vapor samples in New York State. Soil vapor analytical results were compared to the NYSDOH Air Guideline Values (AGV) and NYSDOH Final Guidance on Soil Vapor Intrusion, May 2017, Matrix A, B, and C specified in the NYSDOH guidance document.

   Total VOC concentrations in soil vapor samples ranged from 227.62 µg/m^3 in sample SV-02 to 13,047.7 µg/m^3 in sample SV-05. Total benzene, toluene, ethylbenzene, and xylenes (BTEX) concentrations ranged from 41.1 µg/m^3 in sample SV-05 to 132.2 µg/m^3 in sample SV-04.

CVOCs detected include TCE (maximum concentration of 9,670 µg/m^3), cis-1,2-dichloroethene (maximum concentration of 2,750 µg/m^3), and vinyl chloride (maximum concentration of 177 µg/m^3) were detected in all soil vapor samples, with the exception of SV-02. In addition, PCE was detected in soil vapor sample SV-05 at a concentration of 171 µg/m^3. In soil vapor samples SV-04 and SV-05, 1,1-dichloroethene was detected at concentrations of 12.9 µg/m^3 and 37.9 µg/m^3, respectively.

Other VOCs detected consist of the following:

- 1,1-dichloroethane detected in SV-02 (4.02 µg/m^3)
- 1,2,4-trimethylbenzne detected in all five samples (maximum concentration 27 µg/m^3 in SV-05)
- 1,3,5-trimethylbenzene detected in three samples (maximum concentration 9.83 µg/m^3 in SV-02)
- 1,3-butadiene detected in three samples (maximum concentration 4.42 µg/m^3 in SV-02)
- 2,2,4-trimethylpentane detected in SV-01 (71 µg/m^3)
- 2-butanone detected in four samples (maximum concentration of 24.6 µg/m^3 in SV-02)
- 4-ethyltoluene detected in two samples (maximum concentration 7.23 µg/m^3 in SV-04)
- acetone detected in all five samples (maximum concentration 72.7 µg/m^3 in SV-05)
- benzene detected in four samples, (maximum concentration 26 µg/m^3 in SV-04)
- carbon disulfide detected in four samples (maximum concentration of 15.8 µg/m^3 in SV-01)
- chloromethane detected in two samples (maximum concentration 1.85 µg/m^3 in SV-04)
- cyclohexane detected in SV-01 (24.2 µg/m^3)
- dichlorodifluoromethane detected in two samples (maximum concentration 2.43 µg/m^3 in SV-01)
- ethanol detected in two samples (maximum concentration of 52 µg/m^3 in SV-03)
- ethylbenzene detected in four samples (maximum concentration 14.3 µg/m^3 in SV-02)
- heptane detected in four samples (maximum concentration 20.3 µg/m^3 in SV-01)
- isopropanol detected in three samples (maximum concentration 21.3 µg/m^3 in SV-03)
- n-hexane detected in four samples (maximum concentration 50.8 µg/m^3 in SV-04)
- o-xylene detected in four samples (maximum concentration 16.4 µg/m^3 in SV-04)
- p/m-xylene detected in four samples (maximum concentration 40.3 µg/m^3 in SV-01)
- tertiary butyl alcohol detected in two samples (maximum concentration 10 µg/m^3 in SV-03)
- tetrahydrofuran detected in three samples (maximum concentration 14.7 µg/m^3 in SV-02)
- toluene detected in all five samples (maximum concentration 41.1 µg/m^3 in SV-05)
- trans,1,2-dichloroethene detected in four samples (maximum concentration 128 µg/m^3 in SV-05)

SUMMARY OF THE REMEDY

Alternative I, a Track 1 remedy, will include the following:

- Development and implementation of a CHASP and Community Air Monitoring Plan (CAMP) for the protection of on-site workers, community/residents, and the environment during remediation and construction activities.
- Design and construction of a support-of-excavation (SOE) system to facilitate the Track 1 remediation.
- Implementation of soil erosion, pollution, and sediment control measures in compliance with applicable laws and regulations.
- Removal of remaining miscellaneous debris on the Site.
- Decommission on-site monitoring wells in accordance with NYSDEC CP-43 Policy.
- Excavation, stockpiling, off-Site transport, and disposal of approximately 7,600 cubic yards of contaminated historical fill material that exceeds UUSCOs as defined by 6 NYCRR Part 375-6.8. Excavation will be to 25 ft below sidewalk grade (bottom of historical fill and soils impacted above UUSCOs) Site-wide. For development purposes, excavations are proposed to extend to about 25 ft below sidewalk grade in the roughly 10,200-square-foot building footprint.
- As part of waste characterization and for disposal purposes, a lateral and vertical delineation of hazardous lead centered on soil boring SB-05 (hazardous lead identified from the 18-20' sample) will be completed to facilitate off-site disposal of excavated soil/fill.
- 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.
- Continuing operation of the existing dewatering and treatment system designed by Ground/Water Treatment & Technology, LLC (GWTT) during excavation and remediation activities.
- 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 certified-clean material (i.e., meeting UUSCOs), recycled concrete aggregate (RCA), or virgin, native crushed stone.
- Upon completion of Track 1 excavation, an *in situ* chemical reductant (ISCR) reagent (DARAMEND®) will be mixed with approved backfill at the base of the excavation in the vicinity of the elevated CVOCs near MW-05 at the proposed development depth of 30 ft bgs providing contact with groundwater impacted with CVOCs.
- Construction of a composite cover system consisting of a minimum of 4 inches of clean subbase (recycled concrete aggregate or virgin stone) overlain by a 6-inch concrete slab and installation of a waterproofing/vapor barrier (20-mil thick) to mitigate the potential for a soil vapor exposure pathway.
- Collection and analysis of confirmation soil samples from the excavation base and, to the extent possible, sidewalls of the excavation in accordance with DER-10, to document post-excavation conditions to confirm a Track 1 remedy was achieved.
- Installation of two post-remedy monitoring wells to replace the decommissioned well MW-05 and one well installed downgradient. Post remedy collection and analysis of groundwater samples for VOCs in accordance with DER-10 following remedial excavation activities to document groundwater quality below the Site.

- 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.

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List of Acronyms and Abbreviations

A	
amsl	Above mean sea level
AOC	Area of Concern
ASP	Analytical Services Protocol
AWQS	Ambient Water Quality Standards
B	
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BTEX	Benzene, toluene, ethylbenzene, xylenes
C	
CAMP	Community Air Monitoring Plan
CHASP	Construction Health & Safety Plan
cis-1,2-DCE	cis-1,2-Dichloroethylene
COC	Contaminant of Concern
CP-51	Commissioners Policy-51 *(specifically "October 2010 NYSDEC Commissioners Policy 51")*
CPP	Citizen Participation Plan
CQAP	Construction Quality Assurance Plan
CSM	Conceptual Site Model
CVOC	Chlorinated Volatile Organic Compound
D	
DER-10	Division of Environmental Remediation-10 *(specifically "May 2010 NYSDEC Technical Guidance for Site Investigation and Remediation")*
DUSR	Data Usability Summary Report
E	
EE	Environmental Easement
ELAP	Environmental Laboratory Approval Program
F	
FER	Final Engineering Report
ft bgs	feet below ground surface
G	
GWQS	Groundwater Quality Standard
GWTT	Ground/Water Treatment & Technology, LLC
H	
Haley & Aldrich	Haley & Aldrich of New York
HAZWOPER	Hazardous Waste Operations and Emergency Response

List of Acronyms and Abbreviations (Continued)

I

IC	Institutional Control
ISCR	*In situ* Chemical Reductant

M

mg/kg	milligrams per kilogram
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µg/m^3	micrograms per cubic meter
ml/min	milliliter per minute

N

ng/L	nanograms per liter
NTU	Nephelometric Turbidity Unit
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health

O

OSHA	Occupational Health and Safety Administration

P

PAH	Polycyclic Aromatic Hydrocarbon
PBS	Petroleum Bulk Storage
PCB	Polychlorinated Biphenyl
PCE	Perchloroethylene/Tetrachloroethene
Ph II/RI	Phase II Remedial Investigation Report
PHFxA	Perfluorohexanoic Acid
PFOA/PFAS	Per- and polyfluoroalkyl substances
PID	Photoionization Detector
PPE	Personal Protective Equipment

Q

QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QHHEA	Qualitative Human Health Exposure Assessment

R

RA	Remedial Action
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCA	Recycled Concrete Aggregate
RCRA	Resource Conservation and Recovery Act

List of Acronyms and Abbreviations (Continued)

RE	Resident Engineer
RI	Remedial Investigation
RIWP	Remedial Investigation Work Plan
RRSCO	Restricted Residential Soil Cleanup Objective
S	
SCG	Standards, Criteria, and Guidelines
SCO	Soil Cleanup Objective
SDS	Safety Data Sheet
Site	65 Eckford Street, Brooklyn, New York
SMMP	Soil/Materials Management Plan
SMP	Site Management Plan
SOE	Support-of-Excavation
SRI	Supplemental Remedial Investigation
SVOC	Semi-Volatile Organic Compound
SWPPP	Stormwater Pollution Prevention Plan
T	
TAL	Total Analyte List
TCE	Trichloroethylene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOGS 1.1.1	Technical and Operational Guidance Series 1.1.1 *(Specifically "June 1998 NYSDEC Division of Water Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values, Class GA for the protection of a source of drinking water modified per the April 2000 addendum")*
TPH	Total Petroleum Hydrocarbons
U	
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
UUSCO	Unrestricted Use Soil Cleanup Objective
V	
VC	Vinyl Chloride
VOC	Volatile Organic Compound
W	
WQCA	Wastewater Quality Control Application

1. Introduction

This draft Remedial Action Work Plan (RAWP) was developed by Haley & Aldrich of New York (Haley & Aldrich) on behalf of 65-73 Eckford Realty LLC (the Volunteer) for the proposed development located at 65 Eckford Street (Block 2698, Lot 26) within the Greenpoint neighborhood of Brooklyn, New York (the Site).

In January 2017, 65-73 Eckford Realty LLC filed an application with the New York State Department of Environmental Conservation (NYSDEC) to amend the existing application (Site No. C224218) which included removal of the previous applicant and addition of new ownership information. The updated Brownfield Cleanup Program (BCP) application was approved by NYSDEC with 65-73 Eckford Realty LLC as the Volunteer. The Volunteer proposes to remediate and redevelop the Site for residential use.

This RAWP summarizes the nature and extent of contamination on the Site as determined from data gathered during the Remedial Investigation (RI) performed by Environmental Business Consultants (EBC) in December 2015 and during the Supplemental Remedial Investigation (SRI) performed by Haley & Aldrich from 27 December 2021 through 14 January 2022. It provides an evaluation of a Track 1 cleanup and other applicable remedial action alternatives, their associated costs, and the recommended and preferred remedy. The remedies described in this document are 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, regulations, and requirements.

1.1 SITE LOCATION AND DESCRIPTION

The Site, identified as Block 2698, Lot 26 on the New York City tax map, is 10,200-square feet and is bound to the north by a four-story residential building, to the east by Eckford followed by residential apartment buildings, to the south by a residential apartment building currently in construction (enrolled in the NYSDEC BCP Program as Site Number C224218), and to the west by a four-story residential building and a one-story industrial building. The Site location is shown on Figure 1. Existing Site features are shown on Figure 2. A site survey map is provided in Appendix A.

The Site is located in an urban area surrounded by commercial, residential, and industrial properties served by municipal water. The land is currently located within a MX-8 Special Mixed-Use District (MX) and zoned as M1-2/R6A for “medium-density apartment house districts,” which allows for residential use. The Site owner plans to continue site use for residential purposes consistent with current zoning. A copy of the zoning map is included in Appendix F.

The Site is listed with an environmental E-Designation, E-138 – Greenpoint/Williamsburg rezoning action (CEQR 04DCP003K). The requirements under the E-Designation program are satisfaction of the requirements for Hazardous Material components with the New York City Office of Environmental Remediation (NYCOER).

1.2 REDEVELOPMENT PLAN

The proposed redevelopment plan includes construction of a five-story residential building. The proposed structure includes a two-level cellar and consists of the following: a sub-cellar that will be utilized as recreational space, a library/study room, and for storage, and a cellar that will be utilized as recreational space, offices, and will contain refuse and mechanicals rooms. The first floor will contain a lobby and bike room and the second through fifth floors will be comprised of residential units. A bulkhead will extend above the roof level to 60 feet above ground level followed by an elevator bulkhead that will extend 64 feet above ground level. On-grade parking will be located in the rear of the building and accessed via Eckford Street. It is anticipated that the building footprint will encompass a roughly 10,092 square foot area of the Site. The proposed elevator pit will extend to a depth of approximately 29 feet below ground level. The gross area of the first floor will be 2,491 square feet (sf), and the gross areas of the upper floors will be approximately 5,461 sf. The proposed use is consistent with existing zoning for the property. Copies of proposed development plans are included in Appendix B.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The Site is located in a mixed-use commercial, residential and industrial area. The Site is bound to the north by a four-story residential building, to the east by Eckford followed by residential apartment buildings, to the south by a residential apartment building currently in construction, and to the west by a four-story residential building and a one-story industrial building.

Two public schools, John Ericsson Middle School 126 and Northside Charter High School, are located at 424 Leonard Avenue (approximately 700 feet to the south of the Site). No hospitals or daycare facilities are located within a 500-foot radius of the Site.

Direction	Adjoining properties	Surrounding Properties
North	Residential apartment building	Commercial storefronts and Driggs Avenue
South	Residential apartment building currently in construction	Residential apartment buildings
East	Eckford Street	Residential apartment buildings and commercial storefronts
West	Residential apartment building and industrial building	Leonard Street, residential apartment buildings and McCarron Park

Additionally, the following sensitive receptors are located within a one-half mile radius including schools and day cares listed below:

School/Day Care Name	Approximate distance from Site in feet and (directional)	Administrator	Phone	Address
John Ericsson Middle School 126	700' S	Maria Ortega	(718) 782-2527	424 Leonard Street, Brooklyn, NY 11222
Northside Charter High School	700’ S	Stanton Brown	(347) 390-1273	424 Leonard Street, Brooklyn, NY 11222
PS 110 – The Monitor	1750' E	Dana Raciunas	(718) 383-7600	124 Monitor Street, Brooklyn, NY 11222

A-Tech High School	1300' W	Neil Harris	(718) 218-9301	50 Bedford Avenue, Brooklyn, NY 11222
Ardor School for Passion-Based Learning	1550' W	N/A	N/A	29 Nassau Avenue, Brooklyn, NY 11222
French for Little Ones Playschool	1400' NW	N/A	(347) 263-6404	33 Nassau Avenue, Brooklyn, NY 11222
PS 34 – Oliver H. Perry Elementary	1500' N	Alain Beugoms	(718) 389-5842	131 Norman Avenue, Brooklyn, NY 11222
PS 031 – Samuel F. Dupont	2275' NW	Mary Scarlato	(718) 383-8998	75 Meserole Avenue, Brooklyn, NY, 11222

1.4 SITE HISTORY

The Site was developed between 1905 and 1916 and improved with several one-story manufacturing buildings occupied by the Meisel Danowitz & Co. woodworking operation. The Site was redeveloped by 1916 with a 1-2 story building and had been utilized by several industrial operations including a machine shop, wood box manufacturing facility, automobile parking garage, and metal finishing facility. Records indicate that former operations utilized underground gasoline storage tanks that were located in the northeast portion of the Site. The Site was occupied by the Carter Spray Finishing Corporation from 1960 to 2008 which used the building for metal finishing and spraying. The building was razed in 2015. The Site was subject to multiple subsurface investigations and construction of a five-story hotel on the Site began in 2018. Construction included excavation, transportation of soil for off-site disposal, and the installation of a secant pile wall along the perimeter of the Site. Construction of the hotel was not completed. Currently, the Site is excavated to approximately 5 to 6 feet below grade Site wide and remains vacant. The current owner, 65-73 Eckford Realty LLC, purchased the Site from Z65 Realty LLC in July 2016.

The area surrounding the Site was historically used for residential dwellings, light manufacturing, and warehousing from the late 1800s through the mid-2000s. From the mid-2000s, the area was primarily used for commercial/residential purposes.

1.5 PREVIOUS ENVIRONMENTAL REPORTS

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

1. Phase II Environmental Site Assessment, prepared by EBC, February and April 2015
2. Remedial Investigation Report (RIR), prepared by EBC, June 2016
3. Interim Remedial Measure Work Plan (IRM WP), prepared by EBC, January 2016
4. Corrective Action Work Plan, prepared by Haley & Aldrich, August 2021
5. Supplemental Remedial Investigation Report (SRIR), prepared by Haley & Aldrich, February 2022 (summarized in Section 2.0)
6. Interim Construction Completion Report (ICCR), prepared by Haley & Aldrich, February 2022

The February SRIR is summarized in Section 2.0 and included in Appendix C. Other previous environmental reports are summarized below.

February and April 2015 – Limited Phase II Environmental Site Assessment (EBC)

An initial Limited Phase II Environmental Site Assessment performed by EBC in February 2015 and included the following scope of work:

1. Installed two soil borings and collected soil samples for chemical analysis from the soil borings to evaluate soil quality; and,
2. Collected one groundwater sample for chemical analysis to evaluate groundwater quality.

Additional sampling was performed by EBC in April 2015 and included the following scope of work:

1. Installed three soil borings and collected soil samples for chemical analysis from the soil borings to evaluate soil quality; and,
2. Collected three groundwater samples for chemical analysis to evaluate groundwater quality.

Shallow soil samples representing the depth interval 0 to 2 feet below grade were collected from the historic fill layer and were analyzed for polychlorinated biphenyls (PCBs) and Target Analyte List (TAL) metals. Soil samples representing the depth interval 11 to 13 feet below grade were collected from the water table interface and analyzed for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). The laboratory results identified petroleum related VOCs above Unrestricted Use SCOs and Protection of Groundwater SCOs within the samples collected from the water table interface, including n-Propylbenzene, sec-Butylbenzene, tert-Butylbenzene, and Toluene. Trichloroethene (TCE) (1,100 ug/kg) was detected within one of the samples at the water table interface.

Petroleum-related VOCs were detected in the groundwater samples above groundwater quality standards (GQS). Petroleum-related VOCs detected above GQS includes 2-Isopropyltoluene, Isopropylbenzene, n-Butylbenzene, n-Propyl-benzene, sec-Butylbenzene, and tert-Butylbenzene.

SVOCs including Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, and Indeno(1,2,3-cd)pyrene were reported above Restricted Residential Use SCOs within the soil sample from soil boring B2 (11-13 ft).

June 2016 – Remedial Investigation Report (EBC)

A Remedial Investigation (RI) performed by EBC included the following scope of work:

1. Installed ten soil borings (15SB1 – 15SB10) and collected 31 soil samples for chemical analysis to evaluate soil quality;
2. Installed eight groundwater monitoring wells (15MW1 – 15MW8) and collected eight groundwater samples for chemical analysis to evaluate groundwater quality; and,
3. Installed seven soil vapor probes and collected seven samples for chemical analysis to evaluate the potential for vapor intrusion.

Soil samples collected at both 0 to 2 and 2 to 4 feet below grade were analyzed for VOCs, SVOCs, pesticides, PCBs, and TAL metals. Soil samples collected at 11 to 13 feet below grade (groundwater interface) were analyzed for VOCs and SVOCs. Soil samples collected at 18 to 20 feet below grade (native soil layer) were analyzed for VOCs, SVOCs, pesticides, PCBs, and TAL metals. Groundwater

samples were analyzed for VOCs, SVOCs, pesticides, PCBs, and TAL metals and dissolved metals. Soil vapor samples were analyzed for VOCs by EPA Method TO-15.

A summary of the environmental findings of the Remedial Investigation includes the following:

1. A 5- to 6-foot thick zone of petroleum VOC contamination was identified at the groundwater interface across the Site.
2. TCE impacted soil with the highest concentrations was detected in the shallow soil samples collected from the western portion of the Site.
3. A historic fill material layer extending to depths as deep as 13 feet below grade contained SVOCs and metals exceeding the commercial SCOs.
4. A native soil layer approximately 18 to 20 feet below grade contained elevated concentrations of both arsenic and mercury.
5. Petroleum related VOCs were detected above GQS in six of the eight groundwater samples.
6. Low levels of petroleum related VOCs were detected in soil vapor samples in addition to elevated concentrations of the chlorinated VOCs, TCE and PCE.

January 2016 – Interim Remedial Measure Work Plan (EBC/AMC)

AMC Engineering, PLLC (AMC) submitted an Interim Remedial Measure Work Plan (IRMWP) in October 2015 and revised in January 2016 outlining remedial measures to address soil and groundwater contamination on the Site. The objectives of the IRMWP included the following remedial measures:

1. Waste classification sampling
2. Installation of erosion and sediment control measures and a stabilized construction entrance
3. Installation of support of excavation and a groundwater cutoff wall (i.e., secant pile wall)
4. Removal of underground storage tanks
5. Removal of unregulated construction debris and scrap metal
6. Excavation to approximately 15 feet below grade surface
    a. Screening, segregation, transportation and disposal of historic fill
    b. Screening, segregation and disposal of petroleum contaminated soil
    c. Screening, segregation and disposal of native soil
7. Collection of confirmatory endpoint samples
8. Performance of community air monitoring
9. Submission of Electronic Data Deliverables and Data Usability Summary Reporting
10. Submission of a Construction Completion Report

August 2021 – Corrective Action Work Plan (Haley & Aldrich)

The objective of the Corrective Action Work Plan submitted by Haley & Aldrich in 2021 was to address the existing deficiencies in Site progression through the BCP and remedy non-compliant conditions at the Site derived from the incomplete execution of the IRM in 2018. The CAWP outlined the following tasks:

1. Establish soil erosion, pollution, and sediment control measures in compliance with applicable laws and regulations.

2. Restore the Site to pre-remediation conditions by removing vegetation and miscellaneous construction related debris.
3. Re-establishment of dewatering permit and dewatering system on the Site.
4. Collection of documentation samples.
5. Installation of a demarcation barrier.
6. Backfilling of the excavation to sidewalk grade.
7. Implementation of Community Air Monitoring during Corrective Action Measures.
8. Submission of DFRs to NYSDEC.

February 2022 - Supplemental Remedial Investigation Report (Haley & Aldrich)

Summarized in Section 2.0.

February 2022 – Interim Construction Completion Report (Haley & Aldrich)

An Interim Remedial Measure was submitted by Haley & Aldrich which included the following information:

1. Documentation of work performed under the Interim Remedial Measure Work Plan (by others) from 2018.
2. Summary of measures performed by the Site contractor to bring the Site into compliance with the NYSDEC and NYCDOB.

2. Description 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 and the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006 and subsequent updates). The objective of the SRI was to determine the nature and extent of contamination in soil, groundwater, and soil vapor. The SRI was performed from 27 December 2021 through 14 January 2022.

2.1 SUPPLEMENTAL REMEDIAL INVESTIGATION

The SRI consisted of the following:

- Advancement of twelve soil borings to 20 to 21 ft below sidewalk grade with samples collected at the surface, from the surface to 2 inches below current grade (variable throughout the Site) and from the native soil layer from 18 to 20 ft below sidewalk grade. A total of 24 soil samples were collected (plus quality assurance/quality control [QA/QC] samples) for laboratory analysis;
- Installation of five two-inch groundwater monitoring wells to a depth of 18 to 20 below sidewalk grade and the collection of five groundwater samples (plus QA/QC samples);
- Installation of five soil vapor probes to a depth of approximately 6 to 7 ft below sidewalk grade and the collection of five soil vapor samples.

2.1.1 Soil Investigation

Twelve borings were advanced to 20 to 21 ft below sidewalk grade using a track-mounted direct-push drill rig (Geoprobe®) operated by a licensed operator of Lakewood, the drilling subcontractor. 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 PID response was noted.

Generally, soil samples were collected from the surface at 0 to 2 inches below current grade (variable throughout the Site) and from the native soil layer from 18 to 20 ft below sidewalk grade. Soil borings SB-01 through SB-12 were sampled at various intervals (i.e. shallow and deep) and analyzed for toxicity characteristic leaching procedure (TCLP) lead. Soil boring SB-01 from 0 to 2 inches bgs and soil boring SB-10 from 18 to 20 ft bgs were also analyzed for TCLP mercury.

2.1.2 Groundwater Investigation

Five two-inch diameter monitoring wells were installed to 18 to 20 ft below sidewalk grade at each monitoring well location. Monitoring wells have a 2-inch annular space and were installed using certified clean sand fill and were installed with 10-foot-long slotted PVC screens to straddle the water table. Groundwater was encountered at depths ranging from approximately 9 to 10 ft below sidewalk grade, Monitoring wells were developed by surging a pump in the well several times to pull fine-grained material from the well. Development was not completed until the water turbidity was 50 nephelometric turbidity units (NTU) or less, or 10 well volumes were removed, if possible.

2.1.3 Soil Vapor Investigation

NYSDEC DER-10 requires an assessment of soil vapor for contaminated sites to evaluate the health risk associated with potential exposure to VOCs through vapor intrusion into occupied spaces. Five soil vapor probes were installed to assess soil vapor conditions.

Five soil vapor probes (SV-01 through SV-05) were installed by Lakewood Environmental Solutions using a direct-push drilling rig (Geoprobe®) to advance the stainless-steel probes to a depth of approximately 6 ft below sidewalk grade. The stainless-steel soil vapor probes were sealed with bentonite, and a tracer gas was used in accordance with NYSDOH protocols to serve as a QA/QC measure to verify the integrity of the soil vapor probe seal. In addition, one to three implant volumes were purged prior to the collection of the soil vapor samples. Sampling occurred for the duration of two hours. At the conclusion of the sampling round, tracer monitoring was performed a second time to confirm the integrity of the probe seals.

2.2 SAMPLES COLLECTED

During the SRI, a total of 24 soil samples (plus one duplicate for QA/QC) were collected from the surface at 0 to 2 inches below current grade (variable throughout the Site) and from the native soil layer from 18 to 20 feet below sidewalk grade. Samples were collected using laboratory-provided clean bottle ware, and VOC grab samples were collected using terra cores.

A total of five groundwater samples, one from each monitoring well, were collected for laboratory analysis. A field blank, one trip blank, a duplicate sample, and a MS/MSD sample were also collected for QA/QC purposes. Groundwater monitoring wells were sampled using low-flow sampling methods. Monitoring wells were purged, and physical and chemical parameters stabilized before samples were taken.

A total of five soil vapor samples were collected for laboratory analysis, one from each soil vapor probe. Samples were collected in appropriately sized Summa canisters that were certified clean by the laboratory. Sampling occurred for the duration of two hours.

QA/QC samples included equipment rinsate/field blanks, trip blanks, sample duplicates, and matrix spike/matrix spike duplicates (MS/MSDs).

Soil, groundwater, and soil vapor samples were submitted for laboratory analysis to Alpha Analytical Inc., an NYSDOH Environmental Laboratory Approval Program (ELAP)-certified laboratory located in Westborough, Massachusetts.

2.3 CHEMICAL ANALYSIS

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

Soil samples were analyzed for the following parameters:

- Target Compound List (TCL) VOCs using EPA Method 8260B

- TCL SVOCs using EPA Method using 8270C
- Total Metals by EPA Method 6010
- Per- and polyfluoroalkyl substances (PFAS) using EPA Method 537.1
- 1,4-dioxane using EPA Method 8270 SIM

Groundwater samples collected were analyzed for the following parameters:

- TCL VOCs using EPA Method 8260B;
- TCL SVOCs using EPA Method 8270C;
- Total Metals using EPA Methods 6010/7471;
- PFAS by EPA using 537; and
- 1,4-dioxane using EPA Method 8260B

Soil vapor samples were analyzed for VOCs using USEPA Method TO-15.

2.4 SUPPLEMENTAL REMEDIAL INVESTIGATION FINDINGS SUMMARY

A summary of environmental findings of the Supplemental Remedial Investigation includes the following:

1. The Site's stratigraphy, from the surface down, consists of urban fill generally consisting of brown to dark brown, medium to fine silty sand with varying amounts of loose gravel, asphalt, brick, cinders, and plastic was observed from current grade to depths extending approximately 3 to 4 ft (approximately 8 to 9 ft below sidewalk grade). The urban fill layer was underlain by a potential native layer consisting of gray to dark gray medium to fine silty sand with varying amounts of coarse sand and clay to depths extending approximately 11 to 12 ft (16 to 17 ft from sidewalk grade). Following this native layer was an organic/peat layer observed up to the terminus depth of each soil boring, ranging from 15 to 16 ft (20 to 21 ft from sidewalk grade).

2. Groundwater was encountered at depths ranging from 9 to 10 ft from sidewalk grade, and groundwater beneath the Site generally flows to the west-northwest.

3. Soil analytical results were compared to UUSCOs and RRSCOs. Soil analytical results are summarized below and shown in Figure 3:

   Volatile Organic Compounds

   Acetone (maximum concentration 0.8 mg/kg in SB-12 (18-20') was identified above the UUSCO (0.5 mg/kg), but below the RRSCO (100 mg/kg), in eleven soil samples analyzed. 2-Butanone was identified in one soil sample, SB-12 (18-20'), at a concentration of 0.16 mg/kg, which is above the UUSCO (0.12 mg/kg), but below the RRSCO (100 mg/kg).

   Two CVOCs, cis-1,2-dichloroethene and trichloroethene, were identified in SB-04 (0-2") at concentrations of 0.33 mg/kg and 0.5 mg/kg, respectively, which is above the UUSCOs (0.25 mg/kg and 0.47 mg/kg, respectively), but below the RRSCOs (100 mg/kg and 21 mg/kg, respectively).

No other VOC concentrations exceeded UUSCOs or RRSCOs in soil samples analyzed.

Semi-Volatile Organic Compounds

Two SVOCs including 3-methylphenol/4-methylphenol (maximum concentration 1.1 mg/kg in SB-06 (0-2") and indeno(1,2,3-cd)pyrene (maximum concentration of 1.8 mg/kg in SB-10 (18-20') were identified in several soil samples above UUSCOs (0.33 mg/kg and 0.5 mg/kg, respectively) and RRSCOs, (100 mg/kg and 0.5 mg/kg, respectively).

In addition, 1,2-dichlorobenzene was identified in one soil sample, SB-05 (0-2" at a concentration of 2.3 mg/kg, which is above the UUSCO (1.1 mg/kg), but below the RRSCO (100 mg/kg). Three SVOCs including benzo(a)anthracene (concentration of 3.4 mg/kg), benzo(a)pyrene (concentration of 2.7 mg/kg), and benzo(b)fluoranthene (concentration of 3.7 mg/kg) were identified in SB-10 (18-20') at concentrations above the RRSCOs (all 1 mg/kg). Two SVOCs, benzo(k)fluoranthene and chrysene, were also identified in SB-10 (18-20') at concentrations of 1 mg/kg and 3.4 mg/kg, respectively, which is above the UUSCOs (0.8 mg/kg and 1 mg/kg, respectively), but below the RRSCO (both 3.9 mg/kg). No other SVOC concentrations exceeded UUSCOs or RRSCOS in soil samples analyzed.

Metals

Metals including arsenic [maximum concentration of 40.2 mg/kg in SB-06 (0-2")]; lead [maximum concentration of 1,240 mg/kg in SB-01 (0-2")]; and mercury [maximum concentration of 73.1 mg/kg in SB-12 (18-20')] were detected above RRSCOs (16 mg/kg, 400 mg/kg and 0.81 mg/kg, respectively) in three or more soil samples analyzed (both shallow and deep). Copper was detected in SB-06 (0-2") at a concentration of 556 mg/kg exceeding the RRSCO (170 mg/kg) and identified in up to 11 soil samples at concentrations exceeding UUSCOs.

Metals including nickel [maximum concentration of 48.6 mg/kg in SB-11 (18-20')] and zinc [maximum concentration of 576 mg/kg in SB-06 (0-2")] were detected in multiple soil samples analyzed above UUSCOs (30 mg/kg and 109 mg/kg).

Emerging Contaminants

1,4-dioxane was not detected above laboratory detection limits in soil samples analyzed.

Concentrations of PFOA [(maximum 0.175 nanograms per kilogram (ng/g) in SB-09 (18-20')] was detected above detection limits in six soil samples analyzed. PFOS was detected at a concentration of 0.155 ng/g in SB-04 (0-2") only.

The following PFAS compounds were detected above the laboratory detection limits in one or more the twenty-four soil samples analyzed:

- Perfluorobutanoic Acid (PFBA)
- 1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)
- Perfluorodecanesulfonic Acid (PFDS)
- Perfluorohexanesulfonic Acid (PFHxS)
- Perfluorotetradecanoic Acid (PFTA)

Total PFOA/PFAS compounds detected ranged from 0.057 ng/g in SB-05 (0-2") to 0.265 ng/g in SB-04 (0-2").

4. Groundwater analytical results were compared to NYSDEC AWQS. Groundwater analytical results are summarized below and shown in Figures 4 and 5:

   Volatile Organic Compounds

   Five petroleum VOCs including isopropylbenzene (maximum concentration of 40 µg/L in MW-01, AWQS 5 µg/L); n-Propylbenzene (maximum concentration of 50 µg/L in MW-01, AWQS 5 µg/L); sec-Butylbenzene (maximum concentration of 36 µg/L in MW-01, AWQS 5 µg/L); tert-Butylbenzene (maximum concentration of 10 µg/L in MW-01, AWQS 5 µg/L); and 1,2,4,5-Tetramethylbenzene (maximum concentration of 41 µg/L in MW-01, AWQS 5 µg/L) were detected in two or more groundwater samples above their respective NY-AWQS. Two VOCs, n-Butylbenzene and 1,2,4-Trimethylbenzene, were also detected in MW-01 at concentrations of 14 µg/L and 31 µg/L, respectively, above NY-AWQS (both 5 µg/L).

   The following five VOCs were identified in MW-05 only at concentrations exceeding NY-AWQS: benzene at 1 µg/L (AWQS 1 µg/L), cis-1,2-dichloroethene at 69 µg/L (AWQS 5 µg/L), p/m-xylene at 10 µg/L (AWQS 5 µg/L), trichloroethene at 6.2 µg/L (AWQS 5 µg/L), and vinyl chloride at 51 µg/L (AWQS 2 µg/L).

   Semi Volatile Organic Compounds

   The following six SVOCS, specifically PAHS, were identified in two groundwater samples, MW-03 and MW-05, at concentrations exceeding NY-AWQS: benzo(a)anthracene (maximum concentration of 0.07 µg/L in MW-05, AWQS 0.002 µg/L); benzo(a)pyrene (maximum concentration of 0.04 µg/L in MW-05, AWQS 0 µg/L); benzo(b)fluoranthene (maximum concentration of 0.06 µg/L in MW-05, AWQS 0.002 µg/L), and chrysene (maximum concentration of 0.05 µg/L in MW-05, AWQS 0.002 µg/L). Chrysene was also detected in MW-02 and MW-04 at concentrations of 0.01 µg/L and 0.05 µg/L, respectively, exceeding NY-AWQS. The SVOC indeno(1,2,3-cd)pyrene was detected in MW-03 only at a concentration of 0.05 µg/L, exceeding NY-AWQS (0.002 µg/L). Benzo(k)fluoranthene was detected in MW-03 and MW-05 both at a concentration of 0.02 µg/L, exceeding the NY-AWQS (0.002 µg/L). Bis(2-ethyl(hexyl)phthalate was detected in MW-04 only at a concentration of 5.4 µg/L, exceeding NY-AWQS (5 µg/L).

   Metals

   Four metals were identified in groundwater samples at concentrations exceeding the NY AWQS in groundwater samples collected at the Site. Arsenic concentrations exceeded the NY AWQS (25 µg/L) in one groundwater sample collected from MW-04 and the field duplicate collected from the same location (maximum concentration of 79.9 µg/L in MW-04); iron exceeded the NY AWQS (300 µg/L) in all five groundwater samples analyzed and the duplicate sample from MW-04 (maximum concentration 21,200 µg/L in MW-04); manganese exceeded the NY AWQS (300 µg/L) in three groundwater samples analyzed (maximum concentration 920.07 µg/L in MW-05); and sodium concentrations exceeded the NY AWQS (20,000 µg/L in all five groundwater samples analyzed plus the duplicate sample of MW-04 (maximum concentration of 94,000 µg/L in MW-03).

Emerging Contaminants

A groundwater cleanup regulatory criterion does not exist for 1,4-dioxane in New York State. Concentrations of 1,4-dioxane were compared to New York State's drinking water MCL of 1 µg/L. PFAS compounds in groundwater are compared to the NYSDEC June 2021 guidance values of 0.01 µg/L for individual PFAS (not PFOA or PFOS) compounds and 0.5 µg/L for total concentrations of PFAS (including PFOA and PFOS).

1,4-dioxane was detected at concentrations exceeding New York State's drinking water MCL of 1 µg/L in groundwater samples MW-01 and MW-05, at concentrations of 2.78 µg/L and 1.2 µg/L, respectively.

Perfluorooctanoic Acid (PFOA) was detected at concentrations exceeding the NYSDEC June 2021 guidance value of 0.01 µg/L in all five groundwater samples collected (plus one duplicate sample collected from MW-04). The maximum concentration of PFOA was identified at a concentration of 0.11 µg/L in MW-05. Total PFOA/PFAS concentrations in groundwater samples ranged from 0.0303 µg/L in MW-02 to 0.113 µg/L in MW-05, below the NYSDEC June 2021 guidance value of 0.5 µg/L.

5. No standard currently exists for soil vapor samples in New York State. Soil vapor analytical results are summarized below and shown in Figure 6. Total VOC concentrations in soil vapor samples ranged from 227.62 µg/m^3 in sample SV-02 to 13,047.7 µg/m^3 in sample SV-05. Total benzene, toluene, ethylbenzene, and xylenes (BTEX) concentrations ranged from 41.1 µg/m^3 in sample SV-05 to 132.2 µg/m^3 in sample SV-04.

   CVOCs detected include TCE (maximum concentration of 9,670 µg/m^3), cis-1,2-dichloroethene (maximum concentration of 2,750 µg/m^3), and vinyl chloride (maximum concentration of 177 µg/m^3) were detected in all soil vapor samples, with the exception of SV-02. In addition, PCE was detected in soil vapor sample SV-05 at a concentration of 171 µg/m^3. In soil vapor samples SV-04 and SV-05, 1,1-dichloroethene was detected at a concentrations of 12.9 µg/m^3 and 37.9 µg/m^3, respectively.

   Other VOCs detected at the Site included:

   - 1,1-dichloroethane detected in SV-02 (4.02 µg/m^3)
   - 1,2,4-trimethylbenzne detected in all five samples (maximum concentration 27 µg/m^3 in SV-05)
   - 1,3,5-trimethylbenzene detected in three samples (maximum concentration 9.83 µg/m^3 in SV-02)
   - 1,3-butadiene detected in three samples (maximum concentration 4.42 µg/m^3 in SV-02)
   - 2,2,4-trimethylpentane detected in SV-01 (71 µg/m^3)
   - 2-butanone detected in four samples (maximum concentration of 24.6 µg/m^3 in SV-02)
   - 4-ethyltoluene detected in two samples (maximum concentration 7.23 µg/m^3 in SV-04)
   - acetone detected in all five samples (maximum concentration 72.7 µg/m^3 in SV-05)
   - benzene detected in four samples, (maximum concentration 26 µg/m^3 in SV-04)

- carbon disulfide detected in four samples (maximum concentration of 15.8 µg/m^3 in SV-01)
- chloromethane detected in two samples (maximum concentration 1.85 µg/m^3 in SV-04)
- cyclohexane detected in SV-01 (24.2 µg/m^3)
- dichlorodifluoromethane detected in two samples (maximum concentration 2.43 µg/m^3 in SV-01)
- ethanol detected in two samples (maximum concentration of 52 µg/m^3 in SV-03)
- ethylbenzene detected in four samples (maximum concentration 14.3 µg/m^3 in SV-02)
- heptane detected in four samples (maximum concentration 20.3 µg/m^3 in SV-01)
- isopropanol detected in three samples (maximum concentration 21.3 µg/m^3 in SV-03)
- n-hexane detected in four samples (maximum concentration 50.8 µg/m^3 in SV-04)
- o-xylene detected in four samples (maximum concentration 16.4 µg/m^3 in SV-04)
- p/m-xylene detected in four samples (maximum concentration 40.3 µg/m^3 in SV-01)
- tertiary butyl alcohol detected in two samples (maximum concentration 10 µg/m^3 in SV-03)
- tetrahydrofuran detected in three samples (maximum concentration 14.7 µg/m^3 in SV-02)
- toluene detected in all five samples (maximum concentration 41.1 µg/m^3 in SV-05)
- trans,1,2-dichloroethene detected in four samples (maximum concentration 128 µg/m^3 in SV-05)

2.5 SIGNIFICANT THREAT

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

2.6 GEOLOGY AND HYDROGEOLOGY

2.6.1 Historical Fill Material

The Site is underlain by a layer of urban historic fill, predominantly consisting of brown to dark brown, medium to fine silty sand with varying amounts of loose gravel, asphalt, brick, cinders, and plastic. The urban fill material extended to a depth of approximately 3 to 4 ft (approximately 8 to 9 ft below sidewalk grade) at each boring location. PID readings above background levels were observed during soil sampling activities.

2.6.2 Native Soil

The historic urban fill material is underlain by a potential native layer consisting of gray to dark gray medium to fine silty sand with varying amounts of coarse sand and clay to depths extending approximately 11 to 12 ft (approximately 16 to 17 ft from sidewalk grade) at each boring location. Underlain by this layer is an organic/peat layer ranging from approximately 15 to 16 ft (20 to 21 ft from sidewalk grade) at each boring location.

2.6.3 Bedrock

Bedrock was not encountered during the SRI. Depth to bedrock is greater than 100 ft bgs. According to the USGS Bedrock and Engineering Geologic Maps of New York County and Parts of Kings and Queens

Counties, New York, dated 1994, bedrock beneath the Site is an igneous intrusive classified as Ravenswood grano-diorite of middle Ordovician to middle Cambrian age.

2.6.4 Hydrogeology

Groundwater was encountered at depths ranging from approximately 9 to 10 ft below sidewalk grade. Groundwater is inferred to flows to the west-northwest. A groundwater contour map is included as Figure 7.

2.7 CONTAMINANT CONDITIONS

2.7.1 Conceptual Site Model

A conceptual site model (CSM) was developed based on the findings of the SRI performed from 27 December 2021 through 14 January 2022 under the BCP program. The CSM provides a framework for distribution of impacted materials sitewide and potential migration/exposure pathways.

2.7.2 Potential Sources of Contamination

Based on the analytical results of the SRI, the primary contaminants of concern for the Site are metals, SVOCs (specifically PAHs), and VOCs (specifically chlorinated compounds) in soil; SVOCs, VOCs, and metals in groundwater; and CVOCs in soil vapor.

Based on the identified contaminants, the source of contamination to soil, groundwater, and soil vapor is likely the results of both historical metals finishing and spraying processes at the Site and placement of historical urban fill from an unknown source.

The surrounding area was formerly used for industrial operations, which could indicate additional source areas off-Site with migrating impacts. In addition, the lack of petroleum contamination in soil above the groundwater interface and the evenly distributed concentrations of petroleum related VOCs in groundwater Site-wide suggests an off-Site source(s) possibly associated with historic spill incidents at both 55 Eckford Street and 498 Leonard Street.

2.7.3 Description of AOCs

Based on site observations, site development history, and the findings of the previous environmental reports, five AOCs were identified. This section discusses the results of the SRI with respect to the AOCs.

2.7.4 AOC 1 – Site-Wide Urban Fill

The Site was developed between 1905 and 1916 and improved with several one-story manufacturing buildings before being redeveloped in 1916 with a 1-2-story building that was primarily occupied by the Carter Spray Finishing Corporation, a metal finishing and spraying company. During the SRI, a historical fill layer of unknown origin was identified from current grade (approx. 5 ft bgs) extending to depths between 10 and 13 ft below sidewalk grade across the Site. Fill material predominantly consists of brown to dark brown, medium to fine silty sand with varying amounts of loose gravel, asphalt, brick,

cinders, and plastic. Based on soil sampling performed during the SRI, the urban fill interval from current grade to at least 13 ft below sidewalk grade is impacted with SVOCs (specifically PAHs), metals including arsenic, copper, lead, mercury, and zinc which are present at concentrations above NYSDEC Part 375 UUSCOs and/or RRSCOs. Metals concentrations were generally consistent Site-wide and the highest SVOC concentrations in soil were primarily identified in the central-northern portion of the Site.

Data reported in the June 2016 RI completed by EBC also identified PAH and metals contamination in historical fill material throughout the Site to depths as great as 13 ft bgs.

2.7.5 AOC 2 – CVOCs in Soil

Cis,1,2-dichloroethene and TCE were identified in one soil sample collected from the historical urban fill interval [SB-04 (0-2")] at concentrations of 0.33 mg/kg and 0.5 mg/kg, respectively, exceeding the UUSCOs.

Data reported in the June 2016 RI completed by EBC identified the CVOC TCE detected above UUSCOs within shallow soil samples collected from 0-2 ft and 2-4 ft intervals Site-wide. The highest concentrations were detected within the rear of the former building (i.e. the western portion of the Site). It should be noted that the Site is currently excavated to approximately 5 ft bgs Site-wide, therefore, a majority of the CVOC-impacted shallow soil has been removed and disposed of off-Site as part of the 2018 IRM.

2.7.6 AOC 3 – Metals in Deep Native Soil

Metals including arsenic [maximum concentration of 14.9 mg/kg in SB-09 (18-20')], mercury [maximum concentration of 73.1 mg/kg in SB-12 (18-20')], lead [maximum concentration of 266 mg/kg in SB-01 (18-20')], and zinc [maximum concentration of 301 mg/kg in SB-01 (18-20')] were identified in the deep intervals Site-wide at concentrations above NYSDEC Part 375 UUSCOs and/or RRSCOs.

2.7.7 AOC 4 – Chlorinated and Petroleum VOCs in Groundwater.

Several CVOCs including cis-1,2-dichloroethene, trichloroethene, and vinyl chloride were detected in MW-05 only at concentrations of 69 µg/L, 6.2 µg/L, and 51 µg/L, respectively, exceeding NY-AWQS. Petroleum related VOCs including isopropylbenzene (maximum concentration of 40 µg/L in MW-01); n-Proplybenzene (maximum concentration of 50 µg/L in MW-01); sec-Butylbenzene (maximum concentration of 36 µg/L in MW-01); tert-Butylbenzene (maximum concentration of 10 µg/L in MW-01); and 1,2,4,5-Tetramethylbenzene (maximum concentration of 41 µg/L in MW-01) were detected in two or more groundwater samples above NY-AWQS. The absence of petroleum contamination within soil above the groundwater interface and the evenly distributed concentration of petroleum related VOCs in groundwater Site-wide suggests an off-Site source(s), possibly associated with historic spill incidents at both 55 Eckford Street and 498 Leonard Street.

2.7.8 AOC 3 – Soil Vapor Impacts

Detected CVOCs including cis-1,2-dichloroethene (maximum concentration of 2750 µg/m^3 in SV-05), trichloroethene (maximum concentration of 9670 µg/m^3 in SV-05), and vinyl chloride (maximum concentration of 177 µg/m^3 in SV-05) were detected in four soil vapor samples. Soil vapor sample SV-05,

collected from the northeast portion of the Site, also contained a PCE concentration of 171 µg/m^3. Cis-1,2-dichloroethene, TCE, and vinyl chloride were identified in a co-located groundwater sample collected during the SRI (MW-05). Based on the data collected during this SRI, CVOCs are present in soil vapor Site-wide likely attributed to the former metal finishing and spraying operation.

2.8 QUALITATIVE HUMAN EXPOSURE ASSESSMENT

A qualitative exposure assessment consists of characterizing the exposure setting (including the physical environment and potentially exposed human and ecological resource populations), identifying exposure pathways, and evaluating chemical fate and transport. An exposure pathway describes the means by which an individual or ecological resource 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.

2.8.1 Receptor Population

The receptor population includes the people or ecological resources who are or may be exposed to contaminants at a point of exposure. The identification of potential receptors is based on the characteristics of the Site, the surrounding land uses, and the probable future land uses. The Site is currently excavated to approximately 5 to 6 ft Site-wide and secured with a 10' high construction fence. Since the Site is vacant, individual receptors would currently only include construction/maintenance workers that may be employed to perform work on the property.

Exposure routes on a vacant and undeveloped site would include direct contact activities, although soil vapor and groundwater contamination may impact off-Site properties. The reasonably anticipated future use of the Site is for residential purposes which is consistent with surrounding property use and zoning. At full development, the majority of the Site will be covered by concrete, asphalt, or a building with a full basement such that no ecological resources will foreseeably be exposed to contaminants remaining at the Site. The roughly 560-square-foot rear yard will have a 2-ft minimum clean cover installed following remediation. Therefore, exposed receptors under the future use scenario will be comprised of individual residents, indoor workers, outdoor workers (e.g., groundskeepers or maintenance staff), and construction workers who may be employed at or perform work on the property. Site visitors may also be considered receptors; however, their exposure would be similar to that of the residents and employees but at a lesser frequency and duration. In addition, residents or employees in off-Site adjoining buildings may be exposed to soil vapors.

2.8.2 Contaminant Sources

The source of contamination is defined as either the source of contaminant release to the environment (such as a waste disposal area or point of discharge) or the impacted environmental medium (i.e., soil, soil vapor, groundwater) at the point of exposure. Sections 4.0 and 5.0 discuss the contaminants of concern (COCs) present in the Site media at elevated concentrations. In general, these include SVOCs (specifically PAHs), VOCs, and metals including arsenic, copper, lead and mercury in historical urban fill, metals, SVOCs, and VOCs in groundwater, and CVOCs in soil vapor.

2.8.3 Exposure Routes and Mechanisms

The point of exposure is a location where actual or potential human contact with a contaminated medium may occur. Based on the exceedances of UUSCOs/RRSCOs for SVOCs (specifically PAHs), VOCs, and metals in soil, exceedances of AWQS for SVOCs, VOCS, and metals in groundwater, and elevated CVOCs VOCs in soil vapor, the point of exposure is defined as the whole Site.

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

Current Use Scenario: The Site is currently excavated to approximately 5 to 6 ft Site-wide and secured with a 10' high construction fence. Exposure to contaminated surface soil and contaminated groundwater is possible during subsurface investigations or other activities that disturb the subsurface. Release and transport mechanisms include contaminated surface soil transported as dust, contaminated groundwater flow, and volatilization of contaminants from soil and/or groundwater into vapor phase.

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

Construction/Remediation Scenario: In the continued absence of engineering and institutional controls, there will be continued exposure pathways during construction/remediation specifically related to surface soil. Construction/Remedial activities include excavation and off-site disposal of soil and potential localized dewatering of impacted groundwater to facilitate the construction of the foundation elements. Release and transport mechanisms include disturbed and exposed soil during excavation, contaminated soil transported as dust, contaminated groundwater flow (localized dewatering), inhalation of dust from contaminated soil, and volatilization of contaminants from soil and/or groundwater into vapor phase.

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

Future Use Scenario: The anticipated remedial approach includes excavation of contaminated soil, dewatering of groundwater accumulated in excavations (if required), and installation of a composite cover system as part of construction. In the absence of engineering and institutional controls, release and transport mechanisms include contaminated groundwater and volatilization of contaminants from soil and/or groundwater into the vapor phase. Routes of future exposure include cracks in the foundation or slab or emergency repairs to the foundation walls or slab.

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

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

Concerning the indoor air pathway, the NYSDOH has issued a guidance document for assessing potential impacts to indoor air via soil vapor intrusion. Concerning skin contact, inhalation, and incidental ingestion of volatile organics present in soil and groundwater, the potential exists for exposure to VOCs for construction workers involved in subsurface activities where volatiles are present at elevated concentration. Concerning the future use, a soil vapor intrusion evaluation will be conducted post remedy.

2.8.4 Exposure Assessment

Based on the above, we determine the following Qualitative Human Health Exposure Assessment (QHHEA) conclusions for current conditions, construction/remediation conditions and future use conditions as listed below.

Current Use Scenario

Site contamination includes SVOCs (specifically PAHs), VOCs, and metals impacts to soil related to historic fill of unknown origin and native deeper soil and CVOC impacts to soil vapor likely due historic Site operations and/or migrating from an off-site source. Under current conditions, the likelihood of exposure to soil or groundwater is limited, as the Site is affixed with a perimeter fence secured with a lock. Site access is only granted to personnel associated with the planned development. Potable water for Kings County will continue to be sourced from reservoirs in the Catskill and Delaware Watersheds. All intrusive work on the Site will be performed in accordance with a Site-Specific Health and Safety Plan (HASP) and donning of appropriate PPE.

Construction/Remediation Scenario

The exposure element exists for all elements during the construction and remediation phase. The overall risk will be minimized by the implementation of a Site-Specific Construction Health and Safety Plan (CHASP), localized monitoring of organic vapors, community air monitoring on the Site perimeter for particulates and VOCs, vapor and dust suppression techniques, installation of a stabilized entrance, cleaning truck tires and undercarriages and donning of appropriate PPE. Additionally, the Site will be remediated pursuant to a NYSDEC-approved Remedial Action Work Plan which will include a Soil Materials Management Plan that will highlight measures for PPE, covering of stockpiles, housekeeping,

suppression techniques (particulates and vapor) and measures to prevent off-site migration of contaminates.

Future Use Scenario

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

2.9 REMEDIAL ACTION OBJECTIVES

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

2.9.1 Soil

RAOs for Public Health Protection:

- Prevent ingestion/direct contact with contaminated soil
- Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil or contaminated soil in particulate form

RAOs for Environmental Protection:

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

2.9.2 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
- Remove source of groundwater or surface contamination

2.9.3 Soil Vapor

RAOs for Public Health Protection:

- Mitigate the risk of impacts to public health resulting from existing, or the potential for, soil vapor migration off-Site, or intrusion into the proposed development at the Site

2.9.4 Protection of Human Health and the Environment

Alternative I – The remedy would significantly reduce the potential for each of the identified pathways of exposure to on-site contaminated media. Remediating the Site to Track 1 standards would result in

the elimination of Site soil that exceeds UUSCOs. Encountered underground storage tanks (USTs) would be decommissioned, removed, and disposed off-site, and petroleum-impacted material, if encountered, would be excavated and disposed off-Site. The RAOs for public health and environmental protection would be met through the removal of contaminated media at the Site to meet UUSCOs and PGW SCOs, which would significantly reduce the potential for exposure pathways via possible ingestion, inhalation, or dermal contact.
Since no engineering or institutional controls will be required for this remedy to maintain the Site in the future, this remedy is the most protective of human health and the environment.

Alternative II – The Track 2 remedy will provide similar overall protection to public health and the environment as Alternative I. Remediating the Site to Track 2 standards will result in the removal of Site soil that exceeds RRSCOs. Encountered USTs would be decommissioned, removed, and disposed off-Site, and petroleum-impacted material, if encountered, would be excavated, and disposed off-Site. The RAOs for public health and environmental protection would be met through the removal of contaminated media at the Site to meet RRSCOs, which would significantly reduce the potential for exposure pathways via possible ingestion, inhalation, or dermal contact.

Since no engineering and institutional controls will be required for this remedy to maintain the Site in the future, this remedy is protective of human health and the environment.

Public health will be protected during remediation under both remedial alternatives by implementing and enforcing dust, odor, and organic vapor control and monitoring procedures when needed.

3. Summary of Remedial Action

This section presents an analysis of the proposed remedial alternatives that could potentially be achieved under the BCP. The proposed SCOs under Alternative I would be the Part 375 UUSCOs under a conditional Track 1 cleanup. Alternative II would utilize Part 375 RRSCOs under a Track 4 cleanup. Both alternatives would achieve the established RAOs outlined in Section 2.9. Following evaluation, Alternative II was selected as the preferred remedy.

3.1 ALTERNATIVE I – TECHNICAL DESCRIPTION

Alternative I, a Track 1 remedy, will include the following:

- Development and implementation of a CHASP and Community Air Monitoring Plan (CAMP) for the protection of on-site workers, community/residents, and the environment during remediation and construction activities.
- Design and construction of a support-of-excavation (SOE) system to facilitate the Track 1 remediation.
- Implementation of soil erosion, pollution, and sediment control measures in compliance with applicable laws and regulations.
- Removal of remaining miscellaneous debris on the Site.
- Decommission on-site monitoring wells in accordance with NYSDEC CP-43 Policy.
- Excavation, stockpiling, off-Site transport, and disposal of approximately 7,600 cubic yards of contaminated historical fill material that exceeds UUSCOs as defined by 6 NYCRR Part 375-6.8. Excavation will be to 25 ft below sidewalk grade (bottom of historical fill and soils impacted above UUSCOs) Site-wide. For development purposes, excavations are proposed to extend to about 25 ft below sidewalk grade in the roughly 10,200-square-foot building footprint.
- As part of waste characterization and for disposal purposes, a lateral and vertical delineation of hazardous lead centered on soil boring SB-05 (hazardous lead identified from the 18 to 20 ft bgs sample) will be completed to facilitate off-site disposal of excavated soil/fill.
- 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.
- Continuing operation of the existing dewatering and treatment system designed by Ground/Water Treatment & Technology, LLC (GWTT) during excavation and remediation activities.
- 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 certified-clean material (i.e., meeting UUSCOs), recycled concrete aggregate (RCA), or virgin, native crushed stone.
- Upon completion of Track 1 excavation, an *in situ* chemical reductant (ISCR) reagent (DARAMEND®) will be mixed with approved backfill at the base of the excavation in the vicinity

of the elevated CVOCs near MW-05 at the proposed development depth of 30 ft bgs providing contact with groundwater impacted with CVOCs.

- Construction of a composite cover system consisting of a minimum of 4 inches of clean subbase (recycled concrete aggregate or virgin stone) overlain by a 6-inch concrete slab and installation of a waterproofing/vapor barrier (20-mil thick) to mitigate the potential for a soil vapor exposure pathway.
- Collection and analysis of confirmation soil samples from the excavation base and, to the extent possible, sidewalls of the excavation in accordance with DER-10, to document post-excavation conditions to confirm a Track 1 remedy was achieved.
- Installation of two monitoring wells to replace the decommissioned well MW-05 and one well installed downgradient. Collection and analysis of groundwater samples in accordance with DER-10 following remedial excavation activities to document groundwater quality below the Site.
- Completion of 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 in Figure 8. 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 D) 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 (COCs). 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 vapors 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.

Support of Excavation

To accommodate removal of soil that exceeds Track 1 UUSCOs, an SOE system will require construction. Excavations are anticipated to be completed into the water table throughout the Site. Additional SOE to support hot-spot excavation areas throughout the Site may be constructed, as necessary.

Fill and Soil Removal

PAHs, metals, and VOCs were detected in historical fill material at concentrations that exceed the UUSCOs and metals were detected in deeper native soil at concentrations exceeding UUSCOs. To achieve Track 1, soil removal and disposal will extend from surface grade to about 25 ft below sidewalk grade throughout the entire Site footprint (extent of historical fill material), resulting in about 7,600 cubic yards of contaminated historical fill/native material to be disposed off-site. For development purposes, excavations will extend to about 25 ft below sidewalk grade in the roughly 10,200-square-foot building footprint and a total of about 7,600 cubic yards of material will be removed from the Site. 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 occurred as part of the Corrective Action and is detailed in the Interim Construction Completion Report submitted to NYSDEC in February 2022.

Waste Characterization

Waste characterization will be performed for off-site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results, and QA/QC results will be reported. Data available for excavated material to be disposed of at a given facility will be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

In addition, during the SRI, TCLP lead was detected in SB-05 (18-20') at 25.6 mg/L, which exceeds the USEPA allowable limit of 5 mg/L for hazardous waste. TCLP lead was also detected above laboratory detection limits in SB-04 (0-2") and SB-10 (18-20') at concentrations of 1.09 mg/L and 1.63 mg/L, respectively, however, the concentrations did not exceed the USEPA allowable limit of 5 mg/L. Additional vertical and horizontal delineation of elevated TCLP lead will be performed during waste characterization sampling in the northeast region of the Site.

Hazardous soil will be managed in accordance with applicable federal, state, and local regulations. As such, the handling, transport, and disposal of hazardous fill material is subject to USEPA and the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations. The excavated material would be segregated in the field and temporarily placed in stockpiles, or direct loaded, and transported by Part 364-permitted trucks to a facility permitted by RCRA to accept hazardous waste.

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).

Excavation Backfill

As required for construction purposes, imported material will consist of clean fill that meets the UUSCOs or other acceptable fill material such as virgin stone from a quarry or RCA. If RCA is imported to the Site, it will come from a NYSDEC-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of RCA acquisition. RCA imported from compliant facilities will not require chemical testing, unless required by NYSDEC under its terms for operation of the facility. Imported RCA must be derived from recognizable and uncontaminated concrete (less than 10% by weight passing through a No. 80 sieve). RCA

is not acceptable for, and will not be used as, site cover material.

Fluids Management

A dewatering and treatment system was designed by a Ground/Water Treatment & Technology, LLC (GWTT) NYS-licensed Professional Engineer. To date, GWTT has installed four dewatering sumps and brought a 7,800-gallon frac tank to the Site. Approximately 12,000 gallons of standing water was evacuated to the sewer on Eckford Street and as the current grade of the site does not extend into the groundwater interface, dewatering operations currently address only accumulated water from precipitation events.

During future excavation associated with the remedy and installation of the proposed foundation, water management will be required to facilitate construction. Groundwater is encountered between 8 to 10 ft below sidewalk surface across the Site. The on-Site dewatering system was installed to collect the groundwater infiltration during the excavation. The revised permit, issued on August 27, 2021 (Permit No. 929596) allows for the dewatering of 20,000 gallons per day for the period of 30 August 2021 through 29 August 2022.

Groundwater will be collected from within the active work area using the four sumps installed by GWTT. Pumps will be used to convey collected groundwater from the sumps to a temporary on-Site treatment and/or collection system. Liquids removed from the Site, including dewatering fluids, will be handled, transported, and disposed of in accordance with approved New York City Department of Environmental Protection (NYCDEP) permits.

Groundwater Remediation

Upon completion of over excavation in a 15 by 15 ft vicinity of MW-05 from 25 ft bgs to 30 ft bgs, DARAMEND® (Appendix I), an ISCR reagent produced by PeroxyChem (formerly Adventus Remediation Technologies, Inc.), will be mixed with approved backfill at the base of the excavation to the proposed development depth of 25 ft bgs providing contact with the groundwater impacted with CVOCs. DARAMEND® is a mixture of zerovalent iron and carbon that promotes the ISCR of CVOCs through the creation of reducing anoxic conditions.

The proposed over-excavation area will be backfilled with approximately 70 tons of approved backfill. DARAMEND® will be applied dry to the backfill material directly in the excavation as per the manufacturer's directions at 2 to 3% percent ratio by weight, or a total of 1.4 to 2 tons of reagent. The reagent will be applied to the over excavation area in one-foot lifts and mixed with the excavator buckets and/or axial head mixers. DARAMEND® will be handled properly in accordance with instructions for use and the safety data sheet included in Appendix I.

Composite Cover and Waterproofing/Vapor Barrier System

As part of construction, a composite cover system will be installed, consisting of a minimum of 4 inches of clean subbase (recycled concrete aggregate or virgin stone) overlain by a 6-inch concrete slab and installation of a waterproofing/vapor barrier (20-mil thick) to mitigate the potential for a soil vapor exposure pathway. Under the Alternative I – Track 1 cleanup, this composite cover system would not be considered an engineering control.

Confirmation Soil Sampling

Per NYSDEC DER-10, confirmation soil samples will be collected from the excavation base (approximately 25 to 27 ft bgs) at a frequency of one sample per 900 square feet to confirm Track 1 UUSCOs were achieved. Sidewall samples will not be collected from the site perimeter because excavation will extend across the site footprint and SOE measures (e.g., sheeting and lagging) will have vertical excavation faces. If the site is sloped for SOE, then one sidewall sample will be collected for every 30 linear feet per DER-10. If these confirmation samples do not meet UUSCOs, then the Site may achieve Track 2, if Residential SCOs are achieved, and these samples then become documentation samples.

An estimated twelve confirmation soil samples, plus QA/QC samples, would be collected and analyzed for the Part 375 list of VOCs, SVOCs, pesticides, metals, PFAS and 1,4-dioxane.

Post-Remedy Soil Vapor Intrusion Evaluation

CVOCs, including cis,1,2-dichloroethen, TCE, and vinyl chloride were identified in soil vapor samples collected throughout the Site. The origin of the CVOC impacts to soil vapor may be attributed to the former metal spraying and finishing operations at the Site and/or migration from an off-site source.

Following remedial actions and prior to occupancy, a Soil Vapor Intrusion (SVI) Evaluation will be conducted to document that engineering controls are not required to address potential soil vapor intrusion will be conducted at the Site and submitted to NYSDEC and NYSDOH.

3.2 ALTERNATIVE II – TECHNICAL DESCRIPTION

Alternative II, a Track 2 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 2 remediation.
- Implementation of soil erosion, pollution, and sediment control measures in compliance with applicable laws and regulations.
- Removal of the miscellaneous debris on the Site.
- Decommission on-site monitoring wells in accordance with NYSDEC CP-43 Policy.
- Excavation, stockpiling, off-Site transport, and disposal of 5,700 cubic yards of contaminated historical fill/native material that exceeds RRSCOs as defined by 6 NYCRR Part 375-6.8. This includes excavation to a depth of 15 ft below sidewalk grade within the proposed 10,200-square-foot building footprint to remove contaminated historical fill material and native soil exceeding RRSCOs. Excavation beyond the historical fill interval and impacted native soil, to approximately 25 ft bgs, will also occur in the hotspot area surrounding soil borings SB-10, SB-11, and SB-12, to remove metals-impacted (specifically, mercury-impacted) soil/fill material and PAH-impacted soil/fill material (in SB-10 only) that exceeds the RRSCOs. This localized excavation is expected to generate an additional 20-30 cubic yards of impacted soil/fill for off-site transport and disposal. For development purposes, excavations will extend to about 25 ft

below sidewalk grade in the roughly 10,200-square-foot building footprint and a total of about 7,600 cubic yards of material will be removed from the Site.

- If encountered, removal of USTs and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) and decommissioning/disposal off-site during site redevelopment in accordance with DER-10, 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements.
- As part of waste characterization and for disposal purposes, a lateral and vertical delineation of hazardous lead centered on soil boring SB-05 (hazardous lead identified from the 18-20' sample) will be completed to facilitate off-site disposal of excavated soil/fill.
- Screening for indications of contamination (by visual means, odor, and monitoring with PIDs) of excavated material during intrusive site work.
- Continuing operation of the existing dewatering and treatment system designed by GWTT during excavation and remediation activities.
- 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 certified-clean material (i.e., meeting both the Protection of Groundwater [PG] and RRSCOs), RCA, or virgin, native crushed stone.
- Construction of a composite cover system consisting of a minimum of 4 inches of subbase (recycled concrete aggregate) overlain by a 6-inch concrete slab and installation of a waterproofing/vapor barrier (20-mil thick) to mitigate the potential for a soil vapor exposure pathway.
- Collection and analysis of documentation soil samples from the excavation base and, to the extent possible, sidewalls of the excavation in accordance with DER-10, to document post-excavation conditions to confirm a Track 2 RRSCOs were achieved. If a Track 2 Residential cleanup is achieved, engineering controls (i.e., composite cover system) will not be a required element of the remedy and NYSDEC will issue a Track 2 Certificate of Completion.
- Completion of a SVI Evaluation in accordance with DER-10 and NYSDOH Final Guidance on Soil Vapor Intrusion following remedial excavation activities and prior to occupancy.
- Establishment of use restrictions including prohibitions on the use of groundwater from the Site and prohibitions on sensitive site uses, such as farming or vegetable gardening in residual site soil, to significantly reduce the potential for future exposure pathways.
- Establishment of an approved SMP to ensure long-term management of engineering and institutional controls, including the performance of periodic inspections and certification that the controls are performing as they were intended.
- Recording of an Environmental Easement (EE) to ensure future owners of the site continue to maintain engineering/ institutional controls as required.

The Alternative II remediation extent is shown on Figure 9 and is based on data presented in the SRIR and the proposed development plans. The requirements for each of the Alternative II tasks are described below.

<u>On-Site Worker, Public Health, and Environmental Protection</u>

A site-specific CHASP is appended to this RAWP (Appendix D) and will be enforced during excavation and foundation construction to protect on-Site workers from accidents and acute and

chronic exposures to the identified contaminated media. 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.

Support of Excavation

To accommodate removal of soil that exceeds Track 2 RRSCOs, an SOE system will require construction. Excavations are anticipated to be completed below the water table throughout the site.

Fill and Soil Removal

PAHs and metals were detected in historical fill material and deeper native soil at concentrations that exceed the RRSCOs. To achieve Track 2, soil removal and disposal will extend from surface grade to about 15 ft bgs throughout the entire Site footprint, resulting in 5,700 cubic yards of contaminated historical fill/native material to be disposed of off-site. Excavation beyond the historical fill interval and impacted deeper native soil, to approximately 25 ft below sidewalk grade, will also occur in the hotspot areas surrounding soil boring SB-10, SB-11, and SB-12, to remove metals-impacted (specifically, mercury-impacted) and PAH-impacted soil/fill material (in SB-10 only) that exceeds the RRSCOs. This localized excavation is expected to generate an additional 20-25 cubic yards of impacted soil/fill for off-site transport and disposal. For development purposes, excavations will extend to 25 ft below sidewalk grade in the roughly 10,200 square-foot building footprint and a total of about 7,600 cubic yards of material will be removed from the Site. 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.

Waste Characterization

Waste characterization will be performed for off-site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results, and QA/QC results will be reported. Data available for excavated material to be disposed of at a given facility will be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

In addition, during the SRI, TCLP lead was detected in SB-05 (18-20') at 25.6 mg/L, which exceeds the USEPA allowable limit of 5 mg/L for hazardous waste. TCLP lead was also detected above laboratory detection limits in SB-04 (0-2") and SB-10 (18-20') at concentrations of 1.09 mg/L and 1.63 mg/L, respectively, however, the concentrations did not exceed the USEPA allowable limit of 5 mg/L. Additional vertical and horizontal delineation of elevated TCLP lead will be performed during waste characterization sampling in the northeast region of the Site.

Hazardous soil will be managed in accordance with applicable federal, state, and local regulations. As such, the handling, transport, and disposal of hazardous fill material is subject to USEPA and the OSHA HAZWOPER regulations. The excavated material would be segregated in the field and temporarily placed

in stockpiles, or direct loaded, and transported by Part 364-permitted trucks to a facility permitted by RCRA to accept hazardous waste.

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 FER.

Fluids Management

A dewatering and treatment system was designed by a GWTT NYS-licensed Professional Engineer. To date, GWTT has installed four dewatering sumps and brought a 7,800-gallon FRAC tank to the Site. Approximately 12,000 gallons of standing water was evacuated to the sewer on Eckford Street and as the current grade of the site does not extend into the groundwater interface, dewatering operations currently address only accumulated water from overflow events.

During future excavation associated with the remedy and installation of the proposed foundation, water management will be required to facilitate construction. Groundwater is encountered between 8 to 10 ft below sidewalk surface across the Site. The on-Site dewatering system was installed to collect the groundwater infiltration during the excavation. The revised permit, issued on August 27, 2021 (Permit No. 929596) allows for the dewatering of 20,000 gallons per day for the period of 30 August 2021 through 29 August 2022.

Groundwater will be collected from within the active work area using the four sumps installed by GWTT. Pumps will be used to convey collected groundwater from the sumps to a temporary on-Site treatment and/or collection system. Liquids removed from the Site, including dewatering fluids, will be handled, transported, and disposed of in accordance with approved NYCDEP permits.

Excavation Backfill

As required for construction purposes, imported material will consist of clean fill that meets the
The lower of PGW SCOs or RRSCOs or other acceptable fill material such as virgin stone from a quarry or RCA. If RCA is imported to the site, it will come from a NYSDEC-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of RCA acquisition. RCA imported from compliant facilities will not require chemical testing, unless required by NYSDEC under its terms for operation of the facility. Imported RCA must be derived from recognizable and uncontaminated concrete (less than 10% by weight passing through a No. 80 sieve). RCA is not acceptable for, and will not be used as, site cover or drainage material.

Documentation Soil Sampling

Per NYSDEC DER-10, documentation soil samples will be collected from the excavation base (approximately 25-27 ft bgs) at a frequency of one sample per 900 square feet. Sidewall samples will not be collected from the site perimeter because excavation will extend across the Site footprint and SOE measures (e.g., sheeting and lagging) will preclude access to soil sidewalls. If the Site is sloped for SOE, then one sidewall sample will be collected for every 30 linear feet per DER-10.

An estimated twelve documentation soil samples, plus QA/QC samples, would be collected and analyzed for the Part 375 list of VOCs, SVOCs, pesticides, metals, PFAS and 1,4-dioxane.

Post-Remedy Soil Vapor Intrusion Evaluation

CVOCs, including cis,1,2-dichloroethene, PCE, TCE, and vinyl chloride were identified in soil vapor samples collected throughout the Site. The CVOCs that have partitioned to the vapor phase from impacted soil and groundwater are likely due the historic metals finishing and spraying operations at the Site and nearby properties and/or migration from an off-site source. A mechanical ventilation system will be installed within the proposed subgrade areas compliant with the NYC Mechanical Code requirements to mitigate any potential soil vapor intrusion. Although not considered an engineering control, the building foundations will be waterproofed as part of building construction.

Following remedial actions and prior to occupancy, a SVI Evaluation will be conducted to document that engineering controls are not required to address potential soil vapor intrusion will be conducted at the Site and submitted to NYSDEC and NYSDOH.

Composite Cover System

As part of construction, a composite cover system will be installed, consisting of a minimum of 4 inches of clean subbase (recycled concrete aggregate or virgin stone) overlain by a 6-inch concrete slab and installation of a waterproofing/vapor barrier (20-mil thick) to mitigate the potential for a soil vapor exposure pathway. Under the Track 2 remedy, the composite cover system and waterproofing/vapor barrier system would function as engineering controls to be monitored under site management.

Site Management Plan and Environmental Easement

An EE would be recorded referencing Institutional Controls (ICs) that are part of the selected remedy, which would be binding upon all subsequent owners and occupants of the property. The ICs would: 1) restrict the site's use to restricted residential, commercial and industrial uses, although land use is subject to local zoning laws; 2) restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDEC or NYSDOH; 3) require implementation of an NYSDEC-approved Site Management plan (SMP); 4) require the completion and submission to the NYSDEC a periodic certification of ICs and ECs in accordance with Part 375; and 5) include notice-of-use restrictions of the site's soil. The Engineering Controls (ECs) for the Site would include the composite cover system (including concrete foundation and waterproofing/vapor barrier). The SMP would identify all use restrictions and ECs and long-term monitoring and maintenance requirements to ensure the ICs and/or ECs remain in place and are effective. The SMP will include, but may not be limited to:

1. An Excavation Work Plan which details the provisions for management of future excavations in areas of remaining contamination
2. Descriptions of the provisions of the EE including any land use, and/or groundwater use restrictions
3. Provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion
4. Provisions for the management and inspection of the identified ECs
5. Maintaining site access controls and NYSDEC notification
6. The steps necessary for the periodic reviews and certification of the ICs and/or ECs
7. A Monitoring Plan to assess the performance and effectiveness of the remedy. The Monitoring plan includes, but may not be limited to:
    a. Monitoring for vapor intrusion for any buildings developed on the site, as may be required by the Institutional and Engineering Control Plan discussed above
8. A schedule of monitoring and frequency of submittals to NYSDEC.

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 (SCG)
- 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 removing 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. 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 both Track 1 cleanup. Increased truck traffic in Alternative I, relative to Alternative II, may be necessary to haul out the additional soil that exceeds UUSCOs to achieve Track 1 standards.

Under Alternative I, the excavated soil and fill would require approximately 378, 20-cubic yard truck trips for disposal. Implementing the Alternative I would require approximately 2 to 3 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 short-term adverse impacts and risks to the community. The excavated soil and fill would require approximately 285, 20-cubic-yard truck trips. Implementing the Alternative II concept would require approximately 1 to 2 months of effort (assuming normal work hours).

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

Alternative I will remove contaminated soil from the Site exceeding UUSCOs while Alternative II will remove contaminated soil from the Site exceeding RRSCOs and will be documented in post-excavation endpoint soil sampling. A post-construction SVI Evaluation would be implemented to evaluate potential for vapor intrusion into the on-Site building.

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

Both remedial alternatives would permanently and significantly reduce the toxicity, mobility, and volume of contamination through removal of contaminated fill and buried solid waste through excavation and off-Site disposal.

3.3.5 Implementability

Alternative I – Implementing a Track 1 remedy will be technically challenging because of SOE requirements associated with protection of the neighboring buildings and streets; however, the

construction of SOE systems to allow for excavations to depths the Alternative I remedy are regularly installed. This remedy will consist primarily of excavation with standard bucket excavators. 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 UUSCOs 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.

Alternative II – The technical feasibility of implementing the Alternative II remedy is similar to Alternative I, as significant excavation as well as installation of an SOE is still required to achieve the Track 2 RRSCOs. This alternative will consist primarily of excavation with standard bucket excavators. 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. 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 1 cleanup is approximately $5,135,000. Because the Site will be remediated to UUSCOs, there are no long-term operation, maintenance, or monitoring costs associated with the proposed 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 2 cleanup is approximately $8,800,000. Alternative I is more cost-effective as Alternative II requires the implementation of the composite cover system as an engineering control as well as long-term operation, maintenance and monitoring for site management. 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. 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 residential land use of the Site and its surroundings are compatible with both remedial alternatives. The proposed development will include construction of a residential condominium building with full cellar extending to approximately 25 feet from sidewalk grade. Mid-rise mixed-use commercial/residential, and multiple-story commercial and institutional buildings are located at properties surrounding the Site.

3.4 SELECTION PREFERRED REMEDY

Both alternatives will be protective of human health and the environment and meet the remedy selection criteria. Alternative I achieves the remedial action goals established for the redevelopment project and is effective in the short-term. Alternative I effectively reduces contaminant mobility and is a better alternative in the reduction of contaminant volume. Alternative I is more effective in the long-term because the Site achieves unrestricted use. The excavation depths for both remedial alternatives are comparable and will produce similar remedial costs. Alternative I is preferred over Alternative II if it can be feasibly and practically implemented at a similar cost while providing greater overall protection to human health and the environment. Therefore, Alternative I is the recommended remedial alternative for this Site. However, if this Alternative is not achievable, Alternative II is similarly protective of human health and the environment.

Figure 8 depicts the Alternative I (Track 1) cleanup plan. Figure 9 depicts the Alternative II (Track 2) cleanup plan. The development excavation plan is shown in Figure 10. The Alternative I and II remediation extent is based on data presented in the RIR and SRIR.

3.4.1 Zoning

The land is located within a MX-8 Special Mixed-Use District (MX) and is currently zoned as M1-2/R6A which allows for residential use. 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, “R6 districts are medium-density areas in Brooklyn, Queens and the Bronx. The height factor regulations for R6 districts encourage small multi-family buildings on small zoning lots and, on larger lots, tall buildings that are set back from the street.” The Site is not located in an En-Zone. 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. The construction of a new residential development conforms to recent development patterns in the area and current zoning.

3.4.4 Environmental Justice Concerns

Per the "Potential Environmental Justice Areas in Northern Brooklyn, Kings County, New York" The Site is not 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.

3.4.5 Land Use Designations

There are no federal or state land use designations.

3.4.6 Population Growth Patterns

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

3.4.7 Accessibility to Existing Infrastructure

The Site is accessible to existing infrastructure.

3.4.8 Proximity to Cultural Resources

The Site is not in close proximity to a registered landmark. The nearest registered landmarks include McCarron Park, located between Leonard Street and Lorimer Street (approximately 0.15-mile west of the Site) and the Russian Orthodox Cathedral of the Transfiguration of Our Lord, located at 228 North 12th Street, Brooklyn, NY (approximately 0.31-mile southwest of the Site), and the 19th Police Precinct Station House and Stable, located at 43 Herbert Street, Brooklyn, NY (approximately 0.28-mile southeast of the Site).

3.4.9 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 the Bushwick Inlet, which is located approximately 0.55-mile west-northwest of the Site.

3.4.10 Off-Site Groundwater Impacts

Municipal water supply wells are not present in this area of New York City; therefore, groundwater from the Site does not affect municipal water supply wells or recharge areas.

3.4.11 Proximity to Floodplains

According to the FEMA Preliminary Flood Insurance Rate Map (FIRM) dated 5 September 2007 (Map Number 3604970202F), 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.

3.4.12 Geography and Geology of the Site

The Site geology is described in Section 2.6.

3.4.13 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 1 (Alternative I) remedy will include the following:

- Development and implementation of a CHASP and CAMP for the protection of on-site workers, community/residents, and the environment during remediation and construction activities.
- Design and construction of a SOE system to facilitate the Track 1 remediation.
- Implementation of soil erosion, pollution, and sediment control measures in compliance with applicable laws and regulations.
- Removal of remaining miscellaneous debris on the Site.
- Decommission on-site monitoring wells in accordance with NYSDEC CP-43 Policy.
- Excavation, stockpiling, off-Site transport, and disposal of approximately 7,600 cubic yards of contaminated historical fill material that exceeds UUSCOs as defined by 6 NYCRR Part 375-6.8.Excavation will be to 25 ft below sidewalk grade (bottom of historical fill and soils impacted above UUSCOs) Site-wide. For development purposes, excavations will extend to about 25 ft below sidewalk grade in the roughly 10,200-square-foot building footprint.
- As part of waste characterization and for disposal purposes, a lateral and vertical delineation of hazardous lead centered on soil boring SB-05 (hazardous lead identified from the 18-20’ sample) will be completed to facilitate off-site disposal of excavated soil/fill.
- 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.
- Continuing operation of the existing dewatering and treatment system designed by GWTT during excavation and remediation activities.
- 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 certified-clean material (i.e., meeting UUSCOs), recycled concrete aggregate (RCA), or virgin, native crushed stone.
- Upon completion of Track 1 excavation, an *in situ* ISCR reagent (DARAMEND®) will be mixed with approved backfill at the base of the excavation in the vicinity of the elevated CVOCs near MW-05 at the proposed development depth of 30 ft bgs providing contact with groundwater impacted with CVOCs.
- Construction of a composite cover system consisting of a minimum of 4 inches of clean subbase (recycled concrete aggregate or virgin stone) overlain by a 6-inch concrete slab and installation of a waterproofing/vapor barrier (20-mil thick) to mitigate the potential for a soil vapor exposure pathway.
- Collection and analysis of confirmation soil samples at the base of the excavation (25 ft bgs) in accordance with DER-10, to document post-excavation conditions to confirm a Track 1 remedy was achieved. Proposed confirmation sample locations are shown in Figure 11.
- Installation of two post-remedy monitoring wells to replace the decommissioned well MW-05 and one well installed downgradient. Post-remedy collection and analysis of groundwater samples for VOCs in accordance with DER-10 following remedial excavation activities to document groundwater quality below the Site.
- Collection of a SVI Evaluation in accordance with DER-10 and NYSDOH Final Guidance on Soil Vapor Intrusion following remedial investigation activities and prior to occupancy.

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 364 – Waste Transporter Permits
- 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
- Code of Federal Regulations (CFR) Title 29 Part 1910.120 - Hazardous Waste Operations and Emergency Response Standard
- CFR Title 29 Part 1926 - Safety and Health Regulations for Construction
- CP-43 – Commissioner Policy on Groundwater Monitoring Well Decommissioning (December 2009)
- NYSDEC Spill Response Guidance Manual
- NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances Under NYSDEC's Part 375 Remedial Programs (June 2021)
- CP-51 – Soil Cleanup Guidance (2010)
- DER-10 – Technical Guidance for Site Investigation and Remediation (May 3, 2010)
- DER-23 – Citizen Participation Handbook for Remedial Programs (March 2010)
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006)
- TOGS 1.1.1 – Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- 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 D). 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
- Decontamination requirements
- Standard operating procedures
- Contingency plan
- CAMP
- Safety data sheets (SDS)

The Volunteer and associated parties preparing the remedial documents submitted to the State and those performing the construction work are responsible for the preparation of 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 Haley & Aldrich 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 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 Construction Quality Assurance Plan

A Construction Quality Assurance Plan (CQAP) 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. Because the remedy will be accomplished concurrently with building construction, the Contractor and construction manager will have the primary responsibility to provide construction quality. A list of engineering personnel involved in implementation of the CQAP and procedures that will be carried out by the remedial engineering team are listed in Section 4.2.1. Project personnel resumes are provided in Appendix G.

4.1.5 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).

4.1.6 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 (SWPPP) 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.

4.1.7 Community Air Monitoring Program

Details of the CAMP are discussed in section 5.4.11.

4.1.8 Contractors Site Operations Plan

The 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.

4.1.9 Citizen Participation Plan

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

1. Brooklyn Community Board 1
   Attn: Dealice Fuller, Chairperson
   435 Graham Avenue
   Brooklyn, NY 11211
   Phone: (718) 389-0009
   Email: bk01@cb.nyc.gov

2. Brooklyn Public Library – Greenpoint Branch
   Attn: Abigail Garnett
   107 Norman Avenue at Leonard Street
   Brooklyn, NY 11222
   Phone: (718) 602-1348
   Email: agarnett@bklynlibrary.org
   Hours: Monday: 10:00 a.m. – 6:00 p.m.
   Tuesday: 1:00 p.m. – 8:00 p.m.
   Wednesday, Friday: 10:00 a.m. – 6:00 p.m.
   Thursday: 10:00 a.m. – 8:00 p.m.
   Saturday: 10:00 a.m. – 5:00 p.m.
   Sunday: Closed

3. NYSDEC
   Attn: Bob Corcoran, Case Manager
   625 Broadway, 12th Floor
   Albany, NY 12233-9656
   Phone: (518) 402-9658

4.2 GENERAL REMEDIAL CONSTRUCTION INFORMATION

4.2.1 Project Organization

A project team for the Site was 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	Bob Corcoran
NYSDOH Case Manager	Scarlett McLaughlin
Remediation Engineer	Scott Underhill, P.E.
Principal	James Bellew
Project Manager/Qualified Environmental Professional	Mari Cate Conlon, P.G.
Haley & Aldrich Health & Safety Director	Brian Fitzpatrick, CHMM
Health & Safety Officer	Brian Ferguson
Field Support and Coordination	Elizabeth Scheuerman
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 Resident Engineer (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 their 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 9.0 and included in Appendix J. 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 Volunteer 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 Eckford 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, the Volunteer, 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 1 and Track 2 remedies are included in Tables 1 and 2, respectively.

4.3 SITE PREPARATION

4.3.1 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 pad for trucks, equipment, and personnel that come into contact with impacted materials during remediation;
- Mark-out metals hot spots and other hot spot areas (if identified during the preliminary waste characterization sampling event)

4.3.2 Monitoring Well Decommissioning

Monitoring wells 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.

4.3.3 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.

4.3.4 Temporarily Stabilized Construction Entrance(s)

Temporary stabilized construction entrances will be installed at the existing curb cuts along Eckford Street. The entrances will be covered with NYSDEC approved gravel or RCA and graded so that runoff water will be directed on site. Vehicles exiting construction areas will be cleaned using clean water or dry brushing, as needed, to remove site soil from the tires and undercarriages. The Contractor will protect and maintain the existing sidewalks and roadways at both site access points.

4.3.5 Utility Marker and Easement Layouts

65-73 Eckford Realty LLC 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. 65-73 Eckford Realty LLC and its Contractors are solely responsible for safe execution of the work performed under this RAWP. 65-73 Eckford Realty LLC 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 65-73 Eckford Realty LLC and its Contractors. 65-73 Eckford Realty LLC and its contractors are solely responsible for the safe execution of the work performed under this RAWP. 65-73 Eckford Realty LLC 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, 65-73 Eckford Realty LLC 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 65-73 Eckford Realty LLC, 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 Truck-Inspection Station

An outbound-truck inspection station will be set up at or near the Site exit. Before exiting the Site, trucks will be required to stop at the truck inspection station and will be examined for evidence of contaminated soil on the undercarriage, body, and wheels. If observed, soil and debris will be removed. Brooms, shovels, and potable water will be utilized for the removal of soil from vehicles and equipment, as necessary. The Contractor is responsible for collecting soil that is tracked immediately off-Site and returning the soil to the Site.

4.3.9 Site Fencing

The Site will be secured with a gated fence with appropriate signage maintained by the Contractor. The fence will limit access to authorized personnel and protect pedestrian from Site activities.

4.3.10 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

Periodic reports and a FER will be required to document the remedial action. The RE, Scott Underhill, will be responsible for certifying the FER and 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 their place. Field reports will be included as appendices to the FER. In addition to the periodic reports and the FER, copies of the relevant Contractor documents will be submitted to the NYSDEC.

4.4.1 Field Reports

Reports providing a summary of activities for each day of active remedial work will be emailed to the NYSDEC and NYSDOH project managers on a daily basis. These reports will include:

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

Reports are not intended to be the primary mode of communication for notifying NYSDEC 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 NYSDEC Project Manager.

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:

- Investigative or remedial actions relative to the Site during the reporting period
- Actions relative to the Site anticipated for the next reporting period
- Approved changes of work scope or schedule, if applicable
- Results of sampling or testing
- Deliverables submitted during the reporting period
- The approximate percentage of completion of the project at the Site
- 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
- All daily reports submitted to NYSDEC during the reporting period will be included as an appendix

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, etc.) 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 Volunteer 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 from the Site

Remediation will include the following material removal tasks:

Excavation, stockpiling, off-Site transport, and disposal of 7,600 cubic yards of historical fill material and native material exceeding UUSCOs as defined by 6 NYCRR Part 375-6.8. Excavation will be to 25 ft bgs (bottom of excavation) site-wide.

For development purposes, excavations will extend to about 25 ft bgs in the roughly 10,200-square-foot building footprint and a total of about 7,600 cubic yards of material will be removed from the Site.

5.1 SOIL CLEANUP OBJECTIVES

SCOs for the Site will be the Track 1 UUSCO concentrations listed in Table 3. Soil and materials management will be conducted in accordance with the SMMP as described below. Soil sample locations and results that exceed the UUSCOs are shown on Figure 3. UST closures (if necessary) will, at a minimum, conform to criteria defined in DER-10.

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.

Confirmation samples will be collected to confirm that UUSCOs have been achieved. If applicable, sidewall samples will be collected from each excavation sidewall at a frequency of one sample per every 30 linear feet.

A total of twelve confirmation samples, plus QA/QC samples, will be collected from the base of the excavation, ranging from 25 to 26 ft bgs. If results of a confirmation soil sample do not comply with the UUSCOs, over-excavation will be completed as practical to achieve a Track 1 remedy and additional confirmation samples will be collected of the over-excavation area at the frequencies indicated above. Alternatively, a Track 2 remedy with Residential SCOs will be achieved. Proposed confirmation sample locations are shown in Figure 11.

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, pesticides, metals, 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 QA/QC

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 (EDD) 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 (DUSR) 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 7,600 cubic yards of soil. A summary of anticipated material types to be excavated and disposed off-site is provided below:

1. Excavation, stockpiling, off-Site transport, and disposal of approximately 7,600 cubic yards of historical fill material and native soil exceeding UUSCOs as defined by 6 NYCRR Part 375-6.8.

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

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.
- If encountered, stockpiling hazardous-impacted on Site will be avoided as necessary, and material will be live-loaded into trucks permitted to transport hazardous waste.

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 [NYSDOT] and NYCDOT requirements). Trucks hauling historic fill material will not be lined unless free liquids are present or the material is grossly impacted. 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 on Site. 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 Volunteer 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 Volunteer and associated parties will ensure that site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this RAWP. Development-related grading cuts and fills will not be performed without NYSDEC approval and will not interfere with, or otherwise impair or compromise, the performance of remediation required by this RAWP. Mechanical processing of historic fill and contaminated soil on-Site is prohibited unless otherwise approved by NYSDEC.

Primary contaminant sources (including, but not limited to, tanks and hotspots) identified during site characterization, the RI, and implementation of the remedy will be surveyed by a surveyor licensed to practice in the State of New York. 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 Eckford Street to Driggs Avenue, west on Driggs Avenue to Leonard Street, south on Leonard Street to Engert Street, east on Engert Street to McGuiness Boulevard, southeast on McGuiness Boulevard to the Brooklyn Queens Expressway, south/southeast on the Brooklyn Queens Expressway to the Verrazzano Bridge (or other NYSDEC approved routes). Truck routes are shown on Figure 12.

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 metals-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 9,450 cubic yards of historical fill and native soil that exceeds UUSCOs 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 6NYCRR Part 360), and federal regulations.

If hazardous soil is identified, it will be managed in accordance with applicable federal, state, and local regulations. As such, the handling, transport, and disposal of hazardous fill material is subject to USEPA and the OSHA HAZWOPER 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:

1. Hazardous waste disposal requires obtaining a United States EPA RCRA generator ID number
2. Hazardous waste must be transported to a facility permitted by RCRA to accept hazardous waste
3. Hazardous waste must be segregated and cannot be comingled with other Site material
4. 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 UUSCOs, 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 65-73 Eckford Realty LLC 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

Materials reuse is not anticipated at the Site.

If on-site material is proposed for reuse, material will be stockpiled and sampled at a frequency consistent with the recommendations of Table 5.4(e)10 in DER-10 in order to confirm UUSCOs are achieved prior to placing backfill. It is noted that only soils meeting the requirements in this section may be reused. Soil proposed for reuse must be non-hazardous, must not be grossly contaminated, and must meet Track 1 UUSCOs. Soil proposed for reuse will not contain organic matter, including wood, roots, stumps, etc., or other solid waste derived from clearing and grubbing. Soil removed during implementation of the remedy will not be reused in a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

5.4.7 Fluids Management

A dewatering and treatment system was designed by a GWTT NYS-licensed Professional Engineer. To date, GWTT has installed four dewatering sumps and brought a 7,800-gallon frac tank to the Site. Approximately 12,000 gallons of standing water was evacuated to the sewer on Eckford Street and as the current grade of the site does not extend into the groundwater interface, dewatering operations currently address only accumulated water from overflow events.

During future excavation associated with the remedy and installation of the proposed foundation, water management will be required to facilitate construction. Groundwater is encountered between 8 to 10 ft below sidewalk surface across the Site. The on-Site dewatering system was installed to collect the groundwater infiltration during the excavation. The revised permit, issued on August 27, 2021 (Permit No. 929596) allows for the dewatering of 20,000 gallons per day for the period of August 30, 2021 through August 29, 2022.

Groundwater will be collected from within the active work area using the four sumps installed by GWTT. Pumps will be used to convey collected groundwater from the sumps to a temporary on-Site treatment and/or collection system. Liquids removed from the Site, including dewatering fluids, will be handled, transported, and disposed of in accordance with approved New York City Department of Environmental Protection (NYCDEP) permits.

5.4.8 Backfill from Off-Site Sources

Materials proposed for import onto the Site are not anticipated as part of the Track 1 remedy. However, if imported materials is proposed, documentation of the material will be provided to NYSDEC for approval prior to its use on Site. Imported soil for backfill must meet the requirements of 6 NYCRR Part 375-6.7(d) and NYSDEC DER-10 Section 5.4(e), Table 5.4(e)10. Material from industrial sites, spill sites, other environmental remediation sites, or other potentially contaminated sites will not be imported to the Site. Solid waste will not be imported onto the Site.

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 recycled concrete aggregate (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 the UUSCOs. 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

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. Erosion and sediment control measures identified in the RAWP will be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they will be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to the sewer system.

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 upwind and downwind perimeters when ground intrusive activities, including soil/waste excavation, soil handling, test pit excavation and/or trenching, are in progress at the Site. The CAMP

aims to provide protection for residents in the designated work area and residents of the downwind community from potential airborne releases that directly result from the remedial construction activities conducted at the Site. Adherence to the monitoring action levels specified in the CAMP requires monitoring and, when necessary, corrective actions to abate emissions, and/or shutdown work. The CAMP also helps to confirm that work activities do not spread contamination off-Site through the air. In addition, visual and olfactory observations will be made to keep dust and odors at a minimum around the work areas. VOCs will be monitored using PIDs, and particulates will be monitored using TSI DustTrak Environmental Monitor (DustTraks) equipment. Readings will be recorded every 15-minutes at the Site by field personnel.

The following actions will be taken based on monitoring of particulate concentrations:

- If the downwind PM-10 particulate level is 100 µg/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 µg/m^3 above 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 µg/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 µg/m^3 of the upwind level and in preventing visible dust migration.

The following actions will be taken based on VOC monitoring:

- 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 shut down.

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 not exist beneath the development footprint after the Track 1 remedy is complete; therefore, ECs and ICs will not be required post-excavation.

7. Engineering Controls

Following completion of the Track 1 UUSCO remedy, neither ECs nor ICs will be required as part of the remedial action. In the event that a Track 4 cleanup (Restricted-Residential) is required since a Track 1 or Track 2 cleanup cannot be achieved, implementation of ECs and ICs may be required.

8. Final Engineering Report

A 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 1 UUSCOs.
- If necessary, a summary of remaining contamination that exceeds the Track 1 UUSCOs 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 1 UUSCOs 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.

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 10 to 12 weeks to complete. After completion of the remedy, a FER will be drafted and subsequently submitted to the NYSDEC for review and approval. A proposed project schedule is included in Appendix J.

References

1. Supplemental Remedial Investigation Report, 65 Eckford Street, Brooklyn, New York. Prepared by Haley & Aldrich of New York, prepared 65-73 Eckford Realty LLC, February 2022.

2. Interim Construction Completion Report, 65 Eckford Street, Brooklyn, New York. Prepared by Haley & Aldrich of New York, prepared 65-73 Eckford Realty LLC, February 2022.

3. Corrective Action Work Plan, 65 Eckford Street, Brooklyn, New York. Prepared by Haley & Aldrich of New York, prepared 65-73 Eckford Realty LLC, August 2021.

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

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

6. Remedial Investigation Report, 65 Eckford Street, Brooklyn, New York, June 2016, Prepared by Environmental Business Consultants, Prepared for Z65 Realty LLC.

7. Phase I Environmental Site Assessment Screening, 65 Eckford Street, Brooklyn, New York, May 2015, Environmental Business Consultants.

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

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

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

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TABLES

Table 1. Alternative I Remedial Cost Estimate

Former Carter Spray Finishing Corp.

65 Eckford Street, Brooklyn, NY

NYSDEC BCP Site C224218

Consulting/Engineering Costs					
Task	**Description**	**Unit**	**Unit Cost**	**Quantity**	**Total Cost**
1	Waste Characterization and Lead Delineation	Lump Sum	$ 80,000	1	$ 80,000
2	Program Management (NYSDEC/NYSDOH Correspondence, Daily/Weekly/Monthly Reporting, etc.)	Month	$ 15,000	10	$ 150,000
3	Remedial Oversight	Month	$ 30,000	3	$ 90,000
4	Confirmation Sampling	Sample	$ 1,000	15	$ 15,000
5	Closure Reporting and COC Coordination	Lump Sum	$ 60,000	1	$ 60,000
				Consulting/Engineering Subtotal	$ 395,000
Contractor Costs					
Task					
1	Mobilization/Demobilization, Site Maintenance, Security, etc.	Allowance	$ 200,000	1	$ 200,000
2	Truck Wash Station	Month	$ 25,000	6	$ 150,000
3	Management/Handling Contaminated Material	Cubic Yard	$ 40	7,600	$ 304,000
4	Support of Excavation (Tiebacks)	Linear Foot	$ 2,000	520	$ 1,040,000
5	Transport and Disposal of Fill Material	Ton	$ 75	11,000	$ 825,000
6	Transport and Disposal of Hazardous Material (Lead)	Ton	$ 275	2,000	$ 550,000
7	DARAMEND® and application	Allowance	$ 25,000	1	$ 25,000
8	Dewatering System	Month	$ 75,000	12	$ 900,000
9	Underground Storage Tank Removal	Allowance	$ 75,000	1	$ 75,000
				Contractor Subtotal	$ 4,069,000
				Total	$ 4,464,000
				15% Contingency	$ 669,600
				Estimated Total	$ 5,133,600

Notes:

1. Assuming a conditional Track 1 Remedy

2. Assumes density of 1.7 tons per cubic yard of fill/soil

3. Assumes residual soil will meet Track 1 Unrestricted Use Soil Cleanup Objectives

4. Assumes full site dewatering

5. SOE Costs are based on a conventional soldier pile and timber lagging system with lateral bracing provided by either steel rakers or tiebacks.

6. Costs are estimated and subject to change. Costs do not include new building construction.

7. RAWP implementation is assumed to take 2-3 months.

8. 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.

9. 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

Former Carter Spray Finishing Corp.

65 Eckford Street, Brooklyn, NY

NYSDEC BCP Site C224218

Consulting/Engineering Costs					
Task	**Description**	**Unit**	**Unit Cost**	**Quantity**	**Total Cost**
1	Waste Characterization and Lead Delineation	Lump Sum	$ 80,000	1	$ 80,000
2	Program Management (NYSDEC/NYSDOH Correspondence, Daily/Weekly/Monthly Reporting, etc.)	Month	$ 15,000	10	$ 150,000
3	Remedial Oversight	Month	$ 30,000	3	$ 90,000
4	Documentation Sampling	Sample	$ 1,000	15	$ 15,000
5	Closure Reporting and COC Coordination (including Site Management Plan)	Lump Sum	$ 110,000	1	$ 110,000
6	Site Management	Month	$ 10,000	360	$ 3,600,000
				Consulting/Engineering Subtotal	$ 4,045,000
Contractor Costs					
Task					
1	Mobilization/Demobilization, Site Maintenance, Security, etc.	Allowance	$ 200,000	1	$ 200,000
2	Truck Wash Station	Month	$ 25,000	6	$ 150,000
3	Management/Handling Contaminated Material	Cubic Yard	$ 40	5,700	$ 228,000
4	Support of Excavation	Linear Foot	$ 1,500	520	$ 780,000
5	Transport and Disposal of Fill Material	Ton	$ 75	7,700	$ 577,500
6	Transport and Disposal of Hazardous Material (Lead)	Ton	$ 275	2,000	$ 550,000
7	Dewatering System	Month	$ 75,000	12	$ 900,000
8	Underground Storage Tank Removal	Allowance	$ 75,000	1	$ 75,000
9	Composite Cover System	Allowance	$ 150,000	1	$ 150,000
				Contractor Subtotal	$ 3,610,500
				Total	$ 7,655,500
				15% Contingency	$ 1,148,325
				Estimated Total	$ 8,803,825

Notes:

1. Assuming a conditional Track 2 Remedy with site management

2. Assumes density of 1.7 tons per cubic yard of fill/soil

3. Assumes residual soil will meet Track 2 Restricted Residential Use Soil Cleanup Objectives

4. Assumes full dewatering

5. SOE Costs are based on a conventional soldier pile and timber lagging system with lateral bracing provided by either steel rakers or tiebacks.

6. Costs are estimated and subject to change. Costs do not include new building construction.

7. RAWP implementation is assumed to take 2-3 months.

8. This cost esimate 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.

9. This estimate does not include legal fees associated with attorneys involved in the project, insurance fees or outside consulting fees.

Table 3. Track 1 Soil Cleanup Objectives
Former Carter Spray Finishing Corp. Site
65 Eckford Street, Brooklyn, NY
NYSDEC BCP Site C224218

PCBs/Pesticides (mg/kg)	
Delta-BHC	0.04
Lindane	0.1
Alpha-BHC	0.02
Beta-BHC	0.036
Heptachlor	0.042
Aldrin	0.005
Endrin	0.014
Dieldrin	0.005
4,4'-DDE	0.0033
4,4'-DDD	0.0033
4,4'-DDT	0.0033
Endosulfan I	2.4
Endosulfan II	2.4
Endosulfan sulfate	2.4
cis-Chlordane	0.094
PCBs, Total	0.1

Volatile Organic Compounds (mg/kg)	
Methylene chloride	0.05
1,1-Dichloroethane	0.27
Chloroform	0.37
Carbon tetrachloride	0.76
Tetrachloroethene	1.3
Chlorobenzene	1.1
1,2-Dichloroethane	0.02
1,1,1-Trichloroethane	0.68
Benzene	0.06
Toluene	0.7
Ethylbenzene	1
Vinyl chloride	0.02
1,1-Dichloroethene	0.33
trans-1,2-Dichloroethene	0.19
Trichloroethene	0.47
1,2-Dichlorobenzene	1.1
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
Methyl tert butyl ether	0.93
Xylenes, Total	0.26
cis-1,2-Dichloroethene	0.25
Acetone	0.05
2-Butanone	0.12
n-Butylbenzene	12
sec-Butylbenzene	11
tert-Butylbenzene	5.9
Naphthalene	12
n-Propylbenzene	3.9
1,3,5-Trimethylbenzene	8.4
1,2,4-Trimethylbenzene	3.6
1,4-Dioxane	0.1

Semivolatile Organic Compounds (mg/kg)	
Acenaphthene	20
Hexachlorobenzene	0.33
1,2-Dichlorobenzene	1.1
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
Fluoranthene	100
Naphthalene	12
Benzo(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1
Benzo(k)fluoranthene	0.8
Chrysene	1
Acenaphthylene	100
Anthracene	100
Benzo(ghi)perylene	100
Fluorene	30
Phenanthrene	100
Dibenzo(a,h)anthracene	0.33
Indeno(1,2,3-cd)pyrene	0.5
Pyrene	100
Dibenzofuran	7
Pentachlorophenol	0.8
Phenol	0.33
2-Methylphenol	0.33
3-Methylphenol/4-Methylph	0.33
1,4-Dioxane	0.1

Metals (mg/kg)	
Arsenic, Total	13
Barium, Total	350
Beryllium, Total	7.2
Cadmium, Total	2.5
Copper, Total	50
Lead, Total	63
Manganese, Total	1600
Mercury, Total	0.18
Nickel, Total	30
Selenium, Total	3.9
Silver, Total	2
Zinc, Total	109

Notes:
1. Criteria are 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives
2. mg/kg: milligram per kilogram

FIGURES

GIS FILE PATH: C:\Users\hwachholz\Documents\working\superseded\202156\GIS\Maps\2021_08\202156_000_0001_PROJECT_LOCUS.mxd — USER: hwachholz — LAST SAVED: 8/3/2021 12:30:35 PM

HALEY ALDRICH

65 ECKFORD STREET
BROOKLYN, NEW YORK

PROJECT LOCUS

MAP SOURCE: ESRI
SITE COORDINATES: 40°43'19"N, 73°56'54"W

APPROXIMATE SCALE: 1 IN = 2000 FT
AUGUST 2021

FIGURE 1

LEGEND

SITE BOUNDARY

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 MARCH 2021

N

0 20 40

SCALE IN FEET

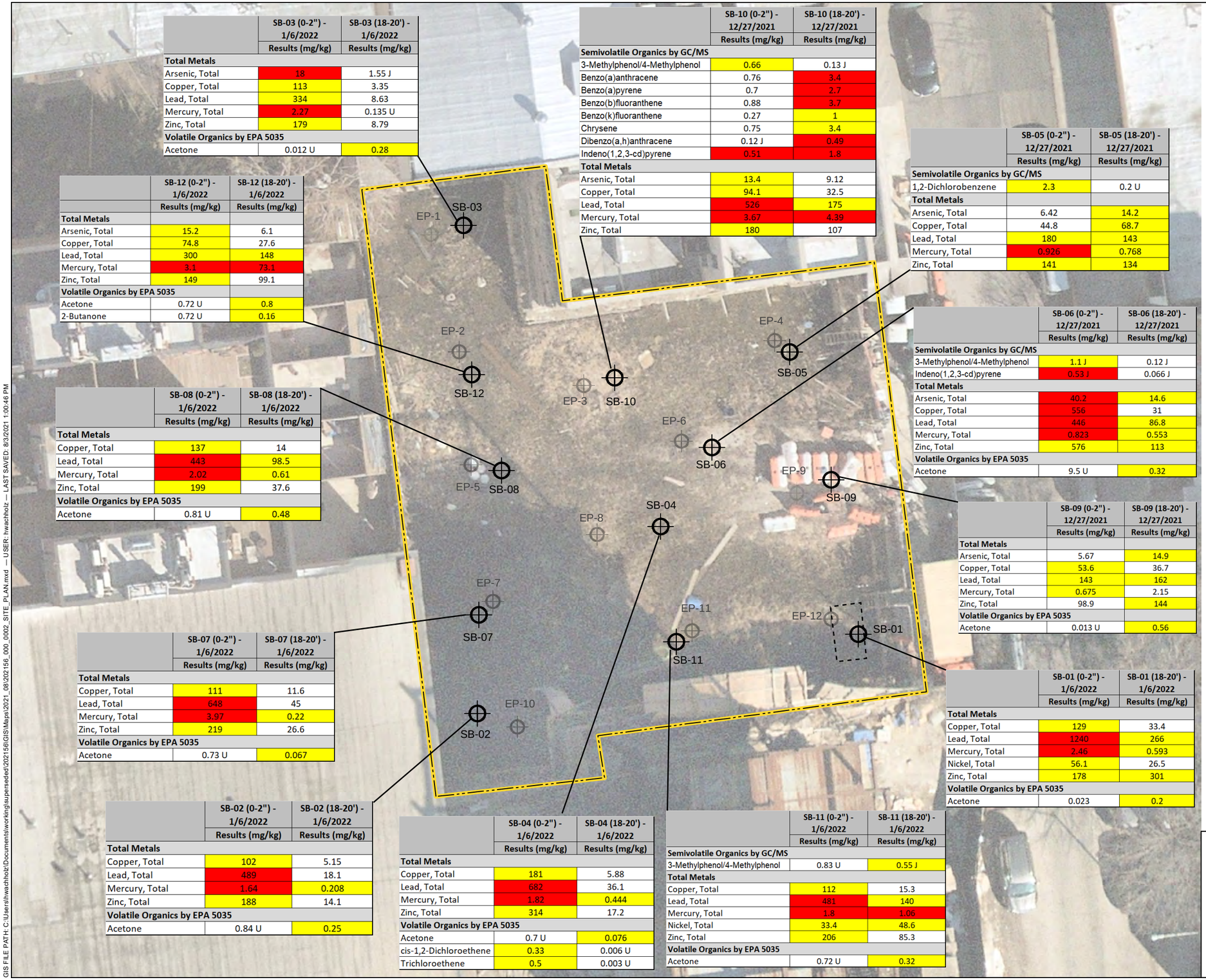
HALEY ALDRICH

65 ECKFORD STREET
BROOKLYN, NEW YORK

SITE PLAN

AUGUST 2021

FIGURE 2



	SB-03 (0-2") - 1/6/2022	SB-03 (18-20') - 1/6/2022
	Results (mg/kg)	Results (mg/kg)
Total Metals		
Arsenic, Total	18	1.55 J
Copper, Total	113	3.35
Lead, Total	334	8.63
Mercury, Total	2.27	0.135 U
Zinc, Total	179	8.79
Volatile Organics by EPA 5035		
Acetone	0.012 U	0.28

	SB-10 (0-2") - 12/27/2021	SB-10 (18-20') - 12/27/2021
	Results (mg/kg)	Results (mg/kg)
Semivolatile Organics by GC/MS		
3-Methylphenol/4-Methylphenol	0.66	0.13 J
Benzo(a)anthracene	0.76	3.4
Benzo(a)pyrene	0.7	2.7
Benzo(b)fluoranthene	0.88	3.7
Benzo(k)fluoranthene	0.27	1
Chrysene	0.75	3.4
Dibenzo(a,h)anthracene	0.12 J	0.49
Indeno(1,2,3-cd)pyrene	0.51	1.8
Total Metals		
Arsenic, Total	13.4	9.12
Copper, Total	94.1	32.5
Lead, Total	526	175
Mercury, Total	3.67	4.39
Zinc, Total	180	107

	SB-05 (0-2") - 12/27/2021	SB-05 (18-20') - 12/27/2021
	Results (mg/kg)	Results (mg/kg)
Semivolatile Organics by GC/MS		
1,2-Dichlorobenzene	2.3	0.2 U
Total Metals		
Arsenic, Total	6.42	14.2
Copper, Total	44.8	68.7
Lead, Total	180	143
Mercury, Total	0.926	0.768
Zinc, Total	141	134

	SB-12 (0-2") - 1/6/2022	SB-12 (18-20') - 1/6/2022
	Results (mg/kg)	Results (mg/kg)
Total Metals		
Arsenic, Total	15.2	6.1
Copper, Total	74.8	27.6
Lead, Total	300	148
Mercury, Total	3.1	73.1
Zinc, Total	149	99.1
Volatile Organics by EPA 5035		
Acetone	0.72 U	0.8
2-Butanone	0.72 U	0.16

	SB-06 (0-2") - 12/27/2021	SB-06 (18-20') - 12/27/2021
	Results (mg/kg)	Results (mg/kg)
Semivolatile Organics by GC/MS		
3-Methylphenol/4-Methylphenol	1.1 J	0.12 J
Indeno(1,2,3-cd)pyrene	0.53 J	0.066 J
Total Metals		
Arsenic, Total	40.2	14.6
Copper, Total	556	31
Lead, Total	446	86.8
Mercury, Total	0.823	0.553
Zinc, Total	576	113
Volatile Organics by EPA 5035		
Acetone	9.5 U	0.32

	SB-08 (0-2") - 1/6/2022	SB-08 (18-20') - 1/6/2022
	Results (mg/kg)	Results (mg/kg)
Total Metals		
Copper, Total	137	14
Lead, Total	443	98.5
Mercury, Total	2.02	0.61
Zinc, Total	199	37.6
Volatile Organics by EPA 5035		
Acetone	0.81 U	0.48

	SB-09 (0-2") - 12/27/2021	SB-09 (18-20') - 12/27/2021
	Results (mg/kg)	Results (mg/kg)
Total Metals		
Arsenic, Total	5.67	14.9
Copper, Total	53.6	36.7
Lead, Total	143	162
Mercury, Total	0.675	2.15
Zinc, Total	98.9	144
Volatile Organics by EPA 5035		
Acetone	0.013 U	0.56

	SB-07 (0-2") - 1/6/2022	SB-07 (18-20') - 1/6/2022
	Results (mg/kg)	Results (mg/kg)
Total Metals		
Copper, Total	111	11.6
Lead, Total	648	45
Mercury, Total	3.97	0.22
Zinc, Total	219	26.6
Volatile Organics by EPA 5035		
Acetone	0.73 U	0.067

	SB-01 (0-2") - 1/6/2022	SB-01 (18-20') - 1/6/2022
	Results (mg/kg)	Results (mg/kg)
Total Metals		
Copper, Total	129	33.4
Lead, Total	1240	266
Mercury, Total	2.46	0.593
Nickel, Total	56.1	26.5
Zinc, Total	178	301
Volatile Organics by EPA 5035		
Acetone	0.023	0.2

	SB-02 (0-2") - 1/6/2022	SB-02 (18-20') - 1/6/2022
	Results (mg/kg)	Results (mg/kg)
Total Metals		
Copper, Total	102	5.15
Lead, Total	489	18.1
Mercury, Total	1.64	0.208
Zinc, Total	188	14.1
Volatile Organics by EPA 5035		
Acetone	0.84 U	0.25

	SB-04 (0-2") - 1/6/2022	SB-04 (18-20') - 1/6/2022
	Results (mg/kg)	Results (mg/kg)
Total Metals		
Copper, Total	181	5.88
Lead, Total	682	36.1
Mercury, Total	1.82	0.444
Zinc, Total	314	17.2
Volatile Organics by EPA 5035		
Acetone	0.7 U	0.076
cis-1,2-Dichloroethene	0.33	0.006 U
Trichloroethene	0.5	0.003 U

	SB-11 (0-2") - 1/6/2022	SB-11 (18-20') - 1/6/2022
	Results (mg/kg)	Results (mg/kg)
Semivolatile Organics by GC/MS		
3-Methylphenol/4-Methylphenol	0.83 U	0.55 J
Total Metals		
Copper, Total	112	15.3
Lead, Total	481	140
Mercury, Total	1.8	1.06
Nickel, Total	33.4	48.6
Zinc, Total	206	85.3
Volatile Organics by EPA 5035		
Acetone	0.72 U	0.32

LEGEND

- SITE BOUNDARY
- SOIL BORING LOCATION
- PROPOSED ENDPOINT SAMPLE LOCATION FROM THE CORRECTIVE ACTION WORK PLAN
- APPROXIMATE LOCATION OF 550-GALLON UST REMOVED IN JUNE 2018

	NY-RESRR	NY-UNRES	Units
Semivolatile Organics by GC/MS			
3-Methylphenol/4-Methylphenol	100	0.33	mg/kg
Benzo(a)anthracene	1	1	mg/kg
Benzo(a)pyrene	1	1	mg/kg
Benzo(b)fluoranthene	1	1	mg/kg
Benzo(k)fluoranthene	3.9	0.8	mg/kg
Chrysene	3.9	1	mg/kg
Dibenzo(a,h)anthracene	0.33	0.33	mg/kg
Indeno(1,2,3-cd)pyrene	0.5	0.5	mg/kg
1,2-Dichlorobenzne	100	1.1	mg/kg
Total Metals			
Arsenic, Total	16	13	mg/kg
Copper, Total	270	50	mg/kg
Lead, Total	400	63	mg/kg
Mercury, Total	0.81	0.18	mg/kg
Nickel, Total	310	30	mg/kg
Zinc, Total	10000	109	mg/kg
Volatile Organics by EPA 5035			
Acetone	100	0.05	mg/kg
2-Butanone	100	0.12	mg/kg
cis-1,2-Dichloroethene	100	0.25	mg/kg
Trichloroethene	21	0.47	mg/kg

NY-RESRR: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

NY-UNRES: New York NYCRR Part 375 Unrestricted Criteria, Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

NOTES

1. ALL LOCATIONS ARE APPROXIMATE AND BASED ON FIELD MEASUREMENTS.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 MARCH 2021

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SCALE IN FEET

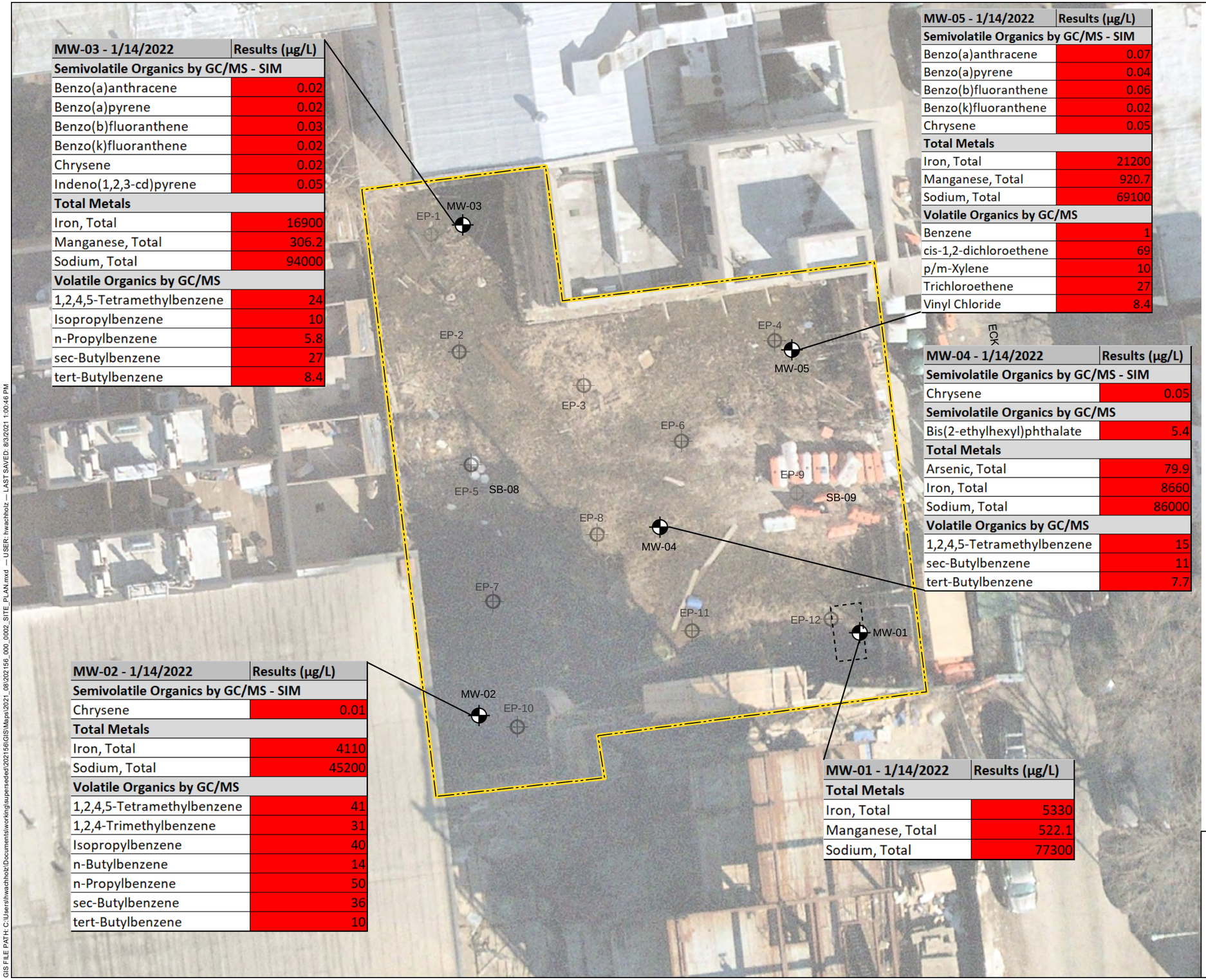
HALEY ALDRICH

65 ECKFORD STREET
BROOKLYN, NEW YORK

SOIL RESULTS EXCEEDANCE MAP

JANUARY 2022

FIGURE 3



MW-03 - 1/14/2022	Results (µg/L)
Semivolatile Organics by GC/MS - SIM	
Benzo(a)anthracene	0.02
Benzo(a)pyrene	0.02
Benzo(b)fluoranthene	0.03
Benzo(k)fluoranthene	0.02
Chrysene	0.02
Indeno(1,2,3-cd)pyrene	0.05
Total Metals	
Iron, Total	16900
Manganese, Total	306.2
Sodium, Total	94000
Volatile Organics by GC/MS	
1,2,4,5-Tetramethylbenzene	24
Isopropylbenzene	10
n-Propylbenzene	5.8
sec-Butylbenzene	27
tert-Butylbenzene	8.4

MW-05 - 1/14/2022	Results (µg/L)
Semivolatile Organics by GC/MS - SIM	
Benzo(a)anthracene	0.07
Benzo(a)pyrene	0.04
Benzo(b)fluoranthene	0.06
Benzo(k)fluoranthene	0.02
Chrysene	0.05
Total Metals	
Iron, Total	21200
Manganese, Total	920.7
Sodium, Total	69100
Volatile Organics by GC/MS	
Benzene	1
cis-1,2-dichloroethene	69
p/m-Xylene	10
Trichloroethene	27
Vinyl Chloride	8.4

MW-04 - 1/14/2022	Results (µg/L)
Semivolatile Organics by GC/MS - SIM	
Chrysene	0.05
Semivolatile Organics by GC/MS	
Bis(2-ethylhexyl)phthalate	5.4
Total Metals	
Arsenic, Total	79.9
Iron, Total	8660
Sodium, Total	86000
Volatile Organics by GC/MS	
1,2,4,5-Tetramethylbenzene	15
sec-Butylbenzene	11
tert-Butylbenzene	7.7

MW-02 - 1/14/2022	Results (µg/L)
Semivolatile Organics by GC/MS - SIM	
Chrysene	0.01
Total Metals	
Iron, Total	4110
Sodium, Total	45200
Volatile Organics by GC/MS	
1,2,4,5-Tetramethylbenzene	41
1,2,4-Trimethylbenzene	31
Isopropylbenzene	40
n-Butylbenzene	14
n-Propylbenzene	50
sec-Butylbenzene	36
tert-Butylbenzene	10

MW-01 - 1/14/2022	Results (µg/L)
Total Metals	
Iron, Total	5330
Manganese, Total	522.1
Sodium, Total	77300

LEGEND

- SITE BOUNDARY
- PERMANENT MONITORING WELL LOCATION
- PROPOSED ENDPOINT SAMPLE LOCATION FROM THE CORRECTIVE ACTION WORK PLAN
- APPROXIMATE LOCATION OF 550-GALLON UST REMOVED IN JUNE 2018

Ambient Water Quality (New York State Groundwater Effluent Limitations for Class GA Groundwater)		
Analytes	**Value**	**Unit**
Bis(2-ethylhexyl)phthalate	5	µg/L
Benzo(a)anthracene	0.002	µg/L
Benzo(a)pyrene	0.0	µg/L
Benzo(b)fluoranthene	0.002	µg/L
Benzo(k)fluoranthene	0.002	µg/L
Chrysene	0.002	µg/L
Indeno(1,2,3-cd)pyrene	0.002	µg/L
Arsenic, Total	25	µg/L
Iron, Total	300	µg/L
Manganese, Total	300	µg/L
Sodium, Total	20000	µg/L
1,2,4,5-Tetramethylbenzene	5	µg/L
1,2,4-Trimethylbenzene	5	µg/L
Benzene	1	µg/L
Isopropylbenzene	5	µg/L
n-Butylbenzene	5	µg/L
n-Propylbenzene	5	µg/L
sec-Butylbenzene	5	µg/L
tert-Butylbenzene	5	µg/L
p/m-Xylene	5	µg/L
cis-1,2-dichloroethene	5	µg/L
Trichloroethene	5	µg/L
Vinyl chloride	2	µg/L

NOTES

1. ALL LOCATIONS ARE APPROXIMATE AND BASED OFF FIELD MEASUREMENTS.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 MARCH 2021
3. GROUNDWATER ANALYTICAL RESULTS COMPARED TO NYSDEC TECHNICAL AND OPERATIONAL GUIDANCE SERIES (TOGS) 1.1.1 AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES FOR CLASS A DRINKING WATER.
4. RESULTS SHOWN IN MICROGRAMS PER LITER (ug/L)
5. RESULTS IN EXCEEDANCE OF NYSDEC TOGS AWQS ARE HIGHLIGHTED

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SCALE IN FEET

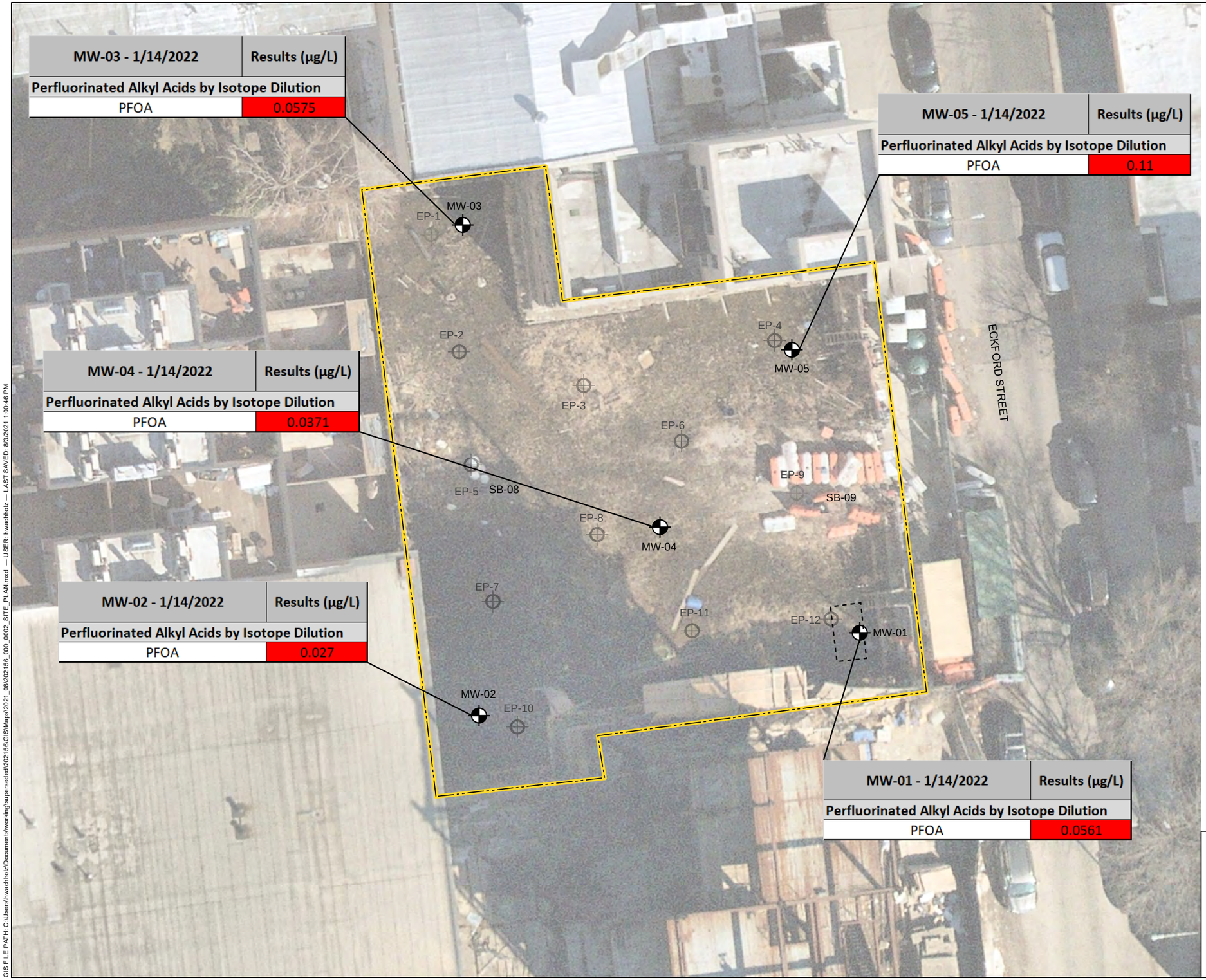
HALEY ALDRICH

65 ECKFORD STREET
BROOKLYN, NEW YORK

GROUNDWATER RESULTS EXCEEDANCE MAP

JANUARY 2022

FIGURE 4



LEGEND

- SITE BOUNDARY
- PERMANENT MONITORING WELL LOCATION
- PROPOSED ENDPOINT SAMPLE LOCATION FROM THE CORRECTIVE ACTION WORK PLAN
- APPROXIMATE LOCATION OF 550-GALLON UST REMOVED IN JUNE 2018

Ambient Water Quality (New York State Groundwater Effluent Limitations for Class GA Groundwater)		
Analytes	**Value**	**Unit**
Perfluorooctanoic Acid (PFOA)	0.01	µg/L

NOTES

1. ALL LOCATIONS ARE APPROXIMATE AND BASED ON FIELD MEASUREMENTS.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 MARCH 2021
3. GROUNDWATER ANALYTICAL RESULTS COMPARED TO NYSDEC TECHNICAL AND OPERATIONAL GUIDANCE SERIES (TOGS) 1.1.1 AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES FOR CLASS A DRINKING WATER.
4. RESULTS SHOWN IN MICROGRAMS PER LITER (ug/L)
5. RESULTS IN EXCEEDANCE OF NYSDEC TOGS AWQS ARE HIGHLIGHTED

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SCALE IN FEET

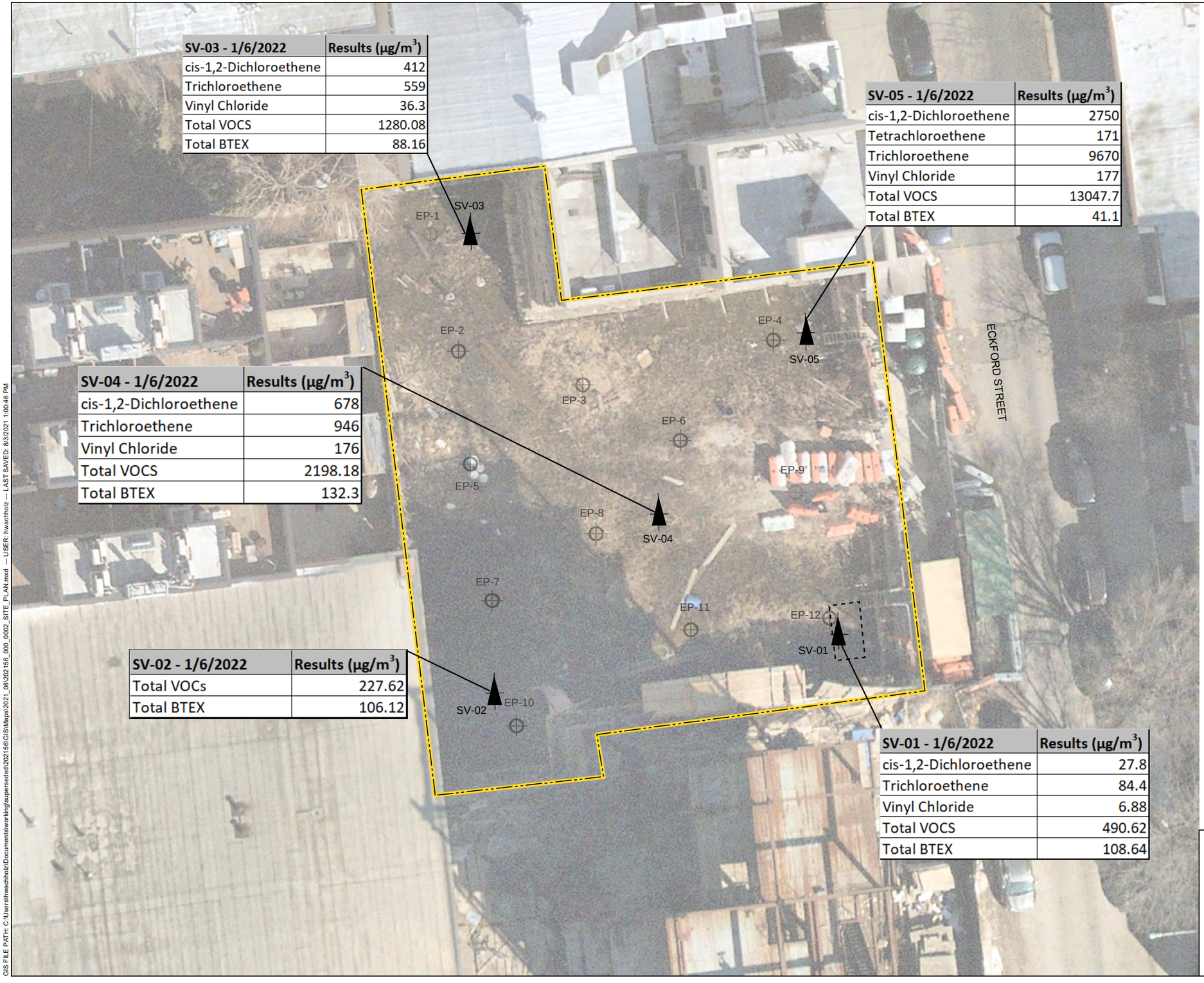
HALEY ALDRICH

65 ECKFORD STREET
BROOKLYN, NEW YORK

EMERGING CONTAMINANTS IN GROUNDWATER RESULTS EXCEEDANCE MAP

JANUARY 2022

FIGURE 5



SV-03 - 1/6/2022	Results (µg/m³)
cis-1,2-Dichloroethene	412
Trichloroethene	559
Vinyl Chloride	36.3
Total VOCS	1280.08
Total BTEX	88.16

SV-05 - 1/6/2022	Results (µg/m³)
cis-1,2-Dichloroethene	2750
Tetrachloroethene	171
Trichloroethene	9670
Vinyl Chloride	177
Total VOCS	13047.7
Total BTEX	41.1

SV-04 - 1/6/2022	Results (µg/m³)
cis-1,2-Dichloroethene	678
Trichloroethene	946
Vinyl Chloride	176
Total VOCS	2198.18
Total BTEX	132.3

SV-02 - 1/6/2022	Results (µg/m³)
Total VOCs	227.62
Total BTEX	106.12

SV-01 - 1/6/2022	Results (µg/m³)
cis-1,2-Dichloroethene	27.8
Trichloroethene	84.4
Vinyl Chloride	6.88
Total VOCS	490.62
Total BTEX	108.64

LEGEND

- SITE BOUNDARY
- SOIL VAPOR POINT LOCATION
- PROPOSED ENDPOINT SAMPLE LOCATION FROM THE CORRECTIVE ACTION WORK PLAN
- APPROXIMATE LOCATION OF 550-GALLON UST REMOVED IN JUNE 2018

NOTES

1. ALL LOCATIONS ARE APPROXIMATE AND BASED ON FIELD MEASUREMENTS.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 MARCH 2021

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SCALE IN FEET

HALEY ALDRICH

65 ECKFORD STREET
BROOKLYN, NEW YORK

SOIL VAPOR RESULTS MAP

JANUARY 2022

FIGURE 6

LEGEND

- SITE BOUNDARY
- JANUARY 2022 SRI GROUNDWATER MONITORING WELL (GROUNDWATER ELEVATION)
- 6.80 GROUNDWATER ELEVATION CONTOUR
- 6.80 INFERRED GROUNDWATER ELEVATION CONTOUR
- (6.80) GROUNDWATER ELEVATION (NAVD 88)
- GROUNDWATER FLOW DIRECTION

NOTES

1. ALL LOCATIONS ARE APPROXIMATE AND BASED OFF FIELD MEASUREMENTS.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 MARCH 2021
3. GROUNDWATER ELEVATIONS BASED ON MONITORING WELL SURVEY PERFORMED BY C.O.C. MAPPING CORPORATION ON 4 FEBRUARY 2022.

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SCALE IN FEET

HALEY ALDRICH

65 ECKFORD STREET
BROOKLYN, NEW YORK

GROUNDWATER CONTOUR MAP

MARCH 2022

FIGURE 7

LEGEND

ALTERNATIVE 1/ TRACK 1 REMEDIAL EXCAVATION TO 25 FT BGS

SITE BOUNDARY

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.

2. BASEMAP REFERENCED FROM NEW RESIDENTIAL BUILDING 65 ECKFORD STREET, BROOKLYN, N.Y., PREPARED BY S. WIEDER ARCHITECT PC, DATED 2.21.2022

3. FT BGS = FEET BELOW GROUND SURFACE

4. AERIAL IMAGERY SOURCE: NEARMAP, 12 MARCH 2021

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SCALE IN FEET

HALEY ALDRICH

65 ECKFORD STREET
BROOKLYN, NEW YORK

ALTERNATIVE I EXCAVATION PLAN

MARCH 2022

FIGURE 8

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0202156\GIS\Maps\2022_03\202156_000_0008_ALTERNATIVE_1_EXCAVATION_PLAN.mxd — USER: hwachholz — LAST SAVED: 3/11/2022 4:55:58 PM

LEGEND

- FEBRUARY 2022 SRI SOIL BORING LOCATION
- ALTERNATIVE II/ TRACK 2 REMEDIAL EXCAVATION TO 25 FT BGS (10X10 FT AREA CENTERED ON SRI BORINGS SB-10, SB-11, AND SB-12)
- ALTERNATIVE II/ TRACK 2 REMEDIAL EXCAVATION TO 20 FT BGS
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. BASEMAP REFERENCED FROM NEW RESIDENTIAL BUILDING 65 ECKFORD STREET, BROOKLYN, N.Y., PREPARED BY S. WIEDER ARCHITECT PC, DATED 2.21.2022
3. FT BGS = FEET BELOW GROUND SURFACE
4. AERIAL IMAGERY SOURCE: NEARMAP, 12 MARCH 2021

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SCALE IN FEET

HALEY ALDRICH

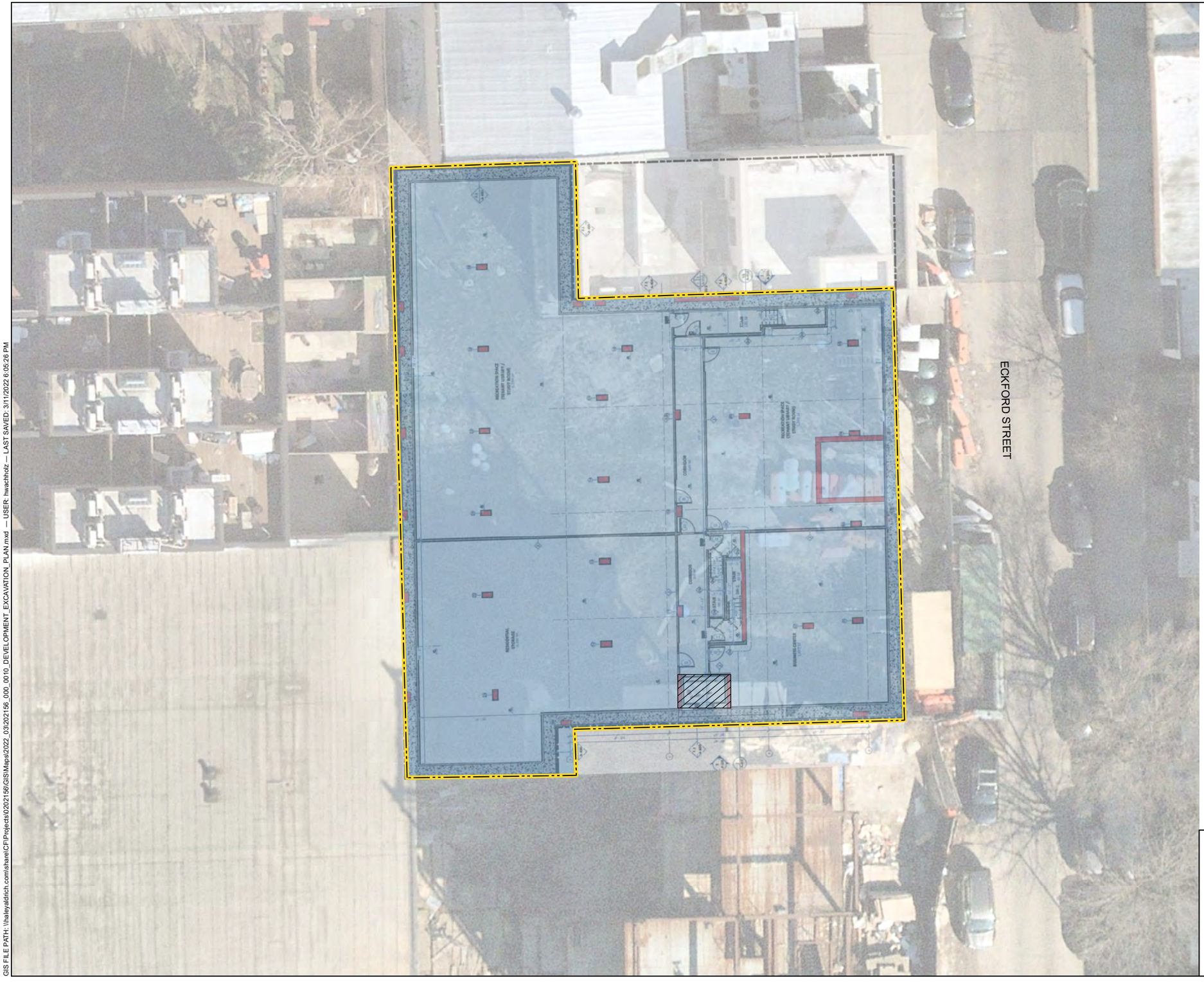
65 ECKFORD STREET
BROOKLYN, NEW YORK

ALTERNATIVE II EXCAVATION PLAN

MARCH 2022

FIGURE 9

GIS FILE PATH: \\haleyaldrich.com\share\CFIProjects\0202156\GIS\Maps\2022_03\202156_000_0009_ALTERNATIVE_2_EXCAVATION_PLAN.mxd — USER: hwachholz — LAST SAVED: 3/11/2022 5:41:33 PM



LEGEND

29 FT EXCAVATION FOR ELEVATOR PIT INSTALLATION

SITE-WIDE EXCAVATION TO 25 FEET BELOW GROUND SURFACE

SITE BOUNDARY

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.

2. BASEMAP REFERENCED FROM NEW RESIDENTIAL BUILDING 65 ECKFORD STREET, BROOKLYN, N.Y., PREPARED BY S. WIEDER ARCHITECT PC, DATED 2.21.2022

3. AERIAL IMAGERY SOURCE: NEARMAP, 12 MARCH 2021

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SCALE IN FEET

HALEY ALDRICH

65 ECKFORD STREET
BROOKLYN, NEW YORK

DEVELOPMENT EXCAVATION PLAN

FIGURE 10

MARCH 2022

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0202156\GIS\Maps\2022_03\202156_000_0010_DEVELOPMENT_EXCAVATION_PLAN.mxd — USER: hwachholz — LAST SAVED: 3/11/2022 6:05:26 PM

LEGEND

PROPOSED SOIL ENDPOINT SAMPLE LOCATION

SITE BOUNDARY

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 MARCH 2021

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SCALE IN FEET

HALEY ALDRICH

65 ECKFORD STREET
BROOKLYN, NEW YORK

ENDPOINT SAMPLE LOCATION PLAN

MARCH 2022

FIGURE 11

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0202156\GIS\Maps\2022_03\202156_000_0011_ENDPOINT_SAMPLE_LOCATION_MAP.mxd — USER: hwachholz — LAST SAVED: 3/11/2022 4:37:20 PM

Legend

- Local Truck Route
- Limited Local Truck Route
  Some of the roadways in Staten Island are designated as Limited Local Truck Routes. These roadways serve as Local Truck Routes but are limited to trucks with two axles and six tires.
- Through Truck Route
- Through Truck Route on Expressway
- Industrial Business Zones (IBZ)
- Parks and Open Spaces
- 29A Highway Exit
- Commercial Vehicles Prohibited

LEGEND

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

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 12 MARCH 2021

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SCALE IN FEET

HALEY ALDRICH

65 ECKFORD STREET
BROOKLYN, NEW YORK

TRUCK ROUTE MAP

MARCH 2022

FIGURE 12

APPENDIX A

Survey Map

SURVEY OF PROPERTY AT
KINGS COUNTY, N.Y.
TAX BLOCK: 2698 TAX LOT: 26

TOP OF PIPE
ELEV. 9.46

TOP OF PIPE
ELEV. 11.44

TAX BLOCK 2698
TAX LOT 26

ELEVATION OF GRADE = 9.50

TOP OF PIPE
ELEV. 11.52

TOP OF PIPE
ELEV. 11.75

TOP OF PIPE
ELEV. 11.45

TOP OF SIDEWALK EL = 15.60

ECKFORD STREET

LEGEND

... PIPE

NOTES:
1. THERE ARE NO VISIBLE STREAMS NOR NATURAL WATER COURSES IN THE PROPERTY EXCEPT AS SHOWN ON THIS SURVEY.
2. PROPERTY CORNER MONUMENTS WERE NOT PLACED AS PART OF THIS SURVEY.
3. IT IS A VIOLATION OF THE STATE EDUCATION LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED LAND SURVEYOR TO ALTER AN ITEM IN ANY WAY.
4. ARCHITECTS MUST ORDER A TOPOGRAPHICAL MAP SPECIFYING THEIR EXACT NEEDS.
5. CONSULT WITH THE HIGHWAY DEPARTMENT BEFORE DESIGNING, INSTALLING, OR MODIFYING ANY NEW OR EXISTING CURBS, WALKS, OR ROADWAYS IN THE STREETS SHOWN HEREON.
6. SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FROM VARIOUS CITY DEPARTMENTS AND/OR PRIVATE UTILITY COMPANIES. THE SURVEYOR ACCEPTS NO RESPONSIBILITY FOR ANY OF THIS DATA.
7. EASEMENTS OF RECORD ARE ONLY GUARANTEED IF AN ABSTRACT OF TITLE IS FURNISHED TO THE SURVEYOR.
8. ALL ELEVATIONS SHOWN REFER TO THE 1988 NAVD.

SURVEY No:- COC2022063

DESCRIPTION:- LOCATION OF TOP OF PIPE EL.

C.O.C MAPPING CORP.
COORDINATES OF CONSTRUCTION
91-22 215th PLACE
QUEENS VILLAGE, N.Y. 11428
TELEPHONE (347)239-9844
EMAIL:- COCMAPPING@GMAIL.COM

DRAFTED:-C.J | CHECKED:- SK

DATE:- FEBRUARY 4, 2022

STATE OF NEW YORK · ADRIAN S. LALSA · 050936 · LICENSED LAND SURVEYOR

APPENDIX B

Proposed Development Plans

DEPT OF BLDGS 320625016 Job Number

ES045846010 Scan Code

65 ECKFORD STREET

BROOKLYN NY 11222

PROPOSED 5 STORY RESIDENTIAL NEW BUILDING

24 DWELLING UNITS

SHEET LIST

	SHEET NUMBER	DOB REV. NUMBER	SHEET NAME	REVISION DATE	ISSUE
.T-100					
1	T-100	0	TITLESHEET	11/19/2021	DOB FILING
.Z-100					
2	Z-100	0	ZONING ANALYSIS	11/19/2021	DOB FILING
3	Z-101	0	ZONING SITE PLAN	11/19/2021	DOB FILING
4	Z-102	0	ZONING MAPS & SURVEY	11/19/2021	DOB FILING
5	Z-103	0	ZONING GROSS AREA PLANS	11/19/2021	DOB FILING
6	Z-104	0	ZONING GROSS AREA PLANS	11/19/2021	DOB FILING
7	Z-105	0	ZONING FLOOR AREA DEDUCTIONS	11/19/2021	DOB FILING
8	Z-106	0	ZONING FLOOR AREA DEDUCTIONS	11/19/2021	DOB FILING
9	Z-107	0	SITE IMAGES	11/19/2021	DOB FILING
A-000					
10	G-100	0	GENERAL NOTES	11/19/2021	DOB FILING
11	G-101	0	GENERAL NOTES	11/19/2021	DOB FILING
12	G-102	0	GENERAL NOTES	11/19/2021	DOB FILING
13	G-103	0	GENERAL NOTES	11/19/2021	DOB FILING
14	G-104	0	GENERAL NOTES	11/19/2021	DOB FILING
15	G-105	0	BUILDING CODE ANALYSIS	11/19/2021	DOB FILING
16	G-200	0	LIFE SAFETY PLANS	11/19/2021	DOB FILING
17	G-201	0	LIFE SAFETY PLANS	11/19/2021	DOB FILING
18	G-202	0	LIFE SAFETY PLANS	11/19/2021	DOB FILING
19	G-203	0	LIFE SAFETY PLANS	11/19/2021	DOB FILING
20	G-204	0	LIFE SAFETY PLANS	11/19/2021	DOB FILING
21	G-300	0	UNIT AREA PLANS	11/19/2021	DOB FILING
22	G-301	0	UNIT AREA PLANS	11/19/2021	DOB FILING
A-100					
23	A-100	0	SUBCELLAR FLOOR PLAN	11/19/2021	DOB FILING
24	A-101	0	CELLAR PLAN	11/19/2021	DOB FILING
25	A-102	0	1ST FLOOR PLAN	11/19/2021	DOB FILING
26	A-103	0	2ND FLOOR PLAN	11/19/2021	DOB FILING
27	A-104	0	3RD-4TH TYPICAL FLOOR PLAN	11/19/2021	DOB FILING
28	A-105	0	5TH FLOOR PLAN	11/19/2021	DOB FILING
29	A-106	0	ROOF PLAN	11/19/2021	DOB FILING
30	A-107	0	BULKHEAD PLAN	11/19/2021	DOB FILING
31	A-108	0	3D FLOOR PLAN VIEWS	11/19/2021	DOB FILING

SHEET LIST

	SHEET NUMBER	DOB REV. NUMBER	SHEET NAME	REVISION DATE	ISSUE
A-200					
32	A-200	0	EAST (ECKFORD STREET) ELEVATION	11/19/2021	DOB FILING
33	A-201	0	NORTH ELEVATION	11/19/2021	DOB FILING
34	A-202	0	WEST ELEVATION	11/19/2021	DOB FILING
35	A-203	0	SOUTH ELEVATION	11/19/2021	DOB FILING
36	A-210	0	3D VIEWS	11/19/2021	DOB FILING
A-300					
37	A-300	0	BUILDING SECTIONS	11/19/2021	DOB FILING
38	A-301	0	BUILDING SECTIONS	11/19/2021	DOB FILING
39	A-302	0	BUILDING SECTIONS	11/19/2021	DOB FILING
40	A-303	0	BUILDING SECTIONS	11/19/2021	DOB FILING
41	A-310	0	WALL SECTION 1	11/19/2021	DOB FILING
42	A-311	0	WALL SECTION 1	11/19/2021	DOB FILING
43	A-312	0	WALL SECTION 2	11/19/2021	DOB FILING
44	A-313	0	WALL SECTION 3	11/19/2021	DOB FILING
45	A-325	0	WALL DETAILS	11/19/2021	DOB FILING
46	A-330	0	3D SECTION	11/19/2021	DOB FILING
A-400					
47	A-400	0	EXTERIOR WALL DETAILS	11/19/2021	DOB FILING
48	A-401	0	FLOOR AND ROOF DETAILS	11/19/2021	DOB FILING
49	A-402	0	PARTITION DETAILS	11/19/2021	DOB FILING
50	A-403	0	DETAILS	11/19/2021	DOB FILING
51	A-404	0	DETAILS	11/19/2021	DOB FILING
52	A-410	0	REFUSE DETAILS	11/19/2021	DOB FILING
53	A-411	0	STAIR PLANS	11/19/2021	DOB FILING
54	A-412	0	STAIR PLANS	11/19/2021	DOB FILING
55	A-413	0	STAIR PLANS	11/19/2021	DOB FILING
56	A-414	0	BUILDING SECTIONS - PARKING RAMP	11/19/2021	DOB FILING
57	A-415	0	STAIR DETAILS	11/19/2021	DOB FILING
58	A-416	0	RAILING & LADDER DETAILS	11/19/2021	DOB FILING
59	A-417	0	ROOFING DETAILS	11/19/2021	DOB FILING
60	A-418	0	MISC DETAILS	11/19/2021	DOB FILING
61	A-419	0	FENCE DETAILS	11/19/2021	DOB FILING
A-500					
62	A-500	0	REFLECTED CEILING PLANS	11/19/2021	DOB FILING
63	A-501	0	REFLECTED CEILING PLANS	11/19/2021	DOB FILING
64	A-502	0	REFLECTED CEILING PLANS	11/19/2021	DOB FILING
65	A-503	0	REFLECTED CEILING PLANS	11/19/2021	DOB FILING
66	A-504	0	REFLECTED CEILING PLANS	11/19/2021	DOB FILING
A-600					
67	A-600	0	DOOR SCHEDULE	11/19/2021	DOB FILING
68	A-601	0	DOOR DETAILS	11/19/2021	DOB FILING
69	A-602	0	WINDOW SCHEDULE	11/19/2021	DOB FILING
A-700					
70	A-700	0	ENLARGED KITTE & LAUNDRY PLANS	11/19/2021	DOB FILING
71	A-701	0	ENLARGED BATH PLANS	11/19/2021	DOB FILING
A-800					
72	A-800	0	MAILBOX ELEVATIONS & ENLARGED BIKE ROOM	11/19/2021	DOB FILING
73	A-801	0	SIGNAGE	11/19/2021	DOB FILING
EN-100					
74	EN-100	0	ENERGY ANALYSIS	11/19/2021	DOB FILING
75	EN-101	0	ENERGY ANALYSIS	11/19/2021	DOB FILING
76	EN-102	0	ENERGY AREA DIAGRAMS	11/19/2021	DOB FILING
77	EN-103	0	ENERGY AREA DIAGRAMS	11/19/2021	DOB FILING
78	EN-104	0	ENERGY THERMAL ENVELOPE DIAGRAM	11/19/2021	DOB FILING
79	EN-105	0	ENERGY THERMAL ENVELOPE DIAGRAM	11/19/2021	DOB FILING
80	EN-200	0	ENERGY INSPECTIONS	11/19/2021	DOB FILING
81	EN-201	0	ENERGY INSPECTIONS	11/19/2021	DOB FILING
82	EN-202	0	ENERGY INSPECTIONS	11/19/2021	DOB FILING
TOTAL: 82					

NYC Buildings
APPROVED
Under Directive 2 of 1975
AMENDED APPLICATION
Date: 02/24/2022
NYC Development Hub

RELATED APPLICATIONS

#	WORK TYPE		APPLICATION #	DOCUMENT #	
1	FN	FENCE	320625016	01	TO BE FILED UNDER SEPARATE APPLICATION
2	FO	FOUNDATION	320625016	02	FILED UNDER SEPARATE APPLICATION
3	ST	STRUCTURAL	320625016	03	FILED UNDER SEPARATE APPLICATION
4		SHED	320625016	04	TO BE FILED UNDER SEPARATE APPLICATION
5	SOE	SUPPORT OF EXCAVATION	320625016	05	
6	MH	MECHANICAL	320625016	06	UNDER SUBSEQUENT APPLICATION
7	PL	PLUMBING	320625016	06	UNDER SUBSEQUENT APPLICATION
8	SP	SPRINKLER	320625016	08	FILED UNDER SUBSEQUENT APPLICATION
9	DM	DEMOLITION	321142278	01	TO BE FILED UNDER SEPARATE APPLICATION
10	CC	CURB CUT		01	TO BE FILED UNDER SEPARATE APPLICATION
11		SITE CONNECTION		-	TO BE FILED UNDER SEPARATE APPLICATION
12		ELEVATOR		01	TO BE FILED UNDER SEPARATE APPLICATION
13	FA	FIRE ALARM		01	FILED UNDER SEPARATE APPLICATION
14		ZONING EXHIBIT RECORD		-	
15	BPP	BUILDERS PAVEMENT PLAN		01	TO BE FILED UNDER SEPARATE APPLICATION
16		STREET TREE		-	TO BE FILED UNDER SEPARATE APPLICATION
17		STANDPIPE	320625016	08	TO BE FILED UNDER SEPARATE APPLICATION

SWA
S. WIEDER ARCHITECT PC

203 CLIFTON PLACE, SUITE #20
BROOKLYN NY, 11216
T: (718) 484-3201

STRUCTURAL ENGINEER:
...

MEP ENGINEER:
...

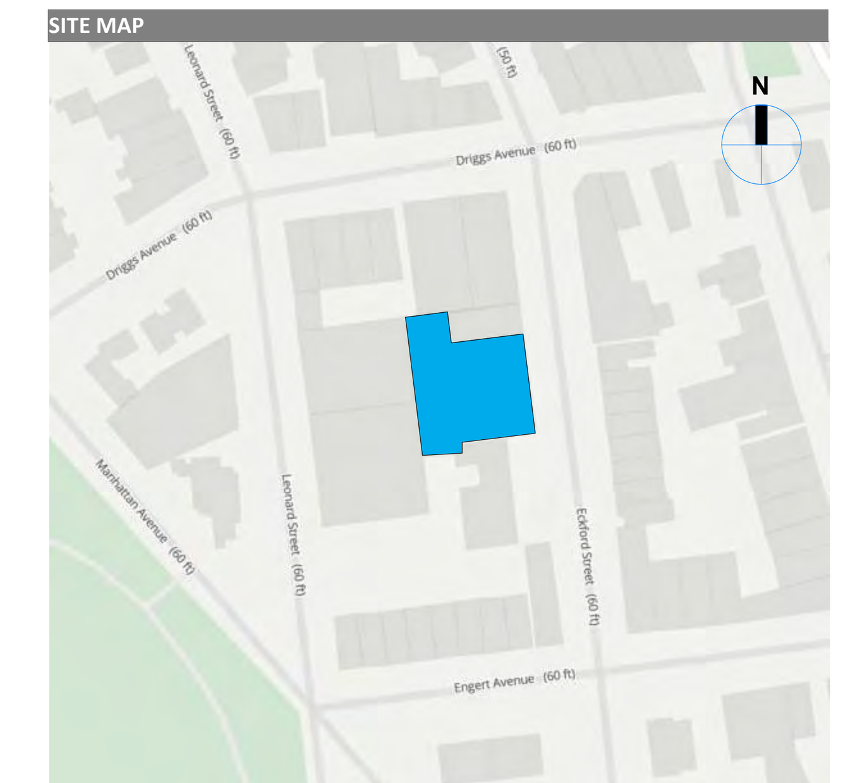
MUNICIPAL CONSULTANT:
...

OWNER:
...

NO.	DESCRIPTION	DATE
0	DOB FILING	11/19/2021

75% CONSTRUCTION DRAWINGS

SITE MAP



LOCATION:

65 ECKFORD STREET
BROOKLYN, NEW YORK 11222

PROPOSED 5 STORY RESIDENTIAL NEW BUILDING

TITLESHEET

DOB # :

320625016

DOB BSCAN + STAMP :

REGISTERED ARCHITECT SHMUEL WIEDER 040451 STATE OF NEW YORK
02/21/2022 3:36:44 PM

DATE: 2/21/2022 3:17:37 PM
SCALE:
DRAWN BY: XX

T-100.00

SHEET: 1 OF 82

2/21/2022 3:17:37 PM

DEPT OF BLDGS 320625016 Job Number

ES011755204 Scan Code

SITE INFORMATION

ADDRESS	65 ECKFORD STREET BROOKLYN, NEW YORK 11222
BLOCK	2698
LOT	26
COMMUNITY BOARD	BROOKLYN COMMUNITY DISTRICT 1
ZONING DISTRICT	M1-2/R6B, MX-8
SPECIAL ZONING DISTRICT	MX-8 SPECIAL MIXED USE DISTRICT
ZONING MAP	13a
LOT AREA	10,142 SF
USE GROUP	2A
OCCUPANCY GROUP	R-2
CONSTRUCTION CLASSIFICATION	IB
MULTIPLE DWELLING CLASSIFICATION	HAEA
BUILDING CODE	2014 NYC BUILDING CODE
ENERGY CODE	2020 NEW YORK CITY ENERGY CONSERVATION CODE, APPENDIX CA (MODIFIED 90.1-2016)
ENVIRONMENTAL NYC OFFICE OF REMEDIATION	LITTLE "E" DESIGNATION
TRANSIT AUTHORITY MTA	N/A
MIH INCLUSIONARY HOUSING DESIGNATED AREA	N/A
VIH INCLUSIONARY HOUSING DESIGNATED AREA	INCLUSIONARY HOUSING ZONE
LANDMARK	N/A
PRIMARY STRUCTURAL SYSTEM	CAST IN PLACE CONCRETE
STRUCTURAL OCCUPANCY RISK	II
SEISMIC DESIGN CATEGORY	B

ZR 23-62 (G) (1)(2) (3)

(1) SUCH OBSTRUCTIONS SHALL BE LOCATED NOT LESS THAN 10 FEET FROM THE STREET WALL OF A BUILDING, EXCEPT THAT SUCH OBSTRUCTIONS NEED NOT BE SET BACK MORE THAN 25 FEET FROM A NARROW STREET LINE OR MORE THAN 20 FEET FROM A WIDE STREET LINE.

PROPOSED BULKHEAD IS SETBACK 23'-11" FROM STREET WALL

(2) ALL MECHANICAL EQUIPMENT SHALL BE SCREENED ON ALL SIDES.

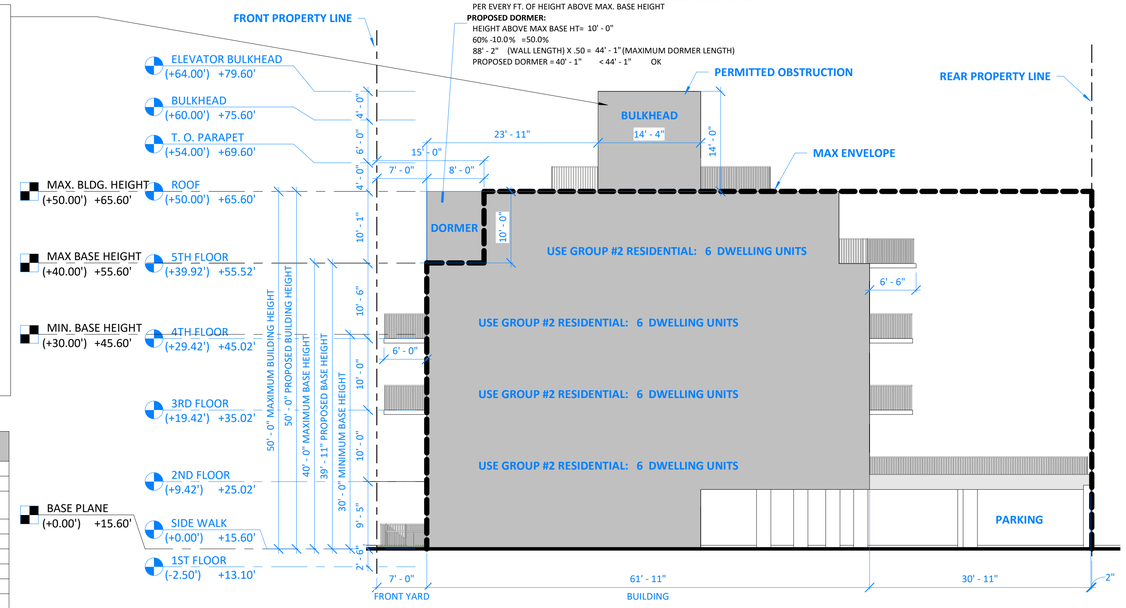
N/A

(3)(II) THE LOT COVERAGE OF ALL SUCH OBSTRUCTIONS DOES NOT EXCEED 20 % OF THE LOT COVERAGE OF THE BUILDING, AND WHERE THE MAXIMUM PERMITTED HEIGHT OF A BUILDING IS LESS THAN 120'-0" SUCH OBSTRUCTIONS ARE LIMITED TO A MAXIMUM HEIGHT OF 25'-0".

PROPOSED BUILDING LOT COVERAGE = 5,460 SF
PERMITTED OBSTRUCTION AREA (5,460 X .2) = 1,092 SF

PROPOSED OBSTRUCTION AREA = 462 SF
462 SF < 1,092 SF OK

MAX. PERMITTED BUILDING HEIGHT 50'-0" <120'-0"
PROPOSED OBSTRUCTION HEIGHT = 14'-0"
14'-0" < 25'-0" OK

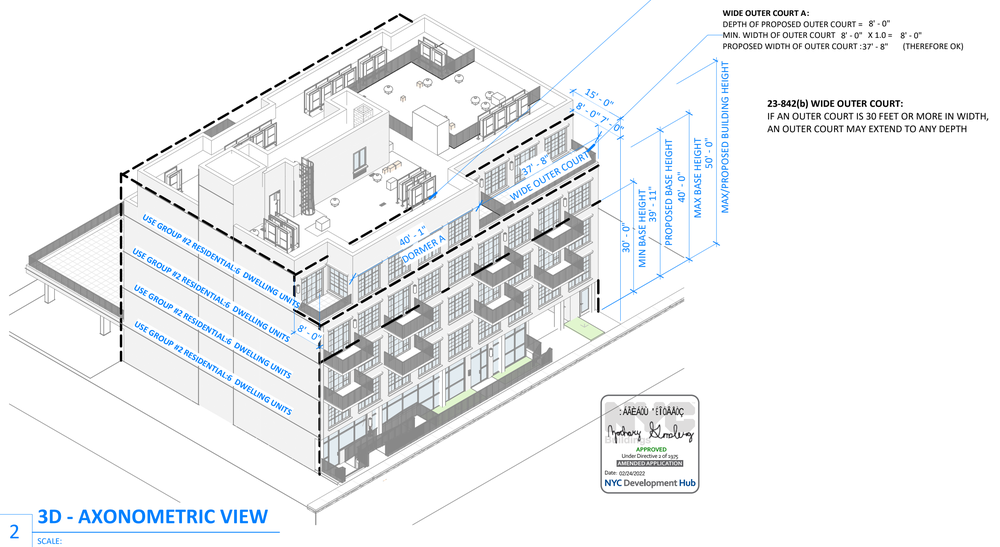


3 ZONING SECTION DIAGRAM.

SCALE: 1" = 10'-0"

BASE PLANE CALCULATION
15.25 + 15.94 = 31.19 / 2 = 15.60

NOTE: ALL ELEVATIONS IN ACCORDANCE WITH NAVD



2 3D - AXONOMETRIC VIEW

SCALE:

ZONING ANALYSIS

SECTION	DESCRIPTION	MAX. ALLOWED OR MIN. REQ'D	PROPOSED
ZR 22-12, 42-00,	USES PERMITTED AS-OF-RIGHT	USE GROUPS: (RESIDENTIAL)1-4, (COMMERCIAL/RECREATION) 5-14. (GENRAL SERVICE/MANUFACTURING) 16 & 17	USE GROUP: 2
ZR 23-153	MAX. FLOOR AREA RATIO	RESIDENTIAL R6B: 2.0 MAX FAR	2.0 FAR, (20,276 SF)
ZR 23-153	MAX. FLOOR AREA	10,142 SF X 2.0 = 20,284 SF MAX ALLOWABLE FLOOR AREA	20,276 SF PROPOSED FLOOR AREA
ZR 23-153	MAX. LOT COVERAGE	60% (10,142 SF X .60 = 6,085 SF)	54% 5,460 SF, COMPLIES
ZR 23-22	MAX. # DWELLING UNITS	680	
		29 DWELLING UNITS (20,284 SF/ 680 = 29)	24 DWELLING UNITS
ZR 23-45	MIN. FRONT YARD	NO FRONT YARD IS REQUIRED, HOWEVER, IF ONE IS PROVIDED, THE AREA OF THE ZONING LOT BETWEEN THE STREET LINE AND ALL STREET WALLS OF THE BUILDING AND THEIR PROLONGATIONS SHALL BE PLANTED IN COMPLIANCE WITH ZR 28-23	7'-0" PLANTED FRONT YARD PROVIDED
ZR 23-462(c)	MIN. SIDE YARD	NO SIDE YARD IS REQUIRED, HOWEVER, IF ONE IS PROVIDED IT SHALL HAVE A MINIMUM WIDTH OF 8'-0"	0'-0", N/A NO SIDE YARD PROVIDED
ZR 23-47, 23-541	MIN. REAR YARD	30'-0" MINIMUM REAR YARD REQUIRED	REAR YARD DEPTH VARIES, 30'-6" MINIMUM PROPOSED, SEE SITE PLAN Z-101
ZR 23-661(b)(2)	STREET WALL LOCATION	THE STREET WALL SHALL BE LOCATED NO CLOSER TO THE STREET LINE THAN THE CLOSEST STREET WALL, OR PORTION THEREOF, OF AN EXISTING ADJACENT BUILDING ON THE AN ADJOINING ZONING LOT LOCATED ON THE SAME STREET FRONTAGE, THAT IS BOTH WITHIN 15 FEET OF THE STREET LINE AND WITHIN 25 FEET OF SUCH QUALITY HOUSING BUILDING.	STREET WALL LOCATED AT 7'-0" FROM STREET LINE.
ZR 23-662(C)(2)	REQUIRED SETBACK	15'-0" REQUIRED SETBACK AT NARROW STREET THE DEPTH OF SUCH REQUIRED SETBACK MAY BE REDUCED BY ONE FOOT FOR EVERY FOOT THAT THE STREET WALL IS LOCATED BEYOND THE STREET LINE, BUT IN NO EVENT SHALL A SETBACK OF LESS THAN SEVEN FEET IN DEPTH BE PROVIDED DISTANCE FROM THE STREET LINE TO THE STREET WALL - 7'-0" 15'-0" - 7'-0" = 8'-0" PERMITTED SETBACK	8'-0" PROPOSED SETBACK AT ECKFORD STREET (60'-0" WIDE)
ZR 23-662	MIN BASE HEIGHT	30'-0" MINIMUM BASE HEIGHT	39'-11" PROPOSED BASE HEIGHT
ZR 23-662	MAX BASE HEIGHT	40'-0" MAXIMUM BASE HEIGHT	39'-11" PROPOSED BASE HEIGHT
ZR 23-662	MAX. BUILDING HEIGHT	50'-0" MAXIMUM BUILDING HEIGHT	50'-0" PROPOSED BUILDING HEIGHT
ZR 25-23, 25-62	MIN. PARKING SPACES	R6B QUALITY HOUSING BUILDING: 50% OF DWELLING UNITS 24 PROPOSED DWELLING UNITS X 0.50 = 12 REQUIRED PARKING SPACES	21 PROPOSED PARKING SPACES LOCATED AT 1ST FLOOR SEE A-102
ZR 25-811	BICYCLE PARKING	1 PER 2 DWELLING UNITS IF MORE THAN 10 UNITS	24 UNITS PROPOSED 24 / 2= 12 REQUIRED BICYCLE PARKING SPACES PROPOSED 12 BICYCLE PARKING SPACES, SEE A-102 & A-800
ZR 26-41	STREET TREE PLANTING	ONE TREE PER 25 FEET OF ZONING LOT STREET FRONTAGE. 88'-6" ECKFORD STREET FRONTAGE / 25'-0" = 4 REQUIRED STREET TREES	4 TREES TO BE PAID INTO THE TREE FUND OFFSITE

ZONING QUALITY HOUSING REGULATIONS

SECTION	DESCRIPTION	MAX. ALLOWED OR MIN. REQ'D	PROPOSED
ZR 23-011 (b)	QUALITY HOUSING PROGRAM	BULK REGULATIONS APPLICABLE TO QUALITY HOUSING BUILDINGS MAY BE APPLIED AS AN ALTERNATIVE.	COMPLIES
ZR 28-01	APPLICATION OF QUALITY HOUSING REGULATIONS	QUALITY HOUSING PROGRAM STANDARDS AND REQUIREMENTS IN CONJUNCTION WITH BULK PROVISIONS FOR QUALITY HOUSING BUILDINGS	COMPLIES
ZR 28-11	ELEVATED GROUND FLOOR UNITS	UP TO 100 SF OF ENTRYWAYS FOR EACH 1'-0" OF DIFFERENCE BETWEEN FLOOR LEVEL OF #DWELLING UNITS# AND #CURB LEVEL#. MAX 500 SF DEDUCTION ALLOWED	N/A
ZR 28-12	REFUSE STORAGE & DISPOSAL	DISPOSAL: A REFUSE DISPOSAL ROOM OF NOT LESS THAN 12 SF WITH NO DIMENSION LESS THAN 3 FT SHALL BE PROVIDED ON EACH STORY THAT HAS ENTRANCES TO DWELLING UNITS. STORAGE: THE STORAGE OF REFUSE SHALL BE PROVIDED AT THE RATE OF 2.9 CUBIC FEET PER DWELLING UNIT. 24 UNITS X 2.9 CF= 70 CF	DISPOSAL: 38 S. F. REFUSE DISPOSAL ROOM PROVIDED AT 2ND-5TH FLOOR STORAGE: PROVIDED AT CELLAR, 369 X 8'-6" = 3,137 C. F., SEE SHEET A-101
ZR 28-13	LAUNDRY FACILITIES	1 WASHING MACHINE PER 20 DWELLING UNITS (24 / 20 = 2 REQUIRED WASHING MACHINES) 1 DRYER PER 40 DWELLING UNITS (24 / 40 = 1 REQUIRED DRYER)	PROPOSED IN EACH DWELLING UNIT
ZR 28-14	DAYLIGHT IN CORRIDORS	50% OF THE SF OF A CORRIDOR MAY BE EXCLUDED FROM THE DEFINITION OF FLOOR AREA IF A WINDOW WITH A CLEAR, NON-TINTED, GLAZED AREA OF AT LEAST 20 SF IS PROVIDED IN SUCH CORRIDOR, PROVIDED THAT SUCH WINDOW: (A) SHALL BE DIRECTLY VISIBLE FROM AT LEAST 50 % OF THE CORRIDOR OR FROM THE VERTICAL CIRCULATION CORE. THIS STANDARD SHALL BE ACHIEVED WHEN A VISUALLY UNOBSTRUCTED STRAIGHT LINE CAN BE DRAWN BETWEEN SUCH CORRIDOR, ELEVATOR OR STAIRWELL, AND THE WINDOW; AND (B) IS FACING A STREET, YARD OR COURT THAT MEETS THE APPLICABLE REGULATIONS SET FORTH IN ARTICLE II, CHAPTER 3.	COMPLIES, SEE SHEET Z-105 & Z-106 FOR DEDUCTIONS
ZR 28-21	RECREATION SPACE REQ. FOR 9 D.U. & OVER	MINIMUM REQUIRED RECREATION SPACE. (3.3% x 20,276 SF) = 669 SF	PROPOSED INDOOR RECREATION SPACE = 669 SF LOCATED AT 1ST FLOOR, SEE A-102
ZR 28-23	PLANTING AREAS	AREA BETWEEN THE STREET LINE AND THE STREET WALL SHALL BE PLANTED, EXCEPT THAT SUCH PLANTINGS SHALL NOT BE REQUIRED AT THE ENTRANCES TO AND EXITS FROM THE BUILDING.., OR BETWEEN NON-RESIDENTIAL USES.., AND THE STREET LINE.	BUILDING STARTS 7'-0" FROM PROPERTY LINE, PLANTING TO BE PROVIDED SEE 1ST FLOOR PLAN, SHEET A-102, Z-101
ZR 28-31	DENSITY PER CORRIDOR	IF THE NUMBER OF DWELLING UNITS SERVED BY A VERTICAL CIRCULATION CORE & CORRIDOR ON EACH STORY DOES NOT EXCEED THE NUMBER SET FORTH IN THE FOLLOWING TABLE, 50 % OF THE SF OF THE CORRIDOR SERVING SUCH DU ON SUCH STORY MAY BE EXCLUDED FROM FLOOR AREA. DU WITH ENTRANCE DOORS ON MORE THAN ONE CORRIDOR (DUPLEX AND TRIPLEX UNITS), MAY COUNT EACH ENTRANCE DOOR AS A FRACTION OF THE TOTAL NUMBER OF DOORS TO SUCH DU WHEN DETERMINING THE NUMBER OF DU SERVED PER CORRIDOR. R6 R7: 11 DU	COMPLIES, SEE SHEET Z-105 & Z-106 FOR DEDUCTIONS
ZR 28-40	PARKING FOR QUALITY HOUSING	ACCESSORY OFF-STREET PARKING SHALL BE PROVIDED AS SET FORTH IN THE APPLICABLE DISTRICT REGULATIONS.	COMPLIES

NOTE:
ALL RELATED FACILITIES AND AMENITIES REQUIRED PURSUANT THE QUALITY HOUSING PROGRAM SHALL NOT BE REMOVED.

ZONING FLOOR AREA SCHEDULE

LEVEL	USE	GFA	DEDUCTION AREA	ZFA	F.A.R.	LOT_AREA	LOT COVERAGE	USE GROUP	OCCUPANCY GROUP	DWELLING UNITS
RESIDENTIAL										
SUBCELLAR FLOOR	RESIDENTIAL	10,092 SF	10,092 SF	0 SF	0.00	10,142 SF	100%	2B	R2	0
CELLAR	RESIDENTIAL	10,092 SF	10,092 SF	0 SF	0.00	10,142 SF	100%	2B	R2	0
1ST FLOOR	RESIDENTIAL	2,656 SF	1,720 SF	936 SF	0.09	10,142 SF	2%	2B	R2	0
2ND FLOOR	RESIDENTIAL	5,461 SF	416 SF	5,045 SF	0.50	10,142 SF	54%	2A	R2	6
3RD FLOOR	RESIDENTIAL	5,461 SF	437 SF	5,024 SF	0.50	10,142 SF	54%	2A	R2	6
4TH FLOOR	RESIDENTIAL	5,461 SF	437 SF	5,024 SF	0.50	10,142 SF	54%	2A	R2	6
5TH FLOOR	RESIDENTIAL	4,621 SF	373 SF	4,248 SF	0.42	10,142 SF	46%	2A	R2	6
ROOF	RESIDENTIAL	470 SF	470 SF	0 SF	0.00	10,142 SF	5%	2B	R2	0
		44,313 SF	24,037 SF	20,276 SF	2.00					24
TOTALS		44,313 SF	24,037 SF	20,276 SF	2.00 < 2.00 FAR					24

< 20,284 SF THEREFORE OK

S. WIEDER ARCHITECT PC

203 CLIFTON PLACE, SUITE #20
BROOKLYN NY, 11216
T: (718) 484-3201

STRUCTURAL ENGINEER:
...

MEP ENGINEER:
...

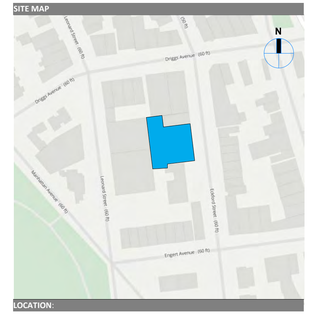
MUNICIPAL CONSULTANT:
...

OWNER:
...

NO.	DESCRIPTION	DATE
0	DOB FILING	11/19/2021

75% CONSTRUCTION DRAWINGS

SITE MAP



LOCATION:

65 ECKFORD STREET
BROOKLYN, NEW YORK 11222

PROPOSED 5 STORY RESIDENTIAL NEW BUILDING

ZONING ANALYSIS

DOB # :

320625016

DOB BSCAN + STAMP :

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SCALE: 1" = 10'-0"
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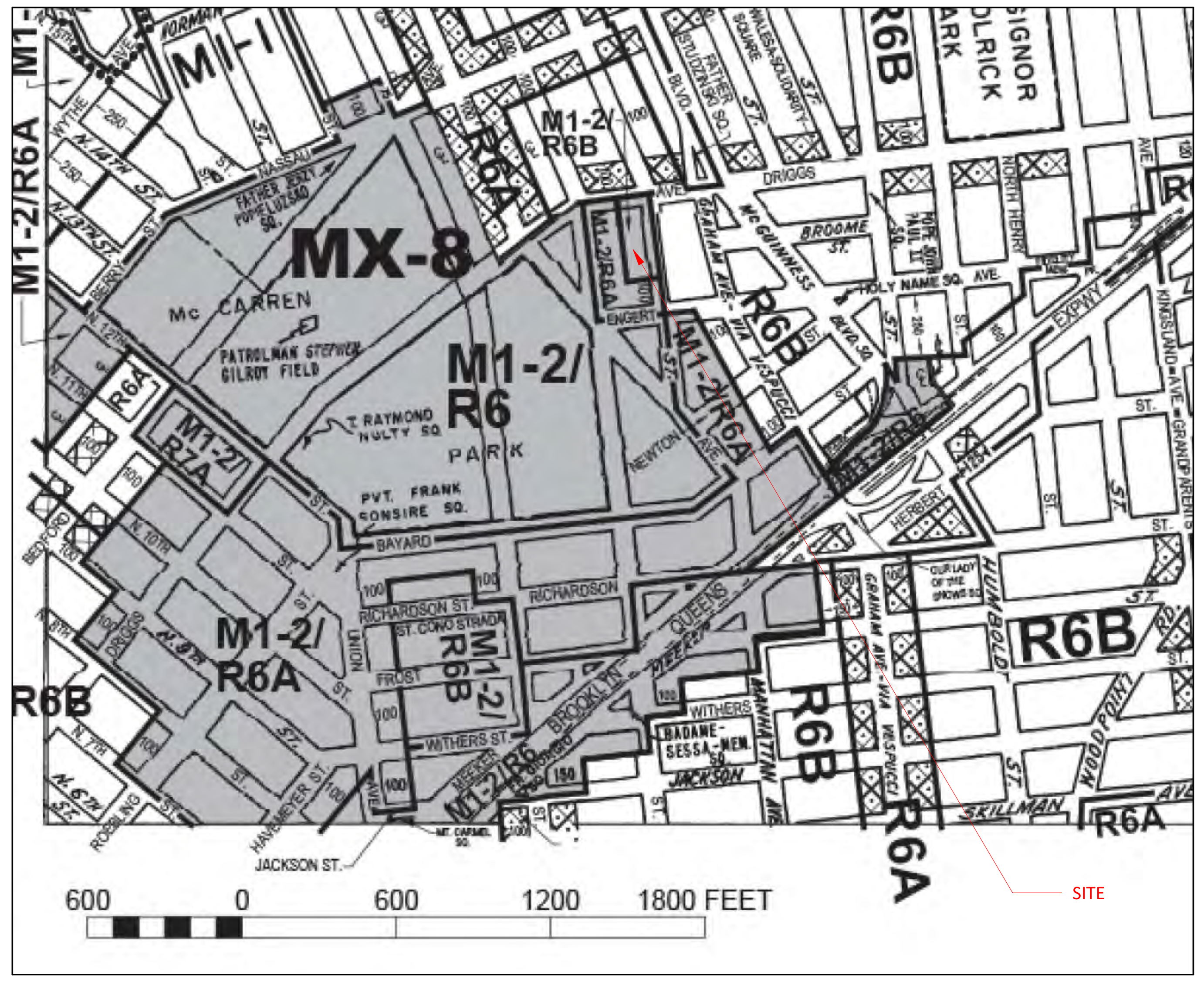
SHEET: 2 OF 82

2/21/2022 3:17:54 PM

SITE NOT A LANDMARK

5 200 FT RADIUS FROM PROJECT SITE. DOB MEMO 8-27-69 & TPPN 10/88

SCALE: 1" = 80'-0"



1 ZONING MAP 13A

SCALE: 12" = 1'-0"

Comparison of Flood Hazard

Effective & Preliminary Flood Hazards

FEMA

Effective	
POI Longitude/Latitude	-73.9482, 40.7221
Effective FIRM Panel	3604970202F
Effective Date	9/5/2007
Flood Zone	X
Static BFE*	Not Available
Flood Depth	Not Available
Vertical Datum	Not Available

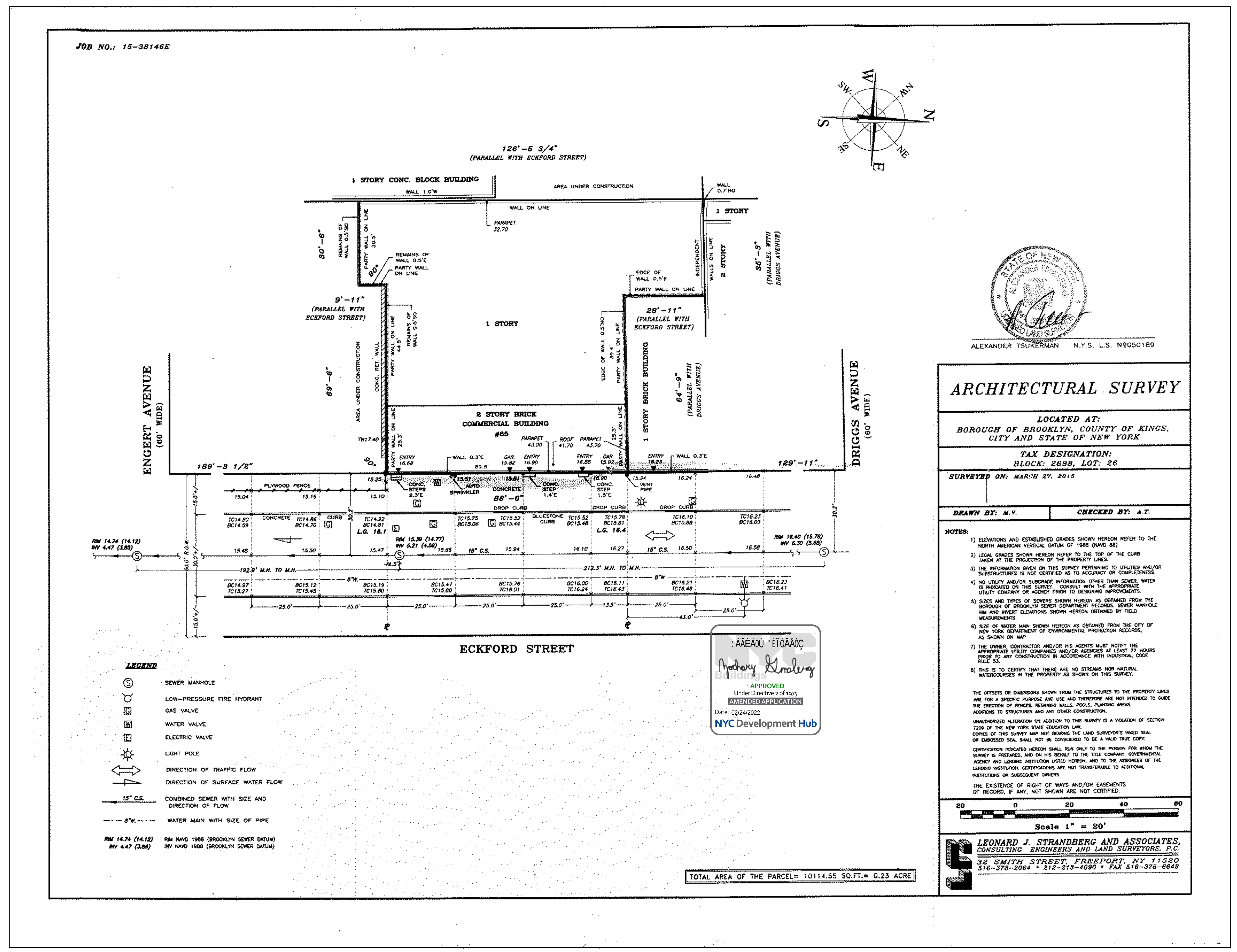
Preliminary	
POI Longitude/Latitude	-73.9482, 40.7221
Preliminary FIRM Panel	3604970202G
Preliminary Issue Date	1/30/2015
Flood Zone	X
Estimated Static BFE*	Not Available
Estimated Flood Depth	Not Available
Vertical Datum	Not Available

3 ZONING FLOOD MAP

SCALE: 12" = 1'-0"

2 TAX MAP

SCALE: 1" = 50'-0"



4 ARCHITECTURAL SURVEY

SCALE: 12" = 1'-0"

DEPT OF BLDGS 320625016 Job Number

ES474080201 Scan Code

S. WIEDER ARCHITECT PC

203 CLIFTON PLACE, SUITE #20
BROOKLYN NY, 11216
T: (718) 484-3201

STRUCTURAL ENGINEER:
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MEP ENGINEER:
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MUNICIPAL CONSULTANT:
...

OWNER:
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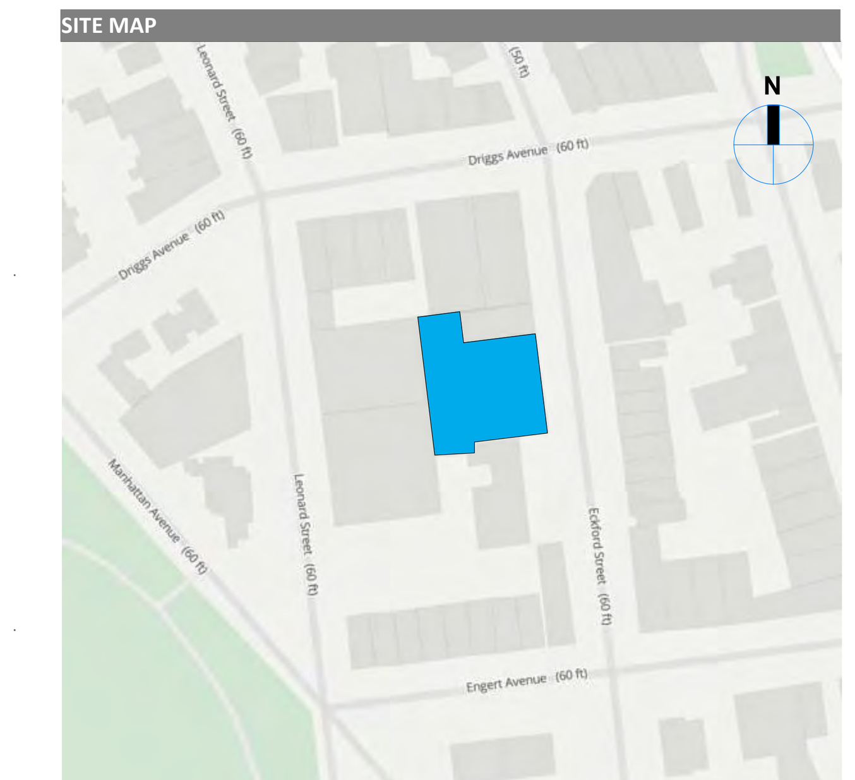
NO.	DESCRIPTION	DATE
0	DOB FILING	11/19/2021

75% CONSTRUCTION DRAWINGS

SITE MAP



LOCATION:

65 ECKFORD STREET
BROOKLYN, NEW YORK 11222

PROPOSED 5 STORY RESIDENTIAL NEW BUILDING

ZONING MAPS & SURVEY

DOB # :

320625016

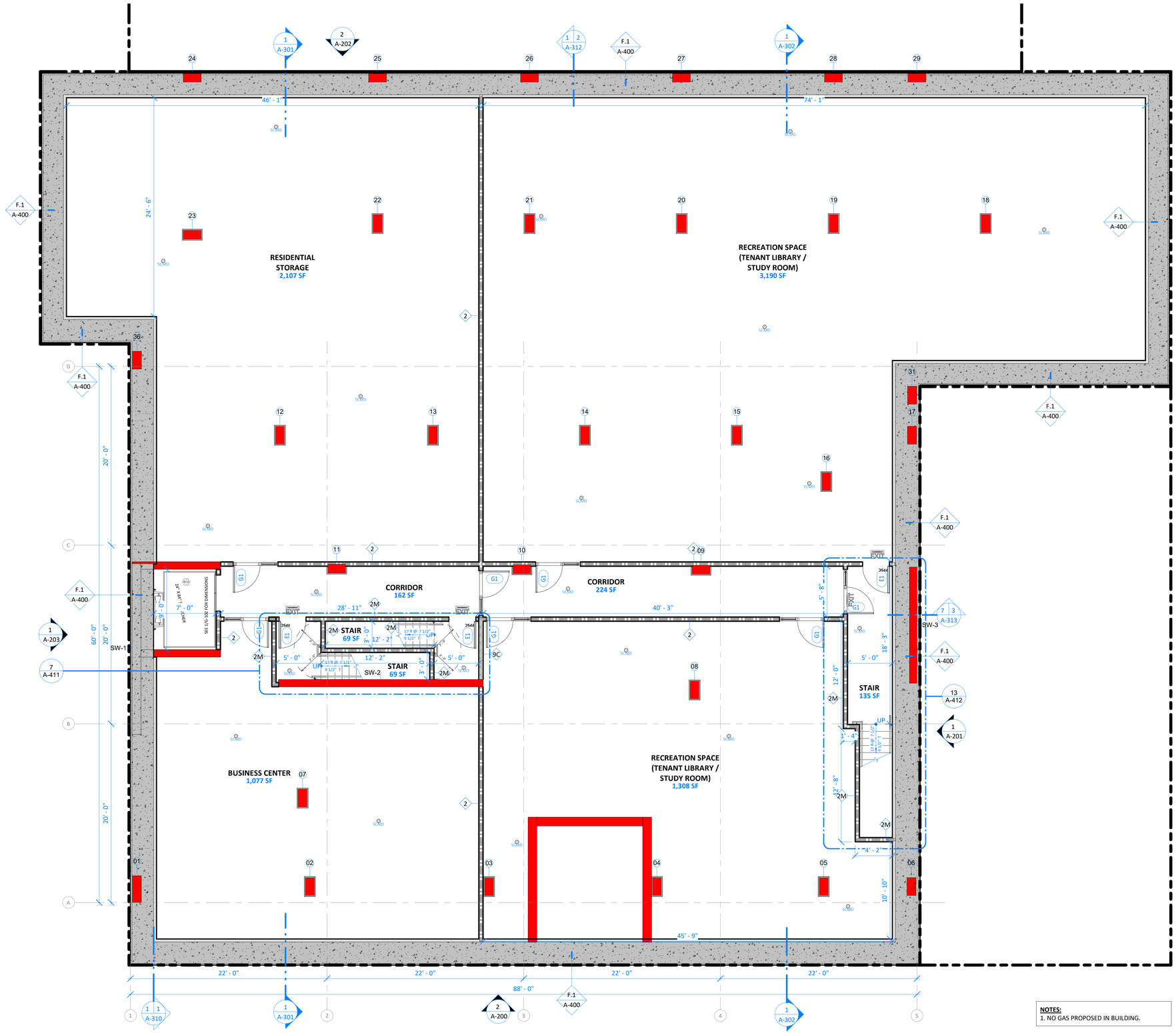
DOB BSCAN + STAMP :

DATE: 2/21/2022 3:18:17 PM
SCALE: As indicated
DRAWN BY: XX

Z-102.00

SHEET: 4 OF 82

2/21/2022 3:18:17 PM



1 **SUBCELLAR FLOOR**

SCALE: 3/16" = 1'-0"

NOTES:
1. NO GAS PROPOSED IN BUILDING.

FLOOR LEGEND

MATERIAL + SYMBOLS

- CONCRETE
- CMU
- STEEL / METAL
- RIGID INSULATION
- GYPSUM BOARD
- BRICK
- EXISTING BUILDING
- NON-FIRE RATED PARTITION
- FIRE RATED PARTITION
- MECH. VENT (MV, 50 CFM, SPR)
- SPRINKLER HEAD
- EXIT SIGN SYMBOL
- HANDICAPPED SYMBOL
- FLOOR DRAIN (FD)
- ROOM TAG (R.L. XX, P.L. XX, R.A. XX, P.A. XX)
- UNIT TAG (UNIT MIX A, STUDIO, NET SF, GROSS; 504 HPD UNIT TYPE)
- FLOOR ELEVATION SYMBOL (S1, 75'-10", A-400)
- SPOT ELEVATION SYMBOL
- WINDOW SCHEDULE TAG (Wx) SEE WINDOW SCHEDULE FOR DETAILED INFORMATION
- DOOR TYPE, SEE DOOR SCHEDULE SHEET (Dx)
- PARTITION TYPE TAG
- STOREFRONT TYPE TAG (S-02)
- COLUMN LINE / GRID INDICATOR (0)
- SMOKE AND CARBON MONOXIDE DETECTOR (SCMD)
- ELECTRIC VEHICLE CHARGING STATION (EV)

APPROVED
Under Directive 1 of 1975
MATERIALS APPLICATION
Date: 02/24/2022
NYC Development Hub

DEPT OF BLDGS 320625016 Job Number

ES661497589 Scan Code

S. WIEDER ARCHITECT PC

203 CLIFTON PLACE, SUITE #20
BROOKLYN NY, 11216
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STRUCTURAL ENGINEER:
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MUNICIPAL CONSULTANT:
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OWNER:
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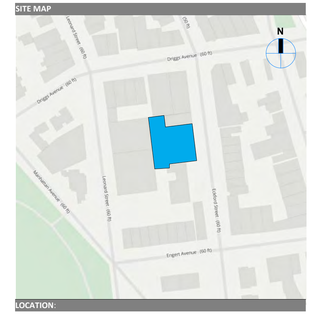
NO.	DESCRIPTION	DATE
0	DOB FILING	11/19/2021

75% CONSTRUCTION DRAWINGS

SITE MAP



LOCATION:

65 ECKFORD STREET BROOKLYN, NEW YORK 11222

PROPOSED 5 STORY RESIDENTIAL NEW BUILDING

SUBCELLAR FLOOR PLAN

DOB # :

320625016

DOB BSCAN + STAMP :

REGISTERED ARCHITECT SAMUEL WIEDER 040451 STATE OF NEW YORK

DATE:	2/21/2022 3:08:03 PM
SCALE:	As indicated
DRAWN BY:	XX

A-100.00

SHEET: 23 OF 82

2/21/2022 3:08:03 PM

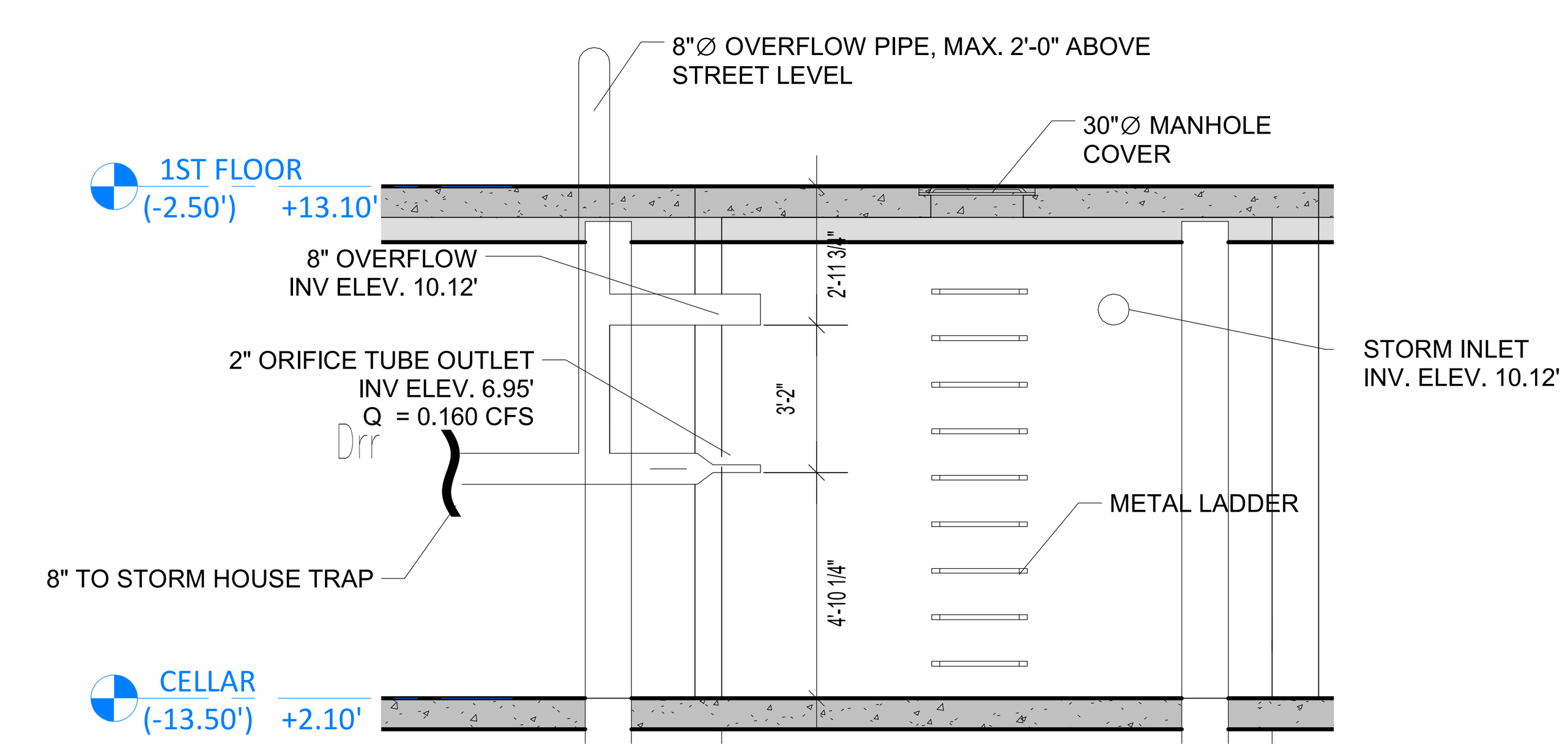
1 .CELLAR FLOOR PLAN
SCALE: 3/16" = 1'-0"

REFUSE STORAGE NOTES:
ALL COMPACTOR WALLS & TRASH CHUTE WALLS SHALL HAVE A STC OF 50

3 HOUR RATED CEILING, PROPOSED 8" CONC. SLAB 4 HOUR RATING AS PER TABLE BC 721.2.2.1

CONCRETE FLOOR SLOPED TO DRAIN

24 DWELLING UNITS X 2.9 C.F. = 70 C.F. REQUIRED
369 SF X 8' - 6"= 3,137 CF PROVIDED



2 DETENTION TANK ELEVATION
SCALE: 1/4" = 1'-0"

NOTES:
1. NO GAS PROPOSED IN BUILDING.
2. MECHANICAL VENTILATION IS PROVIDED IN REFUSE COMPACTOR AND MECHANICAL ROOMS.

APPROVED
AMENDED APPLICATION
Date: 02/24/2022
NYC Development Hub

FLOOR LEGEND

MATERIAL + SYMBOLS

- CONCRETE
- CMU
- STEEL / METAL
- RIGID INSULATION
- GYPSUM BOARD
- BRICK
- EXISTING BUILDING
- NON-FIRE RATED PARTITION
- FIRE RATED PARTITION
- MECH. VENT
- SPRINKLER HEAD
- EXIT SIGN SYMBOL
- HANDICAPPED SYMBOL
- FLOOR DRAIN
- ROOM TAG
- UNIT TAG
- FLOOR ELEVATION SYMBOL
- SPOT ELEVATION SYMBOL
- WINDOW SCHEDULE TAG, SEE WINDOW SCHEDULE FOR DETAILED INFORMATION
- DOOR TYPE, SEE DOOR SCHEDULE SHEET
- PARTITION TYPE TAG
- STOREFRONT TYPE TAG
- COLUMN LINE / GRID INDICATOR
- SMOKE AND CARBON MONOXIDE DETECTOR
- ELECTRIC VEHICLE CHARGING STATION

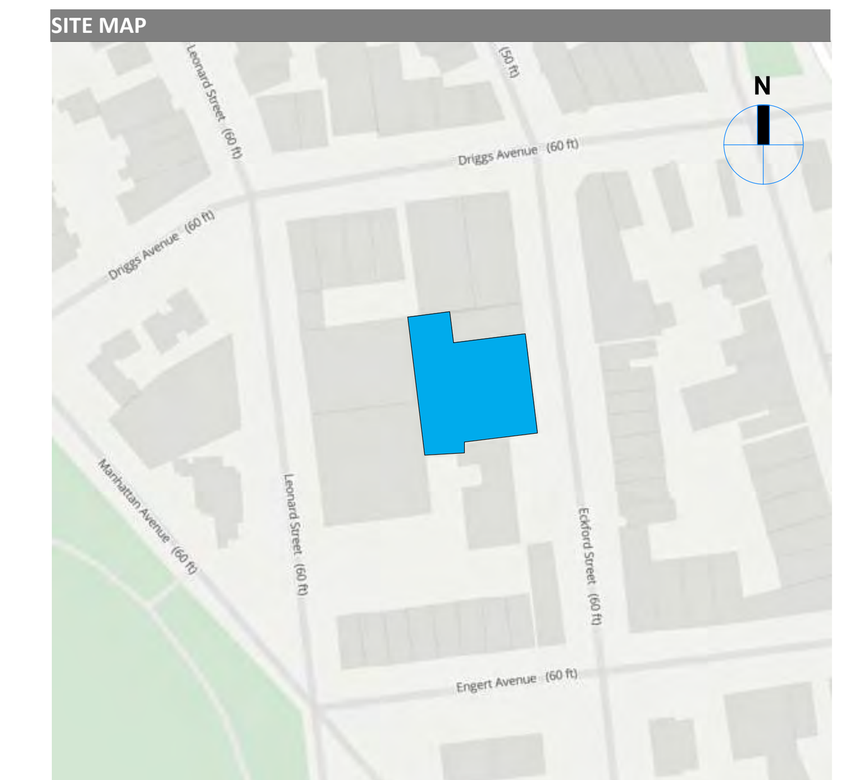
S. WIEDER ARCHITECT PC
203 CLIFTON PLACE, SUITE #20
BROOKLYN NY, 11216
T: (718) 484-3201

STRUCTURAL ENGINEER:
...
MEP ENGINEER:
...
MUNICIPAL CONSULTANT:
...
OWNER:
...

NO.	DESCRIPTION	DATE
0	DOB FILING	11/19/2021

75% CONSTRUCTION DRAWINGS

SITE MAP



LOCATION:
65 ECKFORD STREET BROOKLYN, NEW YORK 11222

PROPOSED 5 STORY RESIDENTIAL NEW BUILDING

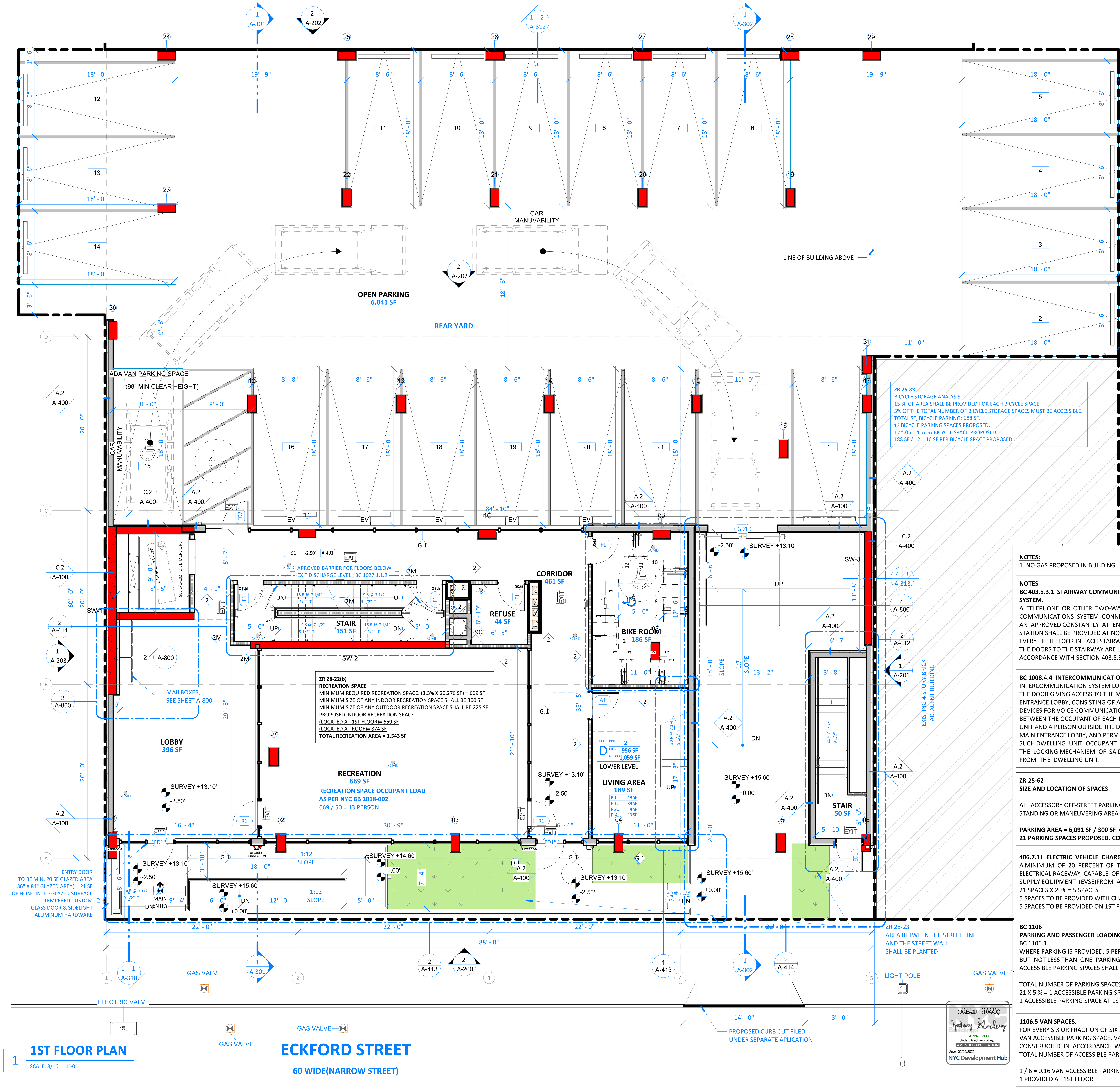
CELLAR PLAN

DOB # :
320625016
DOB BSCAN + STAMP :

DATE:	2/21/2022 3:08:09 PM
SCALE:	As indicated
DRAWN BY:	XX

A-101.00

SHEET: 24 OF 82



1 1ST FLOOR PLAN

SCALE: 3/16" = 1'-0"

ECKFORD STREET

60 WIDE(NARROW STREET)

FLOOR LEGEND

MATERIAL + SYMBOLS

- CONCRETE
- CMU
- STEEL / METAL
- RIGID INSULATION
- GYPSUM BOARD
- BRICK
- EXISTING BUILDING
- NON-FIRE RATED PARTITION
- FIRE RATED PARTITION
- MECH. VENT (MV 50 CFM)
- SPRINKLER HEAD
- EXIT SIGN SYMBOL
- HANDICAPPED SYMBOL
- FLOOR DRAIN (FD)
- ROOM TAG (BICYCLE STORAGE 150 SF; R.L. XX, P.L. XX, R.A. XX, P.A. XX)
- UNIT TAG (UNIT: A, BDR: STUDIO, NET: NET SF, GROSS:; 504 HPD UNIT TYPE)
- FLOOR ELEVATION SYMBOL (S1 | 75'-10" | A-400)
- SPOT ELEVATION SYMBOL
- WINDOW SCHEDULE TAG (Wx) SEE WINDOW SCHEDULE FOR DETAILED INFORMATION
- DOOR TYPE, SEE DOOR SCHEDULE SHEET (Dx)
- PARTITION TYPE TAG (3A)
- STOREFRONT TYPE TAG (S-02)
- COLUMN LINE / GRID INDICATOR (0)
- SMOKE AND CARBON MONOXIDE DETECTOR (SCMD)
- ELECTRIC VEHICLE CHARGING STATION (EV)

NOTES:
1. NO GAS PROPOSED IN BUILDING

NOTES
BC 403.5.3.1 STAIRWAY COMMUNICATION SYSTEM.
A TELEPHONE OR OTHER TWO-WAY COMMUNICATIONS SYSTEM CONNECTED TO AN APPROVED CONSTANTLY ATTENDED STATION SHALL BE PROVIDED AT NOT LESS THAN EVERY FIFTH FLOOR IN EACH STAIRWAY WHERE THE DOORS TO THE STAIRWAY ARE LOCKED IN ACCORDANCE WITH SECTION 403.5.3

BC 1008.4.4 INTERCOMMUNICATION SYSTEM.
INTERCOMMUNICATION SYSTEM LOCATED AT THE DOOR GIVING ACCESS TO THE MAIN ENTRANCE LOBBY, CONSISTING OF A DEVICE OR DEVICES FOR VOICE COMMUNICATION BETWEEN THE OCCUPANT OF EACH DWELLING UNIT AND A PERSON OUTSIDE THE DOOR TO THE MAIN ENTRANCE LOBBY, AND PERMITTING SUCH DWELLING UNIT OCCUPANT TO RELEASE THE LOCKING MECHANISM OF SAID DOOR FROM THE DWELLING UNIT.

ZR 25-62
SIZE AND LOCATION OF SPACES

ALL ACCESSORY OFF-STREET PARKING SPACES, OPEN OR ENCLOSED, EACH 300 SQUARE FEET OF UNOBSTRUCTED STANDING OR MANEUVERING AREA SHALL BE CONSIDERED ONE PARKING SPACE.

PARKING AREA = 6,091 SF / 300 SF = 21 PARKING SPACES PERMITTED
21 PARKING SPACES PROPOSED. COMPLIES

406.7.11 ELECTRIC VEHICLE CHARGING STATIONS.
A MINIMUM OF 20 PERCENT OF THE PARKING SPACES IN AN OPEN PARKING LOT SHALL BE EQUIPPED WITH ELECTRICAL RACEWAY CAPABLE OF PROVIDING A MINIMUM SUPPLY OF 11.5 KVATO ELECTRICAL VEHICLE SUPPLY EQUIPMENT (EVSE)FROM AN ELECTRICAL SUPPLY PANEL.
21 SPACES X 20% = 5 SPACES
5 SPACES TO BE PROVIDED WITH CHARGING STATIONS (SPACES SHOWN WITH "EV" DESIGNATION ON PLAN)
5 SPACES TO BE PROVIDED ON 1ST FLOOR

BC 1106
PARKING AND PASSENGER LOADING FACILITIES
BC 1106.1
WHERE PARKING IS PROVIDED, 5 PERCENT OF THE TOTAL NUMBER OF PARKING SPACES PROVIDED FOR A FACILITY, BUT NOT LESS THAN ONE PARKING SPACE, SHALL BE ACCESSIBLE PARKING SPACES.
ACCESSIBLE PARKING SPACES SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 1106.

TOTAL NUMBER OF PARKING SPACES = 21
21 X 5 % = 1 ACCESSIBLE PARKING SPACES REQUIRED
1 ACCESSIBLE PARKING SPACE AT 1ST FLOOR

1106.5 VAN SPACES.
FOR EVERY SIX OR FRACTION OF SIX ACCESSIBLE PARKING SPACES, AT LEAST ONE SPACE SHALL BE A VAN ACCESSIBLE PARKING SPACE. VAN ACCESSIBLE PARKING SPACES SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH ICC A117.1, INCLUDING SECTION 502 (PARKING SPACES).
TOTAL NUMBER OF ACCESSIBLE PARKING SPACES = 1

1 / 6 = 0.16 VAN ACCESSIBLE PARKING SPACE REQURIED
1 PROVIDED AT 1ST FLOOR

APPROVED
Under Directive 2 of 1975
AMENDED APPLICATION
Date: 02/24/2022
NYC Development Hub

S. WIEDER ARCHITECT PC
203 CLIFTON PLACE, SUITE #20
BROOKLYN NY, 11216
T: (718) 484-3201

STRUCTURAL ENGINEER:
...

MEP ENGINEER:
...

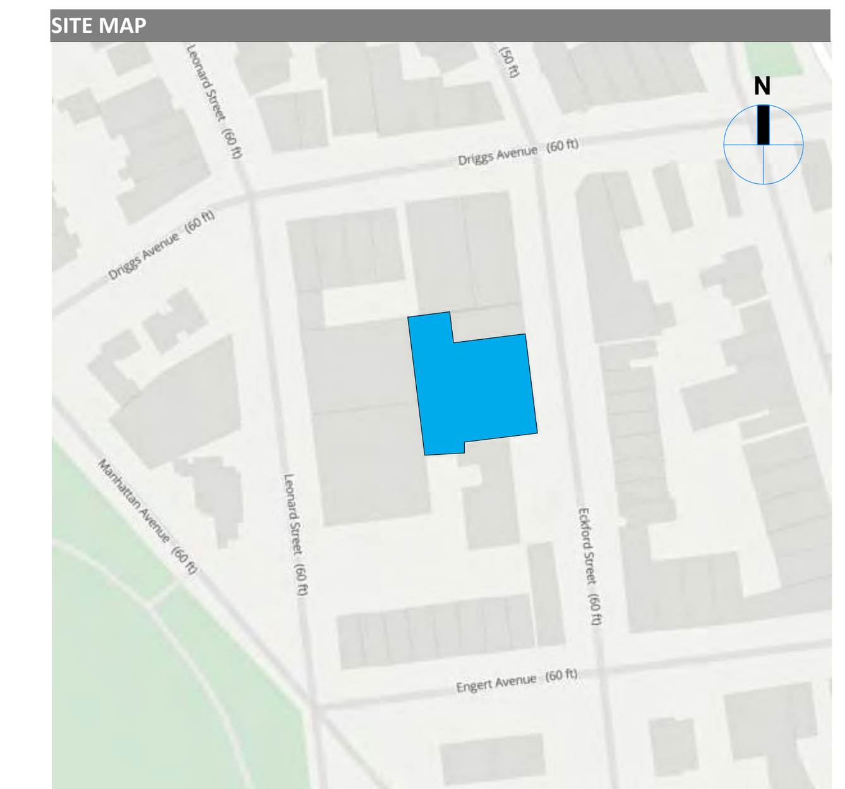
MUNICIPAL CONSULTANT:
...

OWNER:
...

NO.	DESCRIPTION	DATE
0	DOB FILING	11/19/2021

75% CONSTRUCTION DRAWINGS

SITE MAP



LOCATION:
65 ECKFORD STREET
BROOKLYN, NEW YORK 11222

PROPOSED 5 STORY RESIDENTIAL NEW BUILDING

1ST FLOOR PLAN

DOB # :
320625016

DOB BSCAN + STAMP :

DATE: 2/21/2022 3:08:15 PM
SCALE: As indicated
DRAWN BY: XX

A-102.00

SHEET: 25 OF 82

DEPT OF BLDGS 320625016 Job Number
ES964399619 Scan Code

2/21/2022 3:08:15 PM

APPENDIX C

Supplemental Remedial Investigation Report
(to be included once finalized with NYSDEC)

APPENDIX D

Construction Health and Safety Plan

HALEY & ALDRICH, INC.

CONSTRUCTION HEALTH AND SAFETY PLAN

FOR

65 Eckford Street
Project/File No. 0202156-000

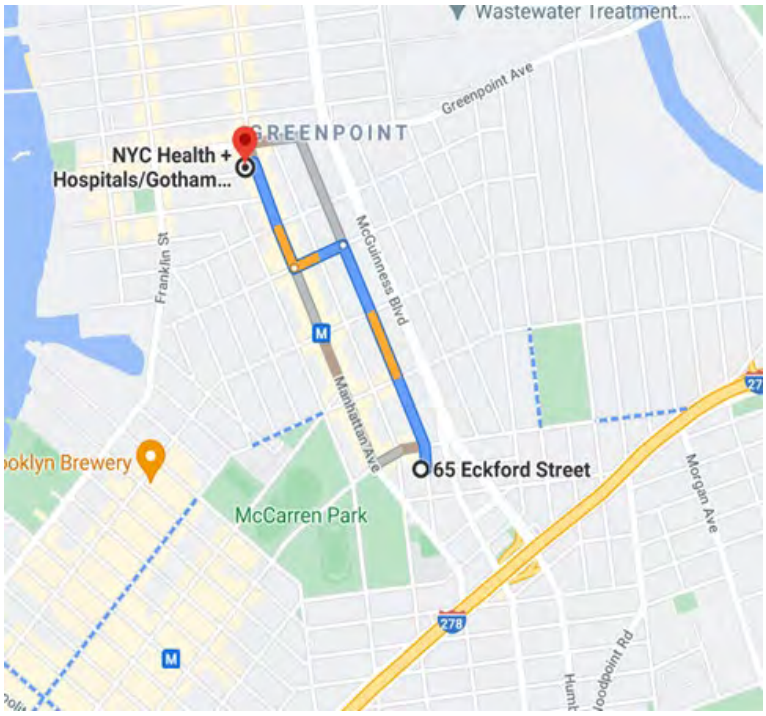
Prepared By: Simmel, Zachary	**Date: 02-10-2022**
Revised By:	**Date:**

EMERGENCY INFORMATION

Project Name: Former Carter Spray Finishing Corp.	**H&A File No:** 0202156-000
Location: **93 Gerry Street, Brooklyn, NY**	
Client/Site Contact: Phone Number:	65-73 Eckford Realty LLC Abraham Posner 718.302.3180
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/Gotham Health, Greenpoint** 875 Manhattan Avenue Brooklyn, NY 11222 844.692.4692
Nearest Occ. Health Clinic: Address: (see map on next page) Phone Number:	**Northside Medical Care** 66 Nassau Avenue Brooklyn, NY 11222 718.383.4600
Liberty Mutual Claim Policy	**WC6-Z11-254100-032**
Other Local Emergency Response Number:	911
Other Ambulance, Fire, Police, or Environmental Emergency Resources:	911

Emergency Hospital

NYC Health + Hospitals/Gotham Health, Greenpoint
875 Manhattan Avenue
Brooklyn, NY 11222
844.692.4692



5 min (0.7 mile)

via Eckford St and Manhattan Ave

Fastest route, lighter traffic than usual

65 Eckford St
Brooklyn, NY 11222

Head north on Eckford St toward Driggs Ave
0.4 mi

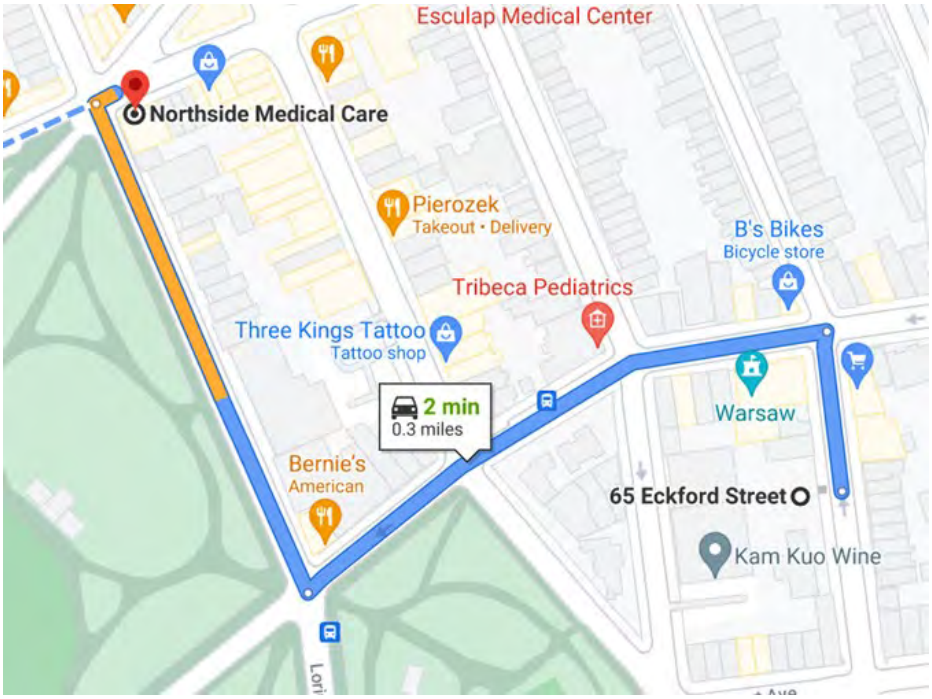
Turn left onto Meserole Ave
0.1 mi

Turn right at the 2nd cross street onto Manhattan Ave
Destination will be on the left
0.2 mi

NYC Health + Hospitals/Gotham Health, Greenpoint
875 Manhattan Ave, Brooklyn, NY 11222

Clinic

Northside Medical Care
66 Nassau Ave,
Brooklyn, NY 11222
718.383.4600



2 min (0.3 mile)

via Driggs Ave and Lorimer St

Fastest route, the usual traffic

65 Eckford St
Brooklyn, NY 11222

Head north on Eckford St toward Driggs Ave
213 ft

Turn left onto Driggs Ave
0.1 mi

Turn right onto Lorimer St
0.1 mi

Turn right onto Nassau Ave
Destination will be on the right
30 ft

Northside Medical Care
66 Nassau Ave, Brooklyn, NY 11222

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	65 Eckford Street	**Project Number**	0202156-000
Project Start Date	04/1/2022	**Project End Date**	12/30/2022
Client Site/Contact: Office Phone Number:	Posner, Abraham 718.302.3180		
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:	Simmel, Zach 646.277.5690 646.787.7669		
APPROVALS: The following signatures constitute approval of this Health & Safety Plan			

Electronic Signatures

Mari Cate Conlon

Project Manager – Mari Cate Conlon

3-28-2022

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	**Site Status**	Open Excavation	**Regulatory Authority**	OSHA

Project Summary

The approximately 10,200 square-foot property located in the Greenpoint neighborhood of Brooklyn is identified as Block 2698, Lot 26 on the New York City Tax Map. The Site has been vacant since 2008 and is currently excavated to approximately 5 to 6 feet below grade Site-wide from former construction operations.

The project is currently within the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) identified as NYSDEC Site Number C224218 and listed with an environmental E-Designation (E-138) for hazardous materials resulting from a City Environmental Quality Review (CEQR) effective 11 May 2005 (CEQR #04DCP003K). The proposed development will include the construction of a multi-story residential building with two cellars encompassing the entire Site footprint and extending to approximately 25 feet below sidewalk grade.

Scope of Work: Remedial Oversight

Project Tasks

Task 1:	**Remedial Oversight**
Perform remedial oversight during implementation of the approved remedy including community air monitoring, documentation soil sampling, and performance of a Soil Vapor Intrusion (SVI) Evaluation.	
Start Date: 04/01/2022	End Date: 12/20/2022
H&A Site Supervisor: Conlon, Mari Cate	Subcontractor: N/A
Task 2:	**Soil Sampling**
Perform soil sampling during implementation of the approved remedy as needed.	
Start Date: 04/01/2022	End Date: 12/20/2022
H&A Site Supervisor: Conlon, Mari Cate	Subcontractor: N/A
Task 3:	**Soil Vapor Sampling (if required)**
Perform soil vapor/indoor air sampling (if required) during implementation of the SVI evaluation post-construction and prior to occupancy of new building(s).	
Start Date: 04/01/2022	End Date: 12/20/2022
H&A Site Supervisor: Conlon, Mari Cate	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 65 Eckford Street, 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 of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) 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 Cate 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 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 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 Remedial Investigation Report (RIR) (prepared Environmental Business Consultants dated February 2021) and the Supplemental Remedial Investigation Report (prepared by Haley & Aldrich dated February 2022). During the investigations, representative Site soils were sampled for VOCs, SVOCs, Target Analyte List (TAL) metals, pesticides and polychlorinated biphenyl (PCBs), per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. Groundwater was encountered approximately 9 to 10 (ft) below ground surface (bgs). Contaminants of concern identified at the Site during these investigations include: metals, SVOCs (specifically PAHs), and VOCs in soil; SVOCs, VOCs, and metals in groundwater; and CVOCs in soil vapor. 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
Benzo(a)anthracene	PEL = 0.2 mg/m^3 TWA REL = 0.1 mg/m^3 TWA	Irritation to respiratory system, bladder, kidneys, skin; dermatitis, bronchitis, cumulative lung damage; suspect human carcinogen.
Benzo(a)pyrene	PEL = 0.2 mg/m^3 TWA REL = 0.1 mg/m^3 TWA	Irritation to respiratory system, bladder, kidneys, skin; dermatitis, bronchitis, cumulative lung damage; suspect human carcinogen.
Benzo(b)fluoranthene	PEL = 0.2 mg/m^3 TWA REL = 0.1 mg/m^3 TWA	Irritation to respiratory system, bladder, kidneys, skin; dermatitis, bronchitis, cumulative lung damage; suspect human carcinogen.
Dibenzo(a,h)anthracene	PEL = 0.2 mg/m^3 TWA REL = 0.1 mg/m^3 TWA	Irritation to respiratory system, bladder, kidneys, skin; dermatitis, bronchitis, cumulative lung damage; suspect human carcinogen.
Indeno(1,2,3-cd)pyrene	PEL = 0.2 mg/m^3 TWA REL = 0.1 mg/m^3 TWA	Irritation to respiratory system, bladder, kidneys, skin; dermatitis, bronchitis, cumulative lung damage; suspect human carcinogen.
Benzo(k)fluoranthene	PEL = 0.2 mg/m^3 TWA REL = 0.1 mg/m^3 TWA	Irritation to respiratory system, bladder, kidneys, skin; dermatitis, bronchitis, cumulative lung damage; suspect human carcinogen.
Chrysene	PEL = 0.2 mg/m^3 TWA REL = 0.1 mg/m^3 TWA	Irritation to respiratory system, bladder, kidneys, skin; dermatitis, bronchitis, cumulative lung damage; suspect human carcinogen.
3-Methylphenol/4-Methylphenol	PEL = 22 mg/m^3 TWA REL = 10 mg/m^3 TWA	Irritation to respiratory system, bladder, kidneys, skin; dermatitis, bronchitis, cumulative lung damage; suspect human carcinogen.

Lead	PEL = 0.05 mg/m^3 TWA REL = 0.05 mg/m^3 TWA	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension
Mercury	PEL = 0.1 mg/m^3 TWA REL = 0.05 mg/m^3 TWA	irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria
Arsenic	PEL = 0.010 mg/m^3 TWA REL = 0.002 mg/m^3 TWA	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, resp irritation, hyperpigmentation of skin, [potential occupational carcinogen]
Copper, Total	PEL = 1 mg/m^3 TWA REL = 1 mg/m^3 TWA	irritation eyes, nose, pharynx; nasal septum perforation; metallic taste; dermatitis; In Animals: lung, liver, kidney damage; anemia
Nickel, Total	PEL = 1 mg/m^3 TWA REL = 0.015 mg/m^3 TWA	irritation eyes, nose, pharynx; nasal septum perforation; metallic taste; dermatitis; In Animals: lung, liver, kidney damage; anemia
Zinc, Total	PEL = 5 mg/m^3 TWA REL = 5 mg/m^3 TWA	irritation eyes, skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal disturbance; dermatitis; eye, skin burns; In Animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage

VOLATILE AND SEMI-VOLATILE ORGANIC COMPOUNDS

The 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 Unrestricted Residential 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 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.

METALS

Various metals including lead, mercury, arsenic, nickel, and zinc were detected in concentrations exceeding NYSDEC Part 375 Unrestricted Residential criteria in soil samples collected and are attributed to historic fill materials and deeper native soils present throughout the Site. Overexposure to metal compounds has been associated with a variety of local and systemic health hazards, both acute and chronic in nature, including lung damage, neurological effects, gastrointestinal effects, kidney and liver damage, allergic dermatitis and other skin disorders. Exposure to metals is most commonly through

inhalation and ingestion of dust. Therefore, dust levels should be controlled with wetting, if necessary, as described in Section 3.2.

ADDITIONAL HAZARD ASSESSMENTS

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

Site Hazards and Controls

Site Hazard Summary		
Slips, Trips, Falls	Cold Temperatures	Sun
High Winds	Urban Fill	

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.

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 NOT:

- 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

Hypothermia: 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 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.

HIGH WINDS

Hazard Information

While high winds are commonly associated with severe thunderstorms and hurricanes they may also occur as a result of differences in air pressures, such as when a cold front passes across the area. They can cause downed trees and power lines, and flying debris (such as dust or larger debris), which adds additional risks and could lead to power outages, transportation disruptions, damage to buildings and vehicles, and serious injury.

Wind Advisory are issued for sustained winds 25 to 39 mph and/or gusts to 57 mph. High Wind warnings are issued by the National Weather Service when high wind speeds may pose a hazard or is life threatening. The criterion for this warning will varies by state. The Beaufort Wind Scale is a helpful tool to when dealing with high winds.

Controls

- Monitor weather reports for high winds advisories and warnings
- Check the work area to identify hazards - beware of trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain.
- 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	Congested Areas	Overhead Utilities	Underground Utilities
Slips, Trips & Falls			

Soil Sampling– Soil sampling by H&A staff on active construction sites can be conducted in conjunction with a wide range of activities such as building construction, earthwork, and soil management related activities. Familiarity with basic heavy construction safety, site conditions

(geotechnical and environmental), and potential soil contaminants are essential components of soil sampling performed on active sites. See OP 1002 Drilling Safety.			
Potential Hazards			
Noise	Heavy Equipment	Ergonomics	Line of Fire
Ground Disturbance	Generated Waste	Slips, Trips & Falls	

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, earthwork 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.

Slips, Trips & Falls

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.

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.

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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.

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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 that all activities will require Level D or Modified Level D PPE.

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 Modified Level D PPE. Modified Level D PPE provides minimal skin protection (i.e., hand/glove protection along with standard work clothes with optional coveralls). Modified Level D is defined as:

- Hardhat
- Eye protection
- Hearing protection (as warranted see above)
- Steel-toed work boots
- Tyvek Coveralls
- Disposable nitrile chemically resistant gloves

Increased PPE, such as Level C or Level B, is not anticipated to be required on the Site.

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 accept 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/Gotham Health, Greenpoint:	844.692.4692 (non-emergency)

HOSPITAL LOCATION

NYC Health and Hospitals/Greenpoint is located at 875 Manhattan Avenue in Brooklyn, New York 11222. 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 – COVID-19 Documents

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, Brian Ferguson, 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 3 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

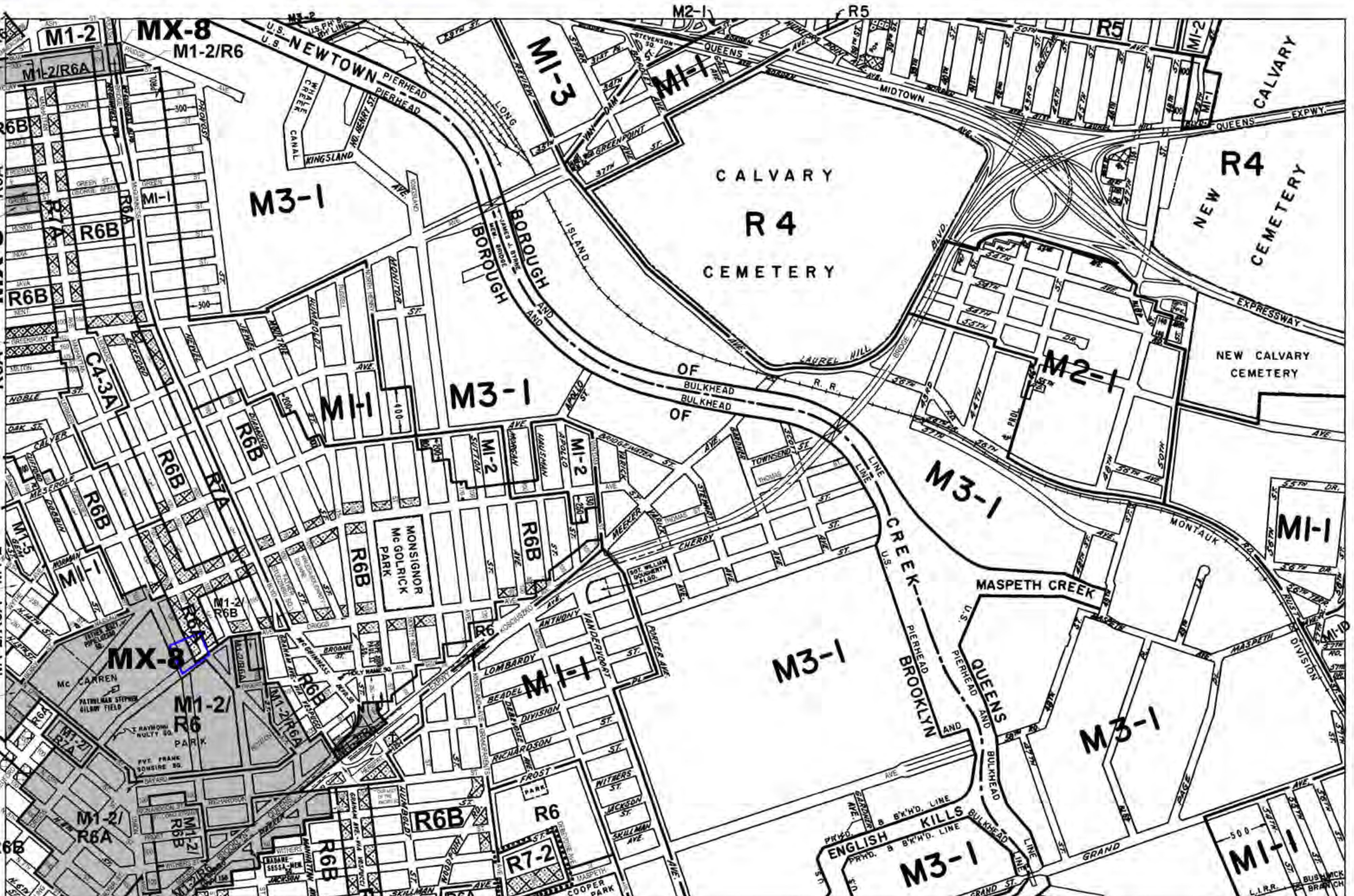
APPENDIX E

Citizen Participation Plan

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.

ZONING MAP

THE NEW YORK CITY PLANNING COMMISSION

Major Zoning Classifications:

The number(s) and/or letter(s) that follows an R, C or M District designation indicates use, bulk and other controls as described in the text of the Zoning Resolution.

R – RESIDENTIAL DISTRICT

C – COMMERCIAL DISTRICT

M – MANUFACTURING DISTRICT

SPECIAL PURPOSE DISTRICT
The letter(s) within the shaded area designates the special purpose district as described in the text of the Zoning Resolution.

AREA(S) REZONED

Effective Date(s) of Rezoning:

11-23-2021 C 210480 ZMK

Special Requirements:

For a list of lots subject to CEQR environmental requirements, see APPENDIX C.

For a list of lots subject to "D" restrictive declarations, see APPENDIX D.

For Inclusionary Housing designated areas and Mandatory Inclusionary Housing areas on this map, see APPENDIX F.

MAP KEY

8d	9b	9d
12c	**13a**	13c
12d	13b	13d

ZONING MAP 13a

NOTE: Zoning information as shown on this map is subject to change. For the most up-to-date zoning information for this map, visit the Zoning section of the Department of City Planning website **www.nyc.gov/planning** or contact the Zoning Information Desk at (212) 720-3291

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

Titan Equity Group, 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.

The Related Companies, 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.

Tishman Speyer, 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 West Development Corporation, 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.

Jim Beam Brands Co., 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.

ARM Parking, 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

The Trump Organization, 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.

Richmond Gardens Apartments, 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 has over 25 years of experience in developing, implementing, and managing a wide range of environmental, health, and safety (EH&S) solutions for a variety of clients. Brian has served as the Health and Safety Manager and Incident Commander at several research and development sites and has managed extensive programs to maintain and clean contaminated sites under Federal and State regulatory programs. He has provided expertise in managing EH&S programs as a consultant, and has actively developed, implemented, and managed these programs as an EH&S professional for various industries.

Brian is currently working as the Chief Health and Safety Officer for Haley & Aldrich, Inc. He, and his staff, are involved in every project Haley & Aldrich, Inc. undertakes. Brian is involved on several projects, directly overseeing the health and safety on the project site of our staff, our contractors, and the public. Brian also acts as support for our on-site health and safety staff on other larger construction and remediation projects.

Through Brian's leadership our safety culture and focus extend from the top of our organization to each and every Haley & Aldrich employee as well as subconsultants and subcontractors. Utilizing a Behavior Based Safety approach, Haley & Aldrich expects every project team member to play an important role in making our projects safe and has given authority to every Haley & Aldrich employee, subconsultant, and subcontractor to stop any activity at any time for health or safety concerns. Our record illustrates that our hard work is paying off. The company has gone 4 years without a lost time injury, and our TRIR and EMR have consistently improved each of the last 3 years.

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, Massachusetts; 2012
B. S. Civil Engineering, State University of New York - Environmental, Science, and Forestry, Syracuse, New York; 2000
Ass. Science Degree in Applied Science and Technology (Nuclear Engineering), Thomas A. Edison State College, Trenton, New Jersey; 2000

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

Mr. Ferguson 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, Mr. Ferguson 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. Elizabeths Hostpital – 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, MA. 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, MA 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, MA 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, MA. 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, MA 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, MA 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. Responsibilities included overseeing geotechnical subsurface investigations, provided foundation recommendations and specifications, and prepared a retaining wall contract document. Responsibilities included coordination of construction monitoring, excavation and construction of footings, and soil reuse and management, assisting with project management, reviewing weekly field construction reports, reviewing and responding to geotechnical design submittals and attending project meetings.

University of Massachusetts Boston, General Academic Building No.1, Boston, MA. 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, MA project engineer for redevelopment of former watch factory. Responsibilities included construction oversight of new precast parking garage, utilitiy 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, MA. 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, MA. 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, MA. 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.

APPENDIX H

Quality Assurance Project Plan

HALEY ALDRICH

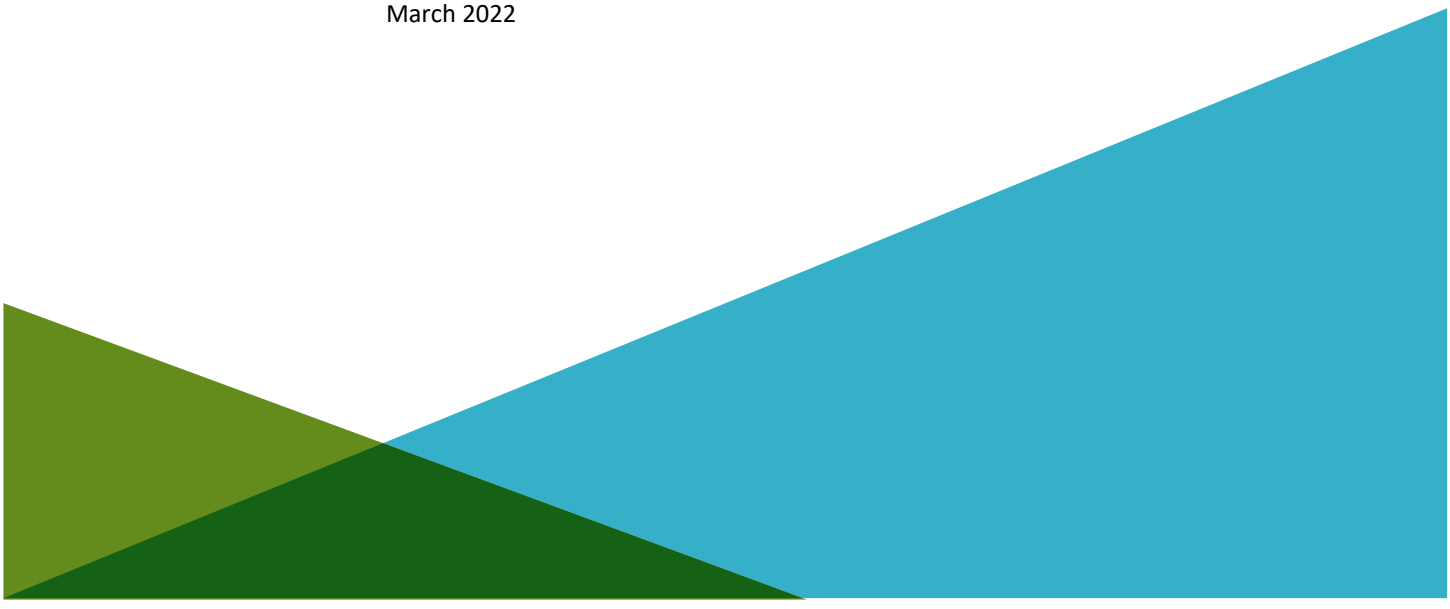
www.haleyaldrich.com

QUALITY ASSURANCE PROJECT PLAN
65 ECKFORD 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. 0202156-002
March 2022



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 65 Eckford 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 Remedial Action Work Plan (RAWP) for the 65 Eckford 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 nature of any remaining groundwater and soil impacts.

1.2 SITE DESCRIPTION AND HISTORY

The general Site description and Site history is provided in the Site Description and History Summary that accompanies the RAWP.

1.3 LABORATORY PARAMETERS

The laboratory parameters for soil include:

- Target Compound List volatile organic compounds (VOCs) using EPA method 8260B
- Target Compound List semi-volatile organic compounds (SVOCs) using EPA method 8270C
- Total Analyte List (TAL) Metals using EPA method 6010
- Polychlorinated biphenyls (PCBs) using EPA method 8082
- Pesticides using EPA 8081
- Per- and polyfluoroalkyl substances (PFAS) using Modified EPA method 537
- 1,4-Dioxane using EPA method 8260B

The laboratory parameters for groundwater include:

- Target Compound List VOCs using EPA method 8260C
- Target Compound List SVOCs using EPA method 8270C
- Total Analyte List Metals using EPA method 6010
- Per- and polyfluoroalkyl substances (PFAS) using Modified EPA method 537
- 1,4-Dioxane using EPA method 8260B

Note: 1,4-Dioxane and PFAS sampling techniques will be conducted following the NYSDEC, Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) under NYSDEC Part 375 Remedial Program released in June 2021 and Sampling for 1,4-Dioxane and Per- and Polyfluoroalkyl Substances (PFAS) Under DEC's Part 375 Remedial Programs release June 2021.

During the collection of groundwater samples, pH, specific conductivity, temperature, dissolved oxygen (DO), and oxidation/reduction potential (ORP) will be measured.

The laboratory parameter for soil vapor includes:

- VOCs using EPA method TO-15

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 borings, soil vapor implants, and groundwater monitoring wells that will be sampled (as applicable).

2. Project Organization and Responsibilities

This section defines the roles and responsibilities of the individuals who will perform the SIWP 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 SIWP 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 SIWP monitoring activities; and
- Overall Site health and safety plan compliance.

2.2 QUALITY ASSURANCE RESPONSIBILITIES

The Quality Assurance (QA) team will consist of a QA Officer and the Data Validation staff. QA 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 monitoring 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 Health & Safety Plan (HASP). 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 as detailed in the RAWP and in compliance with the Field Sampling Plan (FSP) 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

The FSP provides the SOPs for sampling required by the RAWP.

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 information. Equipment rinse blank and field duplicate samples also will be numbered with a unique sample identifier to prevent analytical bias of field QC samples.

Refer to the FSP for the sample labeling procedures.

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. Steps 1 through 4 are repeated for the bottles for each analysis. The samples are collected in order of decreasing analyte volatility as detailed in Section 3.3.1.
3. Chain-of-custody documents are executed.
4. The samples will be handled as specified in Table I.

3.3.1.2 Soil Samples

Soil field duplicates will be collected as specified in the following procedure:

1. Soils will be sampling directly from acetate liners.
2. Soil for VOC analysis will be removed from the sampling device as specified in the FSP.
3. Soil for non-VOC analysis will be removed from the sampling device and collected into clean laboratory provided containers.

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. Refer to the FSP for sample packaging procedures.

- Samples will be assigned a unique sample number and will be affixed to a sample label. Refer to the FSP for sample labeling procedures.

- 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, and the qualitative measurement of Volatile Organic Compounds (VOC) during the collection of soil samples.

6.2 LABORATORY ANALYTICAL PROCEDURES

Laboratory analyses will be based on the U.S. EPA methodology requirements promulgated in:

- "Test Methods for Evaluating Solid Waste," SW-846 EPA, Office of Solid Waste, and promulgated updates, 1986.

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 SIWP. 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.

$$\%\ Recovery = \frac{Spiked\ Sample - Background}{Known\ Value\ of\ Spike} x\,100\%$$

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 SIWP 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.

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. 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.

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.

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.

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.

- 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) based on Department DER-10 Appendix 2B.

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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3. United States Environmental Protection Agency, (1993). Data Quality Objectives Process for Superfund Interim Final Guidance. U.S. EPA/540/R-93-071, Office of Solid Waste and Emergency Response (OSWER), September 1993.

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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7. United States Environmental Protection Agency. Test Methods for Evaluating Solid Waste, Office of Solid Waste, U.S. EPA, SW-846, November 1986, with updates.

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, SAMPLE SIZE REQUIREMENTS AND SAMPLE CONTAINERS
65 Eckford Street
Brooklyn, NY

Analysis/Method	Sample Type	Preservation	Holding Time	Volume/Weight	Container
Volatile Organic Compounds/8260C	Soil	1 - 1 Vial MeOH/2 Vial Water	14 days	120 mL	3 - 40ml glass vials
Semivolatile Organic Compounds/8270D	Soil	Cool, 4 ± 2 °C	14 days	250 mL	1 - 8 oz Glass
Metals/6010D	Soil	Cool, 4 ± 2 °C	180 days	60 mL	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	120 mL	3 - 40ml glass vials
Semivolatile Organic Compounds/8270D	Groundwater	Cool, 4 ± 2 °C	7 days	500 mL	2 - 250 mL amber glass
TAL Metals 6020	Groundwater	HNO_3Cool, 4 ± 2 °C	180 days	500 mL	1 - 500 mL plastic bottle
1,4-Dioxane	Groundwater	Cool, 4 ± 2 °C	7 days	120 mL	3 - 40ml glass vials
PFAS 537	Groundwater	H2O Cool, 4 ± 2 °C	14 days	500 mL	2 - teflon free 250 ml plastic containers
Volatile Organic Compounds/TO-15	Soil Vapor	N/A	30 days	2.7 - 6 L	1 2.7 or 6 L Summa Canister

Notes:
1. Refer to text for additional information.

APPENDIX I

DARAMEND® Safety Data Sheet and Instructions

Environmental Solutions

Daramend® Reagent

Product Sheet

Solid-Phase Treatment of Soils and Sediments

Daramend® *In Situ* Chemical Reduction (ISCR) Reagent represents a superior treatment technology for solid materials impacted by recalcitrant organic compounds. Since the first application in 1991, variations of the technology have been successfully used to treat millions of tons of soil, sediment and other solid materials. Daramend has treated soils containing chlorinated herbicides and pesticides, organic explosive compounds, and chlorinated VOCs at many sites throughout the world.

The Daramend technology is uniquely advantageous because it can often be applied *in situ* without excavation, is typically applied at less than 5 wt % of dry soil mass, and provides the ISCR benefits of very strongly reducing conditions (both biotic and abiotic degradation mechanisms), and near–neutral pH. Relative to traditional composting, Daramend treatment results in significantly shorter treatment durations and eliminates bulking. From a sustainability perspective, because the Daramend reagent is composed of recycled iron and agricultural byproducts, the technology offers many benefits over “dig-and-dump” approaches.

The benefits of Daramend

- Improved soil health: Improves soil tilth and fertility, and reduces toxicity
- Hydrophilic character: Increases soil water holding capacity
- Balanced range of nutrients: Provides a broad range of major, minor and micronutrients
- Recalcitrant contaminants: Promotes remediation of most persistent contaminants in soils

Application methods

- *In situ* landfarming
- *Ex situ* treatment cells or windrows
- Shallow groundwater trench and excavation backfill applications

Examples of Contaminants of Concern
ORGANIC EXPLOSIVES TNT, RDX, HMX, Tetryl, Nitrobenzene
CHLORINATED VOCs Ethenes, Ethanes, Methanes
CHLORINATED PESTICIDES Dieldrin, Toxaphene, Mirex, Chlordane, DDT, HCH, and others

For more information and detailed case studies please visit our website.

PeroxyChem

remediation@peroxychem.com | 1.866.860.4760 | peroxychem.com/remediation

Document 07-02-ESD-14

Environmental Solutions

PeroxyChem

Contaminants Treated

Use this guide by locating the contaminant of concern sorted by contaminant type. The technologies recommended for treatment of each contaminant are located to the right.

✓ Recommended, lab or field data available demonstrating success

▪ Recommended with site specific lab study

	ISCO Klozur® Persulfate	ISCR EHC® Reagent, EHC® Plus, Daramend® Reagent	ENHANCED ANAEROBIC BIOREMEDIATION EHC® Liquid, ELS® Microemulsion	METALS TREATMENT MetaFix® Reagents, EHC® Metals, Daramend® Metals	AEROBIC BIOREMEDIATION Terramend® Reagent	 PermeOx® Ultra	BIOGEOCHEMICAL GeoForm™ Reagents
CHLORINATED SOLVENTS							
Tetrachloroethene (PCE)	✓	✓	✓	✓			✓
Trichloroethene (TCE)	✓	✓	✓	✓			✓
Dichloroethene (cis and trans DCE)	✓	✓	✓	✓			✓
Trichloroethane (TCA)	✓	✓	✓	✓			✓
Dichloroethane (DCA)	✓	✓	✓	✓			✓
Carbon tetrachloride	✓	✓	✓	✓			✓
Chloroethane	✓	✓	✓	✓			✓
Chloroform	✓	✓	✓	✓			✓
Chloromethane	✓	✓	✓	✓			✓
Chlorotoluene	✓	✓	✓	✓			✓
Methylene chloride	✓	✓	✓	✓			✓
Vinyl chloride	✓	✓	✓	✓		✓	✓
Dichloropropane	✓	✓	✓	✓			✓
Dichloropropene	✓	✓	✓	✓			✓
Hexachlorobutadiene	✓	✓	✓	✓			✓
Tetrachloroethane	✓	✓	✓	✓			✓
Trichloropropane	✓	✓	▪	✓			✓
BTEX							
Benzene	✓				✓	✓	
Toluene	✓				✓	✓	
Ethylbenzene	✓				✓	✓	
Xylenes	✓				✓	✓	

Contaminants Treated

✓ Recommended, lab or field data available demonstrating success

▪ Recommended with site specific lab study

	ISCO Klozur® Persulfate	ISCR EHC® Reagent, EHC® Plus, Daramend® Reagent	ENHANCED ANAEROBIC BIOREMEDIATION EHC® Liquid, ELS® Microemulsion	METALS TREATMENT MetaFix® Reagents, EHC® Metals, Daramend® Metals	AEROBIC BIOREMEDIATION Terramend® Reagent	AEROBIC BIOREMEDIATION PermeOx® Ultra	BIOGEOCHEMICAL GeoForm™ Reagents
PAHs							
Acenaphthene	✓				✓		
Acenaphthylene	✓				✓		
Anthracene	✓				✓		
Benzo(a)anthracene	✓				✓		
Benzo(a)pyrene	✓				✓		
Benzo(b)fluoranthene	✓				✓		
Benzo(ghi)perylene	✓				✓		
Chrysene	✓				✓		
Dibenzo(ah)anthracene	✓				✓		
Fluorene	✓				✓		
Naphthalene	✓				✓	✓	
Phenathrene	✓				✓		
Pyrene	✓				✓		
OXYGENATES							
Methyl tert-butyl ether (MTBE)	✓					✓	
Tert-butyl alcohol (TBA)	✓					✓	
PETROLEUM HYDROCARBONS							
GRO (gasoline range organics)	✓				✓	✓	
DRO (diesel range organics)	✓				✓	✓	
ORO (oil range organics >C20 alkanes)	✓				✓		
Creosote (coal tar)	✓				✓		
PHENOLS							
Phenol	✓				✓		
4-chloro-3-methyl phenol	✓				✓		
2-chlorophenol	✓		▪		✓		
2,4-dichlorophenol	✓		▪		✓		
2,4-dinitrophenol	✓		▪		✓		
4-nitrophenol	✓		▪		✓		
Pentachlorophenol	✓	✓	▪	✓	✓		✓

Contaminants Treated

✓ Recommended, lab or field data available demonstrating success ▪ Recommended with site specific lab study

	ISCO Klozur® Persulfate	ISCR EHC® Reagent, EHC® Plus, Daramend® Reagent	ENHANCED ANAEROBIC BIOREMEDIATION EHC® Liquid, ELS® Microemulsion	METALS TREATMENT MetaFix® Reagents, EHC® Metals, Daramend® Metals	AEROBIC BIOREMEDIATION Terramend® Reagent	 PermeOx® Ultra	BIOGEOCHEMICAL GeoForm™ Reagents
CHLOROBENZENES							
Chlorobenzene	✓	✓	▪	✓	✓	✓	▪
Dichlorobenzene	✓	✓	✓	✓			▪
Trichlorobenzene	✓	✓	✓	✓			▪
FLUORINATED COMPOUNDS							
Dichlorodifluoromethane	✓	✓	✓	✓			▪
Trichlorofluouromethane	✓	✓	✓	✓			▪
Trichlorotrifluoroethane	✓	✓	✓	✓			▪
PFCA/PFOA	✓						
PESTICIDES & HERBICIDES							
Chlordane	✓	✓	✓	✓			▪
Heptachlor Epoxide	✓	✓		✓			▪
Lindane (hexachlorocyclohexane)	✓	✓	✓	✓	✓		▪
DDT, DDD, DDE	✓	✓	✓	✓			▪
Toxaphene	✓	✓	✓	✓			▪
Dieldrin	✓	✓	✓	✓			▪
2,4-D	✓	✓	✓	✓	✓		▪
2,4,5-T	✓	✓	✓	✓	✓		▪
Endrin	✓	✓	✓	✓			▪
Kepone	▪	✓		✓			▪
ENERGETICS							
TNT	✓	✓	✓	✓			▪
DNT	✓	✓	✓	✓			▪
Nitroglycerine	✓	✓	✓	✓			▪
HMX	✓	✓	✓	✓			▪
RDX	✓	✓	✓	✓			▪
Perchlorate		✓	✓	✓			▪

Contaminants Treated

✓ Recommended, lab or field data available demonstrating success ▪ Recommended with site specific lab study

	ISCO Klozur® Persulfate	ISCR EHC® Reagent, EHC® Plus, Daramend® Reagent	ENHANCED ANAEROBIC BIOREMEDIATION EHC® Liquid, ELS® Microemulsion	METALS TREATMENT MetaFix® Reagents EHC® Metals, Daramend® Metals	AEROBIC BIOREMEDIATION Terramend® Reagent	 PermeOx® Ultra	BIOGEOCHEMICAL GeoForm™ Reagents
MISCELLANEOUS							
Acetone	✓				▪	▪	
4-methyl-2-pentanone	✓						
1,4-dioxane	✓						
Polychlorinated biphenyls (PCBs)	✓	▪		▪			
Nitrate		✓	✓	✓	✓		✓
Bis(2-ethyhexyl)phthalate	✓				✓		
Nitrobenzene	✓						
Propylbenzene	✓				▪	▪	
4-iso-propyltoluene	✓						
Styrene	✓						
Trimethylbenzene	✓				▪	▪	
n-butylbenzene	✓						
Carbon Disulfide (CS_2)	✓						
Dioxins / Furans	▪						
HEAVY METALS							
Antimony				✓			
Arsenic	✓			✓			▪
Barium				✓			
Cadmium				✓			✓
Chromium		✓	✓	✓			✓
Cobalt				✓			✓
Copper				✓			✓
Lead				✓			✓
Mercury				✓			
Nickel				✓			✓
Selenium				✓			▪
Vanadium				✓			
Zinc				✓			✓

PeroxyChem

peroxychem.com/remediation

Document 13-04-ESD-19

SAFETY DATA SHEET
DARAMEND® Reagent

SDS # : DARR-C
Revision date: 2019-05-13
Format: NA
Version 2.02

1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier

Product Name DARAMEND® Reagent

Recommended use of the chemical and restrictions on use

Recommended Use: Remediation of contaminated soil and groundwater

Restrictions on Use No uses to be advised against were identified.

Manufacturer/Supplier

PeroxyChem LLC
2005 Market Street
Suite 3200
Philadelphia, PA 19103
Phone: +1 267/ 422-2400 (General Information)
E-Mail: sdsinfo@peroxychem.com

Emergency telephone numbers

For leak, fire, spill or accident emergencies, call:
1 800 / 424 9300 (CHEMTREC - U.S.A.)
1 703 / 527 3887 (CHEMTREC - Collect - All Other Countries)
1 303/ 389-1409 (Medical - U.S. - Call Collect)

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the 2015 Workplace Hazardous Materials Information System (WHMIS)

Combustible dust

GHS Label elements, including precautionary statements

EMERGENCY OVERVIEW

Warning

Hazard Statements
May form combustible dust concentrations in air

Precautionary Statements - Prevention

Dry or powdered ingredients are combustible. Dispersal of finely divided dust from products into air may form mixtures that are ignitable or explosive. Minimize airborne dust generation and eliminate sources of ignition.

Hazards not otherwise classified (HNOC)
No hazards not otherwise classified were identified.

Other Information
CONTAINMENT HAZARD: Any vessel that contains wet DARAMEND must be vented due to potential pressure build up from fermentation gases. Powdered material may form explosive dust-air mixtures

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical name	CAS-No	Weight %
Iron	7439-89-6	40-50
Organic amendment	Proprietary	50-60

Occupational exposure limits, if available, are listed in section 8

4. FIRST AID MEASURES

Eye Contact — In case of contact, immediately flush skin with plenty of water. Get medical attention if irritation develops and persists.

Skin Contact — Wash off with soap and water. In the case of skin irritation or allergic reactions see a physician.

Inhalation — Remove person to fresh air. If signs/symptoms continue, get medical attention.

Ingestion — Rinse mouth with water and afterwards drink plenty of water or milk. Call a poison control center or doctor immediately for treatment advice. Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed — Coughing and/ or wheezing.

Indication of immediate medical attention and special treatment needed, if necessary — Treat symptomatically

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media — Dry chemical, CO2, sand, earth, water spray or regular foam.

Specific Hazards Arising from the Chemical — Dry or powdered ingredients are combustible. Dispersal of finely divided dust from products into air may form mixtures that are ignitable and explosive. Minimize airborne dust generation and eliminate sources of ignition.

Flammable properties — Combustible material

Explosion data

Sensitivity to Mechanical Impact — Not sensitive.

Sensitivity to Static Discharge — Fine dust dispersed in air, in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

Protective equipment and precautions for firefighters — As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions — Avoid dust formation. Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). For personal protection see Section 8.

Other — For further clean-up instructions, call PeroxyChem Emergency Hotline number listed in Section 1 "Product and Company Identification" above.

Environmental Precautions — No special environmental precautions required.

Methods for Containment — Cover powder spill with plastic sheet or tarp to minimize spreading and keep powder dry.

Methods for cleaning up — Sweep or vacuum up spillage and return to container.

7. HANDLING AND STORAGE

Handling — Minimize dust generation and accumulation. Keep away from open flames, hot surfaces and sources of ignition. Refer to Section 8.

Storage — Keep tightly closed in a dry and cool place. Keep away from open flames, hot surfaces and sources of ignition. Any vessel that contains wet DARAMEND must be vented due to potential pressure build up from fermentation gases.

Incompatible products — Oxidizing agents. Strong acids.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines — Local nuisance dust standards apply.

Appropriate engineering controls

Engineering measures — Provide appropriate exhaust ventilation at places where dust is formed. It is recommended that all dust control equipment such as local exhaust ventilation and material transport systems involved in the handling of this product contain explosion relief vents or an explosion suppression or an oxygen-deficient environment.

Individual protection measures, such as personal protective equipment

Eye/Face Protection — Safety glasses with side-shields.

Skin and Body Protection	No special precautions required.
Hand Protection	No special precautions required
Respiratory Protection	Whenever dust in the worker's breathing zone cannot be controlled with ventilation or other engineering means, workers should wear respirators or dust masks approved by NIOSH/MSHA, EU CEN or comparable organization to protect against airborne dust.
Hygiene measures	Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Flakes
Physical State	Solid
Color	Tan Brown
Odor	No information available
Odor threshold	No information available
pH	6.0
Melting point/freezing point	No information available Not applicable
Boiling Point/Range	Decomposes upon heating
Flash point	No information available
Evaporation Rate	No information available
Flammability (solid, gas)	Combustible material
Flammability Limit in Air	
Upper flammability limit:	No information available
Lower flammability limit:	No information available
Vapor pressure	No information available
Vapor density	No information available
Density	No information available
Specific gravity	No information available
Water solubility	Insoluble in water
Solubility in other solvents	No information available
Partition coefficient	No information available
Autoignition temperature	No information available
Decomposition temperature	No information available
Viscosity, kinematic	No information available (Solid)
Viscosity, dynamic	No information available
Explosive properties	Low level dust explosion hazard
K_{st}	17 bar-m/sec: St1 Class dust
Oxidizing properties	No information available
Molecular weight	No information available
Bulk density	0.75 - 0.95 kg/L

10. STABILITY AND REACTIVITY

Reactivity	None under normal use conditions.
Chemical Stability	Stable.
Possibility of Hazardous Reactions	Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.
Hazardous polymerization	Hazardous polymerization does not occur.
Conditions to avoid	Heat, flames and sparks.
Incompatible materials	Oxidizing agents. Strong acids.
Hazardous Decomposition Products	Burning produces obnoxious and toxic fumes.

11. TOXICOLOGICAL INFORMATION

Product Information

LD50 Oral Iron:: 98.6 g/kg (rat)
LD50 Dermal No information available
LC50 Inhalation Iron: > 100 mg/m^3 6 hr (rat)

Serious eye damage/eye irritation Not expected to be irritating based on the components.
Skin corrosion/irritation Not expected to be irritating based on the components.

Sensitization No information available.

Chemical name	LD50 Oral	LD50 Dermal	LC50 Inhalation	NOAEL Oral Value
Iron (7439-89-6)	98600 mg/kg (Rat)			

Information on toxicological effects

Symptoms Dust is irritating eyes, nose, throat, and lungs.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Not expected to be irritating based on the components.
corrosivity Not applicable.
Chronic toxicity No known chronic effects of components present at greater than 1%.

Carcinogenicity Contains no ingredient listed as a carcinogen.

Mutagenicity This product is not recognized as mutagenic by Research Agencies

Neurological effects None known

Reproductive toxicity This product does not contain any known or suspected reproductive hazards.

STOT - single exposure No information available.
STOT - repeated exposure No information available.

Aspiration hazard No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity effects The environmental impact of this product has not been fully investigated Not expected to have significant environmental effects

Chemical name	Toxicity to algae	Toxicity to fish	Toxicity to Microorganisms	Toxicity to daphnia and other aquatic invertebrates
Iron		96 h LC50: = 13.6 mg/L (Morone saxatilis) static		48 h Daphnia magna EC50 = 8934.78 mg/l

Persistence and degradability The organic components are biodegradable and can be expected to contribute to BOD.

Bioaccumulation Bioaccumulation is unlikely.

Mobility Is not likely mobile in the environment due its low water solubility.

Other Adverse Effects None known.

13. DISPOSAL CONSIDERATIONS

Waste disposal methods Recovery/recycling recommended. Can be landfilled or incinerated, when in compliance with local regulations.

Contaminated Packaging Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. TRANSPORT INFORMATION

DOT NOT REGULATED

15. REGULATORY INFORMATION

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories
This product has the following hazards that are reportable under The Emergency Planning and Community Right-to-Know rule (EPCRA Tier II):

• Combustible dust

Clean Water Act
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA/EPCRA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive

Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

US State Regulations

U.S. State Right-to-Know Regulations
This product contains the following substances regulated under state Right-to-Know laws:

California Proposition 65
This product does not contain any Proposition 65 chemicals

CANADA

Environmental Emergencies
This product contains no substances listed under Canada's Environmental Emergency regulations.

Canadian National Pollutant Release Inventory
This product contains no substances reportable under Canada's National Pollutant Release Inventory regulations.

International Inventories

Component	TSCA (United States)	DSL (Canada)	EINECS/ELINCS (Europe)	ENCS (Japan)	China (IECSC)	KECL (Korea)	PICCS (Philippines)	AICS (Australia)	NZIoC (New Zealand)
Lecithin 8002-43-5 (3)	X	X	X		X	X	X	X	X
Iron 7439-89-6 (40-50)	X	X	X		X	X	X	X	X
Organic amendment (50-60)		X	X		X		X	X	X
Alfalfa 84082-36-0 (28.5)		X	X		X			X	X

Mexico

Mexico - Grade Minimum risk, Grade 0

16. OTHER INFORMATION

NFPA	**Health Hazards** 1	**Flammability** 1	**Stability** 0	**Special Hazards** -
HMIS	**Health Hazards** 1	**Flammability** 1	**Physical hazard** 0	**Special precautions** -

NFPA/HMIS Ratings Legend Severe = 4; Serious = 3; Moderate = 2; Slight = 1; Minimal = 0

Revision date: 2019-05-13
Revision note *** Indicates updated section,
, SDS sections updated: 9.
Issuing Date: 2015-07-14

Disclaimer
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Prepared By:

PeroxyChem
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End of Safety Data Sheet

Daramend® Reagent for Excavation Backfill and Trench PRB Shallow Groundwater Applications

Daramend® Reagent was originally formulated for surficial soil treatment via land farming techniques but is also frequently used in excavation / backfill applications to promote reductive dehalogenation of residual chlorinated solvents and their metabolites (e.g., cis-DCE and VC). Its coarse particle size provides cost advantages for backfill and trench applications in treating shallow groundwater, and may also enhance the longevity of treatment. Many soil mixing approaches, including simple excavator buckets and axial head mixers, can be used to achieve good distribution. Daramend is a cost-effective solution with approximate product costs of $13 per ton of treated backfill, while providing active treatment for five or more years in these applications.

This document provides information regarding common approaches in utilizing Daramend for excavation backfills and trench style permeable reactive barrier applications.

Excavation Backfills

Where average contaminant concentrations and other project details, such as groundwater geochemistry and velocity, are available reagent dosing can be calculated. Absent any specific site data, a typical dosing of 1 % - 2 % by weight of Daramend in the backfilled material or mixed soil volume may be used. Daramend can be mixed directly into the soil using deep soil mixing equipment or mixed into an open excavation base where prior soil removal had been conducted. Daramend is generally applied dry for these applications to enable easy mixing. In very windy conditions, a slurry may be prepared to minimize dust.

Trench Permeable Reactive Barriers

For permeable reactive barrier (PRB) applications, thorough mixing of the Daramend and sand to be placed in the reactive barrier is essential to ensure uniform treatment in the reactive zone following construction. It is recommended to mix the Daramend and sand mixture as a wet slurry *ex situ* with soil mixing equipment, an excavator, or a cement mixer. Once a homogeneous slurry is created it can be placed into the trench for the PRB construction.

PRBs constructed using dry reagent mixing is generally not recommended; the Daramend will likely segregate from the sand due to varying material densities. In addition, trench PRBs constructed with standing water present will also run the risk of segregation of the Daramend and sand.

With any PRB installation technique one should consider the possible impacts to soil permeability as a result of both the installation technique and the reagent used. The relatively low Daramend dosages typically needed in PRB applications do not adversely impact hydraulic conductivity.

Health and Safety

Daramend is safe when handled properly in accordance with instructions for use and the safety data sheet (SDS). The SDS is posted on our web site at: http://www.peroxychem.com/remediation. When working with Daramend, the use of standard personal protective equipment, including safety glasses, protective clothing and gloves are recommended. Additional safety equipment may be required for mechanical and site operations.

Please contact PeroxyChem for additional guidance.

APPENDIX J

Proposed Remedial Action Project Schedule

Proposed Remedial Action Project Schedule
65 Ekford Street, Brooklyn, NY
BCP Project C224218

ESTIMATED PROJECT SCHEDULE		2022								
Task	**Description**	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1	Design, Investigation and Permitting									
2	NYSDEC RAWP Review									
3	45-Day Public Comment Period									
4	Implementation of RAWP									
6	Preparation of FER and SMP (if required)									
7	NYSDEC & NYSDOH Review of FER & SMP (if required)									
8	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 December 2022