HALEY ALDRICH

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REMEDIAL INVESTIGATION WORK PLAN
40 BRUCKNER BOULEVARD
BRONX, NEW YORK

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

for 40 Bruckner Realty LLC
199 Lee Avenue, suite 1088
Brooklyn, New York

File No. 0200734-002
March 2021

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17 March 2021
File No. 0200734-001

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

Attention: Ms. Jane O'Connell

Subject: Remedial Investigation Work Plan
40 Bruckner Boulevard
Bronx, New York

Dear Ms. O'Connell,

On behalf of 40 Bruckner Realty LLC, Haley & Aldrich of New York is submitting for the review and approval of the New York State Department of Environmental Conservation (NYSDEC) this draft Remedial Investigation Work Plan (RIWP) for 40 Bruckner Boulevard located in the Mott Haven neighborhood of the Bronx, NY (Site). This document is being submitted as part of 40 Bruckner Realty LLC's Brownfield Cleanup Program Application for the Site. This RIWP has been developed based on the NYSDEC's "Technical Guidance for Site Investigation and Remediation" (DER-10, dated May 2010).

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

Sincerely yours,
HALEY & ALDRICH OF NEW YORK

James M. Bellew
Senior Associate

Mari C. Conlon, P.G.
Project Manager

Cc: Jacob Schwimmer – 40 Bruckner Boulevard Realty LLC
Frank Bifera, Esq. – Barclay Damon LLP
Scarlett McLaughlin – NYSDOH

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1. Introduction

On behalf of 40 Bruckner Realty LLC (Requestor), Haley & Aldrich of New York (Haley & Aldrich) has prepared this Remedial Investigation Work Plan (RIWP) for 40 Bruckner Boulevard (see Figure 1) in the Mott Haven neighborhood of the Bronx, NY (Site). This RIWP is being submitted as part of the Brownfield Cleanup Program (BCP) Application submitted by the Requestor who currently holds a 99-year lease for the Site and who has obtained a Long Term Remedial Access And License Agreement from the fee owner, 40 Bruckner LLC , to allow for the completion of the BCP cleanup should it extend beyond the 99-year lease. This RIWP was prepared in accordance with the regulations and guidance applicable to the BCP, including, without limitation, DER-10 which is entitled "Technical Guidance for Site Investigation and Remediation" and dated May 2010 (DER-10).

The Site, identified as Section 2, Block 2295, Lot 51 on the New York City tax map, is 41,240-square feet and is bounded by Bruckner Boulevard to the northeast followed by mixed commercial and residential buildings across Bruckner Boulevard to the east, northeast and north, by East 132nd Street to the southwest followed by the Harlem River Yard to the south, southwest and west, apartment buildings to the southeast, and by Alexander Avenue followed by commercial and industrial/manufacturing buildings to the west and northwest. The Site location is shown on Figure 1. Existing Site features are shown on Figure 2. The Site is currently vacant and is improved with a one-story warehouse, a three-story former commercial use building, a one-story building formerly used as a tire repair shop, and an unpaved material storage and parking area. Attachment 1a of the BCP Application provides a detailed description of the Site, and the Site's historic use and regulatory history, including a summary of previous site characterization activities.

The land is currently zoned as M1-5/R8A which allows for residential and industrial use. The Site is located in an urban area surrounded by commercial, industrial, and residential properties served by municipal water. Requestor plans to redevelop the Site for residential purposes consistent with current zoning.

1.1 PURPOSE

A Phase I Environmental Site Investigation (Phase I) was completed for the owner of the fee title to the Site, 40 Bruckner LLC, and a Limited Phase II Subsurface Investigation (Phase II) was completed for a prospective purchaser of the Site, JCS Realty. The Phase II characterized the Site and partially determined the nature and extent of the volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and metal contaminants in soil. Results of previous site characterization activities are summarized in Tables 1-4. Further details on previous Site characterization activities are provided in Section 1.2 and Attachment 1a of the BCP Application.

The site characterization activities have not identified a source of contamination at the Site to date. However, the site characterization activities did not include sampling of groundwater and soil vapor. Therefore additional targeted soil sampling and the performance of groundwater and soil vapor sampling is proposed. The RI will be implemented upon acceptance of the Site into the BCP and approval

of this RIWP. Results of the additional sample analyses will be used to confirm the results of the previous site characterization activities, potentially identify an on-Site source, and to determine a course for remedial action.

2. Background

2.1 CURRENT LAND USE

Although the Site is currently vacant, the Site is improved with a one-story warehouse, a three-story former commercial use building, a one-story building formerly used as a tire repair shop, and an unpaved materials storage and parking area. The Site is accessed from Bruckner Boulevard, Alexander Avenue and East 132nd Street.

2.2 SITE HISTORY

The Site was developed as early as 1891 with a repair shop in the southwest corner and a machine shop on the east corner of the Site, while the rest of the Site remained vacant. Train tracks ran on a curve along the south, southeast and east sides of the property. By 1908, the Site was developed with an office and a milk company next to the machine shop, which transitions to "Borden's Farm Product" with a wagon house, stable, and lumber yard by 1935. In 1944, the former machine shop and repair shop had been razed and the former "Borden's Farm Product" became a scrap and rubber storage facility. From the mid-1940s to the late 1980s, the Site was used for various industrial purposes and included an area for sorting and bailing rags, a rag stage area, a rag laundry, a paper stage, and by 1968, a wastepaper facility began operations in the east corner of the Site. Additionally, in the mid-1960s, the train tracks running along the south, southeast and east sides of the property were no longer present. In 1965, the Site is listed in City Directories as "Mill Sanitary Wiping Cloth Corp" and is listed as this facility until the mid-1990s.The Site remained relatively unchanged until the early-1990s when the former buildings labeled "Sorting and Bailing Rags" and "Wastepaper Facility" were converted to auto repair shops. The Site then remained relatively unchanged through the mid-2000s. From the mid- to late-2000s, several commercial operations were run at the Site, including, without limitation, NYC Water Works Inc. The current fee owner, 40 Bruckner LLC, purchased the Site from D. Benedetto Inc in December 2011. The Requestor, 40 Bruckner Realty LLC, is currently in a 99-year lease agreement of the Site with 40 Bruckner LLC.

2.3 SURROUNDING LAND USE

The Site is located in a mixed-use residential, commercial, and industrial area. One day care facility is located approximately 300-ft east of the Site and another day care facility is located approximately 500-ft east of the Site. No public schools or hospitals are located within a 500-ft radius of the Site. The properties immediately surrounding the Site are zoned M1-5/R8A while the properties to the south adjacent to 132nd Street are zoned manufacturing district M3-1, and properties to the north adjacent to Bruckner Boulevard are zoned manufacturing/residential district M1-2/R6A.

2.4 SURROUNDING LAND USE HISTORY

The area surrounding the Site was historically used for dwellings, light manufacturing, and industrial purposes from the late 1800s through the mid-1930s. From the mid-1930s to the mid-2000s the area

was primarily used for commercial/residential, auto related, and light manufacturing/industrial purposes.

2.5 PREVIOUS INVESTIGATIONS

A Phase II was performed by Environmental Business Consultants (EBC) on 10 June 2020 on behalf of a prospective purchaser. That Phase II contained the following scope of work:

1. Install ten (10) soil borings across the accessible areas of the Site and collect sixteen (16) soil samples.

A full report on the investigation and its findings are included in Appendix A. A summary of environmental findings of the Phase II includes the following:

1. Depth to groundwater is approximately 8 feet below ground surface (ft bgs) at the Site.
2. The stratigraphy of the Site, from the surface down, consists of historic fill material consisting of brown silty sand with pieces of asphalt, concrete, brick, and wood to depths varying between 3 to 11 ft bgs throughout the Site. Historic fill is underlain by sandy-silts and coarse sands.
3. Soil samples were compared to NYSDEC 6 NYCRR Part 375-6.8 Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Restricted Residential Use Soil Cleanup Objectives (RRSCOs). Soil samples collected during the Phase II showed:
    - One chlorinated VOC, tetrachloroethene (PCE), was detected at 2,500 µg/kg, which is above the UUSCO, in soil boring EBC3 (0-2'). See Figure 3 for the location of EBC3. PCE was also detected in other soil samples but at concentrations that did not exceed the UUSCO. Several petroleum-related VOCs were detected in multiple shallow soil samples but did not exceed UUSCOs.
    - Seven SVOCs were detected above both UUSCOs and RRSOCs in multiple shallow soil samples, including, benzo(a)anthracene (maximum 13,000 µg/kg), benzo(a)pyrene (maximum 12,000 µg/kg), benzo(b)fluoranthene (9,600 µg/kg), benzo(k)fluoranthene (maximum 6,200 µg/kg), chrysene (maximum 12,000 µg/kg), dibenzo(a,h)anthracene (1,400 µg/kg) and indeno(1,2,3-cd)pyrene (6,000 µg/kg).
    - No PCBs were detected at concentrations exceeding the UUSCOs.
    - The metal barium was detected above the RRSCO at EBC8 (0-2') at 686 mg/kg. Additionally, cadmium was detected above the RRSCO at EBC4 (0-2') at 4.36 mg/kg. Several other metals were detected in multiple shallow and deep soil samples, including copper (maximum 508 mg/kg), lead (maximum 1,350 mg/kg), and mercury (maximum 2.28 mg/kg) above both UUSCOs and RRSCOs, and zinc (maximum 2,690 mg/kg) above UUSCOs.
    - Two pesticides were detected above UUSCOs, including 4,4'-DDE at EBC8 (0-2') at 4 µg/kg and 4,4'-DDT in EBC8 (0-2') and EBC9 (0-2') at a maximum concentration of 19 µg/kg.

3. Remedial Investigation

This section describes the field activities to be conducted during the RI and provides the sampling scope, objectives, methods, anticipated number of samples, and sample locations. A summary of the sampling and analysis plan is provided in Table 5 and Figure 3. The following remedial investigation activities will be conducted to fill data gaps so that the nature and extent of contamination at the Site can be determined.

3.1 UTILITY MARKOUT

Field personnel will mobilize to the Site to stake (with flagging or paint) the proposed soil sample locations. Once the sample locations are marked, Dig Safely New York will be contacted to mark underground utilities. If necessary, the adjacent property owners and/or private vendors will be contacted for assistance with markout of utilities. Once the utilities are marked, field equipment and personnel will be mobilized to the Site.

3.2 SOIL SAMPLING

Additional on-Site soil samples will be collected to meet NYSDEC DER-10 requirements for remedial investigations, as well as to further characterize surface soil conditions.

The sampling and analysis plan is summarized in Table 5. Sixteen soil borings will be installed to 20 ft bgs by a track-mounted direct push drill rig (Geoprobe®) operated by a licensed operator. Soil samples will be collected from acetate liners using a stainless-steel trowel or sampling spoon. Samples will be placed in laboratory provided clean bottle ware.

Soils will be logged continuously by a geologist or engineer using the Unified Soil Classification System. The presence of staining, odors, and photoionization detector (PID) response will be noted. Samples will be collected using laboratory-provided clean bottle ware. VOC grab samples will be collected using terra cores. Sampling methods are described in the Field Sampling Plan (FSP) provided as Appendix B. A Quality Assurance Project Plan (QAPP) is provided as Appendix C. Laboratory data will be reported in ASP Category B deliverable format.

Soil samples representative of Site conditions will be collected at locations widely distributed across the Site as shown on Figure 3. Samples will be collected from the exposed surface at 0 to 2 inches bgs and from the groundwater interface at 8 to 10 ft bgs. Additional samples will be collected from any interval exhibiting elevated PID readings and/or visual and olfactory impacts. Samples will be analyzed for:

- Target Compound List (TCL) VOCs using EPA method 8260B
- TCL SVOCs using EPA method 8270C
- Total Analyte List (TAL) Metals using EPA method 6010
- PCBs using EPA method 8082
- TCL Pesticides using EPA method 8081B
- Per- and polyfluoroalkyl substances (PFAS) by EPA Method 537.1

- 1,4-dioxane by EPA Method 8270 SIM

Samples to be analyzed for PFAS and 1,4-dioxane will be collected and analyzed in accordance with the NYSDEC issued January 2021 "Guidelines for Sampling and Analysis of PFAS" and the June 2019 Sampling for "1,4-dioxane and Per- and Polyfluoroalkyl Substances (PFAS) Under DECs Part 375 Remedial Programs," respectively.

In addition, three grab samples will be collected from three distinct stockpiles (locations shown in Figure 2) of unidentified material. Stockpiles will be evaluated for visual and olfactory evidence of contamination as well as by using a PID and VOC samples will be collected from the area exhibiting the greatest impacts. The soil samples will be analyzed for TCL VOCs using EPA method 8260B, TCL SVOCs using EPA method 8270C and TAL Metals using EPA method 6010.

3.3 GROUNDWATER SAMPLING

The purpose of the groundwater sampling is to obtain current groundwater data and analyze for additional parameters (i.e., per- and polyfluoroalkyl substances [PFAS] and 1,4-dioxane) to meet NYSDEC DER-10 requirements for remedial investigations. Groundwater flow is presumed to be from the northeast to the southwest toward the Harlem River.

Eight 2-inch permanent monitoring wells will be installed at least 5 feet into the groundwater table, likely to 15 ft bgs. Monitoring wells will have a 2-inch annular space and be installed using either #0 or #00 certified clean sand fill. Wells will be screened from 5 to 15 ft bgs. Groundwater was encountered at approximately 8 ft bgs during the Phase II completed in June 2020. Monitoring wells will be developed by surging a pump in the well several times to pull fine-grained material from the well. Development will be completed until the water turbidity is 50 nephelometric turbidity units (NTU) or less or 10 well volumes are removed, if possible. The well casings will be surveyed by a New York State licensed surveyor to facilitate preparation of a groundwater contour map and determine the actual direction of groundwater flow at the Site.

The sampling and analysis plan is summarized in Table 5. Well locations are provided on Figure 3.

Select monitoring wells will be sampled and analyzed for:

- TCL VOCs using EPA method 8260B;
- TCL SVOCs using EPA method 8270C;
- Total Metals using EPA methods 6010/7471;
- PCBs using EPA method 8082
- PFAS using EPA method 537; and
- 1,4-Dioxane using EPA method 8260B.

Samples to be analyzed for PFAS and 1,4-dioxane will be collected and analyzed in accordance with the NYSDEC issued January 2021 "Guidelines for Sampling and Analysis of PFAS" and the June 2019 Sampling for "1,4-dioxane and Per- and Polyfluoroalkyl Substances (PFAS) Under DECs Part 375 Remedial Programs," respectively.

Groundwater wells will be sampled using low-flow sampling methods as described in the Field Sampling Plan (FSP). Following the low-flow purge, samples will be collected from monitoring wells for analysis of the analytes mentioned above.

The FSP presented in Appendix B details field procedures and protocols that will be followed during field activities. The Quality Assurance Project Plan (QAPP) presented in Appendix C details the analytical methods and procedures that will be used to analyze samples collected during field activities.

3.4 INVESTIGATION DERIVED WASTE

Following sample collection, boreholes that are not converted to monitoring wells will be backfilled with soil cutting and an upper bentonite plug. Boreholes will be restored to grade with surrounding area. If soil is identified as grossly contaminated, it will be separated and placed into a sealed and labeled Department of Transportation (DOT) approved 55-gallon drum pending characterization and offsite disposal. Groundwater purged from the monitoring wells during development and sample collection will be placed into a DOT approved 55-gallon drum pending offsite disposal.

3.5 SOIL VAPOR SAMPLING

Samples will be collected in accordance with the Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH October 2006). Nine soil vapor probes will be installed to approximately 6 to 7 ft bgs (approximately one and two feet above the groundwater interface previously encountered at approximately 8 ft bgs). The vapor implants will be installed with a direct-push drilling rig (e.g., Geoprobe®) to advance a stainless-steel probe to the desired sample depth. Seal integrity will be verified with a tracer gas (helium) test and one to three volumes of air will be purged from the implant prior to sample collection. Sampling will occur for the duration of two (2) hours.

Samples will be collected in appropriately sized Summa canisters that have been certified clean by the laboratory and samples will be analyzed by using USEPA Method TO-15. Flow rate for both purging and sampling will not exceed 0.2 L/min. Field personnel will record Summa canister and flow controller identification numbers, sample date, sample start time, sample start vacuum, sample end time and sample end vacuum. Sample end vacuum will be between 5 to 8 inches mercury. Sampling methods are described in the Field Sampling Plan (FSP) provided as Appendix B.

3.6 PROPOSED SAMPLING RATIONALE

Haley & Aldrich has proposed the sampling plan described herein and as shown on Figure 3 in consideration of data generated during the Phase II performed in June 2020 as well as observations made during a site inspection on 23 February 2021.

During the site inspection, several features were identified warranting further investigation. Features included a former hydraulic lift located in the east corner of the Site (to be investigated via MW1/SB1/SV1), an encased bulk storage tank located in the cellar (to be investigated via MW4/SB4/SV4), drainage structure located in the west corner of the Site (to be investigated via

MW8/SB8/SV8, SB9 and SB10), and several stockpiles of unidentified material (to be investigated via GS1, GS2 and GS3).

The Phase II included soil borings installed throughout the accessible areas of the Site. However, the sample map from the Phase II (included in Appendix A) shows data gaps, specifically in the north portion of the Site which was labeled as inaccessible. Based on historic Sanborn fire insurance maps, this area was used for former industrial operations including for the Borden's Farm Production facility in the 1900s through 1930s and scrap and rubber storage from 1940s through 1950s. Sampling locations have been proposed to investigate this portion of the Site in addition to other areas lacking adequate investigative data. Proposed sampling locations will also include groundwater and soil vapor sampling to help address data gaps and confirm if there is an on-Site source of contamination.

4. Quality Assurance and Quality Control

Quality Assurance/Quality Control (QA/QC) procedures will be used to provide performance information with regard to accuracy, precision, sensitivity, representation, completeness, and comparability associated with the sampling and analysis for this investigation. Field QA/QC procedures will be used (1) to document that samples are representative of actual conditions at the Site and (2) identify possible cross-contamination from field activities or sample transit. Laboratory QA/QC procedures and analyses will be used to demonstrate whether analytical results have been biased either by interfering compounds in the sample matrix, or by laboratory techniques that may have introduced systematic or random errors to the analytical process.

QA/QC procedures are defined in the Quality Assurance Project Plan included in Appendix C.

5. Data Use

5.1 DATA SUBMITTAL

Analytical data will be supplied in ASP Category B Data Packages. If more stringent than those suggested by the United States Environmental Protection Agency, the laboratory's in house QA/QC limits will be utilized.

5.2 DATA VALIDATION

Data packages will be sent to a qualified data validation specialist for evaluation of accuracy and precision of the analytical results. A DUSR will be created to confirm the compliance of methods with the protocols described in the NYSDEC Analytical service Protocol (ASP). DUSRs will summarize and confirm usability of the data for project-related decisions. Data validation will be completed in accordance with the DUSR guidelines from NYSDEC Division of Environmental Remediation. The DUSR will be included with the submittal of a Remedial Investigation Report (RIR), further discussed in Section 8.

6. Project Organization

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

The NYSDEC Case Manager will be designated by the NYSDEC. The Case Manager will be responsible for overseeing the successful completion of the project work and adherence to the work plan on behalf of NYSDEC.

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

Mari Conlon will be the Project Manager for this work. In this role, Ms. Conlon will manage the day-to-day tasks including coordination and supervision of field engineers and scientists, adherence to the work plan and oversight of project schedule. As the Project Manager, Ms. Conlon will also be responsible for communications with the NYSDEC Case Manager regarding project status, schedule, issues and updates for project work.

Zachary Simmel will be the field engineer responsible for implementing the field effort for this work. Mr. Simmel's responsibilities will include implementing the work plan activities and directing the subcontractors to ensure successful completion of all field activities.

The drilling subcontractor will be Eastern Environmental Solutions. Eastern Environmental Solutions will provide a Geoprobe operator to implement the scope of work in this RIWP.

The analytical laboratory will be Alpha Analytical of Westborough, MA, a New York Environmental Laboratory Approval Program (ELAP) certified laboratory. Alpha Analytical will be responsible for analyzing samples as per the analyses and methods identified in Section 2.

7. Health and Safety

7.1 HEALTH AND SAFETY PLAN

A Site-specific Health and Safety Plan (HASP) has been prepared in accordance with NYSDEC and NYSDOH guidelines and is provided as Appendix E of this work plan. The HASP includes a description of health and safety protocols to be followed by Haley & Aldrich field staff during implementation of the remedy, including monitoring within the work area, along with response actions should impacts be observed. The HASP has been developed in accordance with Occupational Health and Safety Administration (OSHA) 40 CFR Part 1910.120 regulatory requirements for use by Haley & Aldrich field staff that will work at the Site during planned activities. Contractors or other personnel who perform work at the Site are required to develop their own health and safety plan and procedures of comparable or higher content for their respective personnel in accordance with relevant OSHA regulatory requirements for work at hazardous waste sites as well as general industry as applicable based on the nature of work being performed.

7.2 COMMUNITY AIR MONITORING PLAN

The proposed investigation work will be completed both indoors and outdoors at the Site. Where intrusive drilling operations are planned, community air monitoring will be implemented to protect the downwind receptors. A Haley & Aldrich representative will continually monitor the breathing air in the vicinity of the immediate work area using a PID to measure total VOCs in air at concentrations as low as 1 part per million (ppm). The air in the work zone also will be monitored for visible dust generation.

If VOC measurements above 5 ppm are sustained for 15 minutes or visible dust generation is observed, the intrusive work will be temporarily halted and a more rigorous monitoring of VOCs and dust using recordable meters will be implemented in accordance with the NYSDOH Generic Community Air Monitoring Plan (CAMP).

8. Reporting

Following completion of the work, a summary of the RI will be provided to NYSDEC in a Remedial Investigation Report (RIR) to support implementation of proposed remedial action. The report will include:

- Summary of the RI activities;
- Figure showing sampling locations;
- Tables summarizing laboratory analytical results;
- Laboratory analytical data reports;
- Field sampling data sheets;
- Community Air Monitoring data;
- Findings regarding the nature and extent of contamination at the Site;
- Qualitative exposure assessment of any contamination from an on-site source that has migrated offsite; and
- Conclusions and recommendations.

The RIR may be combined with the Remedial Action Work Plan (RAWP) as a RIR/RAWP. The RIR/RAWP will include all data collected during the RI and adhere to technical requirements of DER-10 for an RIR.

9. Schedule

The Site owner plans to implement this RIWP promptly upon execution of a Brownfield Cleanup Agreement and after approval of the RIWP.

Anticipated RI Schedule	
RIWP and 30-Day Public Comment Period (concurrent with BCP application)	March-April 2021
Executed Brownfield Cleanup Agreement	May-June 2021
NYSDEC Approval of RIWP	July 2021
RI Implementation	August 2021
RIR/RAWP Submittal and 45-Day Public Comment Period	October-November 2021
NYSDEC Approval of RIR/RAWP	January 2022

References

1. Brownfield Cleanup Program Application. 40 Bruckner Boulevard, Bronx, New York. Prepared for 40 Bruckner Realty LLC by Haley & Aldrich of New York for submission to the New York State Department of Environmental Conservation. Submitted in March 2021.

2. Limited Phase II Subsurface Investigation. 40 Bruckner Boulevard, Bronx, New York. Prepared by Environmental Business Consultants (EBC), prepared for JCS Realty. December 2020.

3. Phase I Environmental Site Assessment – 40 Bruckner Boulevard, Tax Lot 51, Tax Block 2295, Bronx, New York. Prepared by Roux Environmental Engineering and Geology, D.P.C., prepared for 40 Bruckner, LLC. January 2019.

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

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TABLES

Table 1
40 Bruckner Boulevard
Bronx, New York
Soil Analytical Results
Volatile Organic Compounds

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	EBC1		EBC2		EBC3				EBC4		EBC5	
			(0-2')		(0-3')		(0-2')		(10-12')		(0-2')		(0-2')	
			6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020	
			µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg	
	µg/Kg	µg/Kg	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
1,1,1,2-Tetrachlorothane			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
1,1,1-Trichloroethane	680	100,000	< 5.8	5.8	**0.79**	6.7	**72**	330	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
1,1,2,2-Tetrachloroethane			< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
1,1,2-Trichloroethane			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
1,1-Dichloroethane	270	26,000	< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
1,1-Dichloroethene	330	100,000	< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
1,1-Dichloropropene			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
1,2,3-Trichlorobenzene			< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
1,2,3-Trichloropropane			< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
1,2,4-Trichlorobenzene			< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
1,2,4-Trimethylbenzene	3,600	52,000	< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
1,2-Dibromo-3-chloropropane			< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
1,2-Dibromoethane			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
1,2-Dichlorobenzene	1,100	100,000	< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
1,2-Dichloroethane	20	3,100	< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
1,2-Dichloropropane			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
1,3,5-Trimethylbenzene	8,400	52,000	**3.9**	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
1,3-Dichlorobenzene	2,400	4,900	< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
1,3-Dichloropropane			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
1,4-Dichlorobenzene	1,800	13,000	< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
1,4-Dioxane			< 86	86	< 100	100	< 100	100	< 77	77	< 76	76	< 100	100
2,2-Dichloropropane			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
2-Chlorotoluene			< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
2-Hexanone (Methyl Butyl Ketone)			< 29	29	< 34	34	< 40	40	< 26	26	< 25	25	< 34	34
2-Isopropyltoluene			< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
4-Chlorotoluene			< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
4-Methyl-2-Pentanone			< 29	29	< 34	34	< 40	40	< 26	26	< 25	25	< 34	34
Acetone	50	100,000	**13**	29	**15**	34	**9.1**	40	< 26	26	**7.1**	25	< 34	34
Acrolein			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Acrylonitrile			< 23	23	< 27	27	< 32	32	< 21	21	< 20	20	< 27	27
Benzene	60	4,800	**1.2**	5.8	< 6.7	6.7	**57**	60	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Bromobenzene			< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
Bromochloromethane			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Bromodichloromethane			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Bromoform			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Bromomethane			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Carbon Disulfide			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Carbon tetrachloride	760	2,400	< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Chlorobenzene	1,100	100,000	< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Chloroethane			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Chloroform	370	49,000	< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	**0.52**	5.1	< 6.8	6.8
Chloromethane			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
cis-1,2-Dichloroethene	250	100,000	< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
cis-1,3-Dichloropropene			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Dibromochloromethane			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Dibromomethane			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Dichlorodifluoromethane			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Ethylbenzene	1,000	41,000	**0.67**	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Hexachlorobutadiene			< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
Isopropylbenzene			< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
m&p-Xylenes	260	100,000	**2.8**	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Methyl Ethyl Ketone (2-Butanone)	120	100,000	< 35	35	< 40	40	< 47	47	< 31	31	< 30	30	< 41	41
Methyl t-butyl ether (MTBE)	930	100,000	< 12	12	< 13	13	< 16	16	< 10	10	< 10	10	< 14	14
Methylene chloride	50	100,000	< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Naphthalene	12,000	100,000	**2.9**	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
n-Butylbenzene	12,000	100,000	< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
n-Propylbenzene	3,900	100,000	< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
o-Xylene	260	100,000	**2.3**	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
p-Isopropyltoluene			< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
sec-Butylbenzene	11,000	100,000	< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
Styrene			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
tert-Butly alcohol			< 120	120	< 130	130	< 160	160	< 100	100	< 100	100	< 140	140
tert-Butylbenzene	5,900	100,000	< 5.8	5.8	< 490	490	< 330	330	< 5.2	5.2	< 310	310	< 6.8	6.8
Tetrachloroethene	1,300	19,000	< 5.8	5.8	**1,100**	490	**2,500**	330	< 5.2	5.2	**5**	5.1	< 6.8	6.8
Tetrahydrofuran (THF)			< 12	12	< 13	13	< 16	16	< 10	10	< 10	10	< 14	14
Toluene	700	100,000	**0.99**	5.8	< 6.7	6.7	**93**	330	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
trans-1,2-Dichloroethene	190	100,000	< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
trans-1,3-Dichloropropene			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
trans-1,4-dichloro-2-butene			< 12	12	< 980	980	< 660	660	< 10	10	< 620	620	< 14	14
Trichloroethene	470	21,000	< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Trichlorofluoromethane			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Trichlorotrifluoroethane			< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Vinyl Chloride	20	900	< 5.8	5.8	< 6.7	6.7	< 7.9	7.9	< 5.2	5.2	< 5.1	5.1	< 6.8	6.8
Total BTEX Concentration			**7.96**		**0.00**		**150.00**		**0.00**		**0.00**		**0.00**	
Total VOCs Concentration			**27.76**		**1115.79**		**2731.10**		**0.00**		**12.62**		**0.00**	

COMPOUND	EBC6				EBC7		EBC8						EBC9				EBC10		EBC11	
	(0-2')		(6-8')		(0-2')		(0-2')		(5-7')		(10-12')		(0-2')		(8-10')		(0-2')		(0-2')	
	6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020	
	µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg	
	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
1,1,1,2-Tetrachlorothane	< 23	23	< 19	19	< 18	18	< 4.8	4.8	< 22	22	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 27	27
1,1,1-Trichloroethane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,1,2,2-Tetrachloroethane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,1,2-Trichloroethane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,1-Dichloroethane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,1-Dichloroethene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,1-Dichloropropene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,2,3-Trichlorobenzene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,2,3-Trichloropropane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,2,4-Trichlorobenzene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,2,4-Trimethylbenzene	< 5.7	5.7	< 4.7	4.7	**30**	280	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,2-Dibromo-3-chloropropane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,2-Dibromoethane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,2-Dichlorobenzene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,2-Dichloroethane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,2-Dichloropropane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,3,5-Trimethylbenzene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,3-Dichlorobenzene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,3-Dichloropropane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,4-Dichlorobenzene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
1,4-Dioxane	< 86	86	< 71	71	< 66	66	< 72	72	< 84	84	< 66	66	< 74	74	< 74	74	< 77	77	< 100	100
2,2-Dichloropropane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
2-Chlorotoluene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
2-Hexanone (Methyl Butyl Ketone)	< 29	29	< 24	24	< 22	22	< 24	24	< 28	28	< 22	22	< 25	25	< 25	25	< 26	26	< 33	33
2-Isopropyltoluene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
4-Chlorotoluene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
4-Methyl-2-Pentanone	< 29	29	< 24	24	< 22	22	< 24	24	< 28	28	< 22	22	< 25	25	< 25	25	< 26	26	< 33	33
Acetone	**8.4**	29	< 24	24	**16**	22	**8.2**	24	**7.3**	28	**26**	27	**10**	25	**8.2**	25	< 26	26	< 33	33
Acrolein	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Acrylonitrile	< 11	11	< 9.5	9.5	< 18	18	< 9.6	9.6	< 11	11	< 8.8	8.8	< 9.9	9.9	< 9.9	9.9	< 10	10	< 27	27
Benzene	< 5.7	5.7	< 4.7	4.7	**6.4**	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Bromobenzene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Bromochloromethane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Bromodichloromethane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Bromoform	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Bromomethane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Carbon Disulfide	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	**1.2**	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Carbon tetrachloride	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Chlorobenzene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Chloroethane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Chloroform	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Chloromethane	< 5.7	5.7	< 4.7	4.7	**1.4**	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
cis-1,2-Dichloroethene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
cis-1,3-Dichloropropene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Dibromochloromethane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Dibromomethane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Dichlorodifluoromethane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Ethylbenzene	< 5.7	5.7	< 4.7	4.7	**0.75**	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Hexachlorobutadiene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Isopropylbenzene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
m&p-Xylenes	< 5.7	5.7	< 4.7	4.7	**2.3**	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Methyl Ethyl Ketone (2-Butanone)	< 34	34	< 28	28	**4.7**	26	< 29	29	< 33	33	**14**	26	< 30	30	< 30	30	< 31	31	< 40	40
Methyl t-butyl ether (MTBE)	< 11	11	< 9.5	9.5	< 8.8	8.8	< 9.6	9.6	< 11	11	< 8.8	8.8	< 9.9	9.9	< 9.9	9.9	< 10	10	< 13	13
Methylene chloride	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Naphthalene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
n-Butylbenzene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
n-Propylbenzene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
o-Xylene	< 5.7	5.7	< 4.7	4.7	**1.5**	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
p-Isopropyltoluene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
sec-Butylbenzene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Styrene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
tert-Butly alcohol	< 110	110	< 95	95	< 88	88	< 96	96	< 110	110	< 88	88	< 99	99	< 99	99	< 100	100	< 130	130
tert-Butylbenzene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 470	470	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Tetrachloroethene	**2.7**	5.7	**2.1**	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	**1.1**	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Tetrahydrofuran (THF)	< 11	11	< 9.5	9.5	< 8.8	8.8	< 9.6	9.6	< 11	11	< 8.8	8.8	< 9.9	9.9	< 9.9	9.9	< 10	10	< 13	13
Toluene	< 5.7	5.7	< 4.7	4.7	**5.8**	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
trans-1,2-Dichloroethene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
trans-1,3-Dichloropropene	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
trans-1,4-dichloro-2-butene	< 11	11	< 9.5	9.5	< 8.8	8.8	< 9.6	9.6	< 950	950	< 8.8	8.8	< 9.9	9.9	< 9.9	9.9	< 10	10	< 13	13
Trichloroethene	**0.6**	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Trichlorofluoromethane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Trichlorotrifluoroethane	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Vinyl Chloride	< 5.7	5.7	< 4.7	4.7	< 4.4	4.4	< 4.8	4.8	< 5.6	5.6	< 4.4	4.4	< 4.9	4.9	< 4.9	4.9	< 5.1	5.1	< 6.6	6.6
Total BTEX Concentration	**0.00**		**0.00**		**16.75**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**		**0.00**	
Total VOCs Concentration	**11.70**		**2.10**		**68.85**		**8.20**		**7.30**		**41.20**		**11.10**		**8.20**		**0.00**		**0.00**	

Notes:
* - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives
RL - Reporting Limit
Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value
Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

Table 2
40 Bruckner Boulevard
Bronx, New York
Soil Analytical Results
Semi-Volatile Organic Compounds

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	EBC1		EBC2		EBC3				EBC4		EBC5		EBC6				EBC7		EBC8						EBC9				EBC10		EBC11	
			(0-2')		(0-3')		(0-2')		(10-12')		(0-2')		(0-2')		(0-2')		(6-8')		(0-2')		(0-2')		(5-7')		(10-12')		(0-2')		(8-10')		(0-2')		(0-2')	
			6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020	
	µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg	
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
1,2,4,5-Tetrachlorobenzene			< 260	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
1,2,4-Trichlorobenzene			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
1,2-Dichlorobenzene			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
1,2-Diphenylhydrazine			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
1,3-Dichlorobenzene			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
1,4-Dichlorobenzene			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
2,4,5-Trichlorophenol			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
2,4,6-Trichlorophenol			< 180	180	< 190	190	< 180	180	< 180	180	< 180	180	< 200	200	< 180	180	< 180	180	< 190	190	< 180	180	< 170	170	< 180	180	< 180	180	< 180	180	< 170	170	< 170	170
2,4-Dichlorophenol			< 180	180	< 190	190	< 180	180	< 180	180	< 180	180	< 200	200	< 180	180	< 180	180	< 190	190	< 180	180	< 170	170	< 180	180	< 180	180	< 180	180	< 170	170	< 170	170
2,4-Dimethylphenol			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
2,4-Dinitrophenol			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
2,4-Dinitrotoluene			< 180	180	< 190	190	< 180	180	< 180	180	< 180	180	< 200	200	< 180	180	< 180	180	< 190	190	< 180	180	< 170	170	< 180	180	< 180	180	< 180	180	< 170	170	< 170	170
2,6-Dinitrotoluene			< 180	180	< 190	190	< 180	180	< 180	180	< 180	180	< 200	200	< 180	180	< 180	180	< 190	190	< 180	180	< 170	170	< 180	180	< 180	180	< 180	180	< 170	170	< 170	170
2-Chloronaphthalene			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
2-Chlorophenol			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
2-Methylnaphthalene			< 250	250	< 260	260	**240**	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
2-Methylphenol (o-cresol)	330	100,000	< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
2-Nitroaniline			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
2-Nitrophenol			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
3&4-Methylphenol (m&p-cresol)	330	100,000	< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
3,3'-Dichlorobenzidine			< 180	180	< 190	190	< 180	180	< 180	180	< 180	180	< 200	200	< 180	180	< 180	180	< 190	190	< 180	180	< 170	170	< 180	180	< 180	180	< 180	180	< 170	170	< 170	170
3-Nitroaniline			< 350	350	< 370	370	< 360	360	< 360	360	< 370	370	< 400	400	< 370	370	< 350	350	< 370	370	< 350	350	< 340	340	< 350	350	< 360	360	< 370	370	< 350	350	< 350	350
4,6-Dinitro-2-methylphenol			< 210	210	< 220	220	< 220	220	< 220	220	< 220	220	< 240	240	< 220	220	< 210	210	< 220	220	< 210	210	< 200	200	< 210	210	< 220	220	< 220	220	< 210	210	< 210	210
4-Bromophenyl phenyl ether			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
4-Chloro-3-methylphenol			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
4-Chloroaniline			< 280	280	< 300	300	< 290	290	< 290	290	< 290	290	< 320	320	< 290	290	< 280	280	< 300	300	< 280	280	< 270	270	< 280	280	< 290	290	< 290	290	< 260	280	< 280	280
4-Chlorophenyl phenyl ether			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
4-Nitroaniline			< 350	350	< 370	370	< 360	360	< 360	360	< 370	370	< 400	400	< 370	370	< 350	350	< 370	370	< 350	350	< 340	340	< 350	350	< 360	360	< 370	370	< 350	350	< 350	350
4-Nitrophenol			< 350	350	< 370	370	< 360	360	< 360	360	< 370	370	< 400	400	< 370	370	< 350	350	< 370	370	< 350	350	< 340	340	< 350	350	< 360	360	< 370	370	< 350	350	< 350	350
Acenaphthene	20,000	100,000	**230**	250	< 260	260	**420**	250	< 250	250	**190**	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Acenaphthylene	100,000	100,000	**220**	250	< 260	260	< 250	250	< 250	250	**1,500**	260	**190**	280	**140**	260	< 250	250	< 260	260	**260**	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Acetophenone			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Aniline			< 280	280	< 300	300	< 290	290	< 290	290	< 290	290	< 320	320	< 290	290	< 280	280	< 300	300	< 280	280	< 270	270	< 280	280	< 290	290	< 290	290	< 280	280	< 280	280
Anthracene	100,000	100,000	**650**	250	< 260	260	**620**	250	< 250	250	**1,900**	260	**230**	280	**280**	260	< 250	250	< 260	260	**320**	250	< 240	240	< 250	250	**200**	250	< 260	260	< 240	240	< 240	240
Benz(a)anthracene	1,000	1,000	**2,000**	250	< 260	260	**1,100**	250	< 250	250	**13,000**	2,600	**550**	280	**800**	260	**170**	250	**140**	260	**890**	250	< 240	240	< 250	250	**620**	250	**190**	260	< 240	240	**140**	240
Benzidine			< 350	350	< 370	370	< 360	360	< 360	360	< 370	370	< 400	400	< 370	370	< 350	350	< 370	370	< 350	350	< 340	340	< 350	350	< 360	360	< 370	370	< 350	350	< 350	350
Benzo(a)pyrene	1,000	1,000	**1,800**	180	< 190	190	**960**	180	< 180	180	**12,000**	1,800	**750**	200	**790**	180	**200**	180	**160**	190	**890**	180	< 170	170	< 180	180	**630**	180	**170**	180	< 170	170	**230**	170
Benzo(b)fluoranthene	1,000	1,000	**1,500**	250	< 260	260	**730**	250	< 250	250	**9,600**	2,600	**660**	280	**700**	260	**160**	250	< 260	260	**780**	250	< 240	240	< 250	250	**530**	250	**200**	260	< 240	240	**160**	240
Benzo(ghi)perylene	100,000	100,000	**890**	250	< 260	260	**580**	250	< 250	250	**5,100**	260	**1,000**	280	**720**	260	**170**	250	**210**	260	**570**	250	< 240	240	< 250	250	**400**	250	**140**	260	< 240	240	**150**	240
Benzo(k)fluoranthene	800	3,900	**1,400**	250	< 260	260	**660**	250	< 250	250	**6,200**	260	**550**	280	**570**	260	**130**	250	< 260	260	**700**	250	< 240	240	< 250	250	**490**	250	**160**	260	< 240	240	**150**	240
Benzoic acid			< 1800	1,800	< 1900	1,900	< 1800	1,800	< 1800	1,800	< 1800	1,800	< 2000	2,000	< 1800	1,800	< 1800	1,800	< 1900	1,900	< 1800	1,800	< 1700	1,700	< 1800	1,800	< 1800	1,800	< 1800	1,800	< 1700	1,700	< 1700	1,700
Benzyl butyl phthalate			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Bis(2-chloroethoxy)methane			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Bis(2-chloroethyl)ether			< 180	180	< 190	190	< 180	180	< 180	180	< 180	180	< 200	200	< 180	180	< 180	180	< 190	190	< 180	180	< 170	170	< 180	180	< 180	180	< 180	180	< 170	170	< 170	170
Bis(2-chloroisopropyl)ether			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Bis(2-ethylhexyl)phthalate			**220**	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	**130**	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Carbazole			**150**	180	< 190	190	**320**	180	< 180	180	**700**	180	< 200	200	< 180	180	< 180	180	< 190	190	< 180	180	< 170	170	< 180	180	< 180	180	< 180	180	< 170	170	< 170	170
Chrysene	1,000	3,900	**1,900**	250	< 260	260	**1,200**	250	< 250	250	**12,000**	2,600	**620**	280	**750**	260	**180**	250	**130**	260	**940**	250	< 240	240	< 250	250	**680**	250	**240**	260	< 240	240	**130**	240
Dibenz(a,h)anthracene	330	330	**240**	180	< 190	190	**140**	180	< 180	180	**1,400**	180	**240**	200	**160**	180	< 180	180	< 190	190	**130**	180	< 170	170	< 180	180	**120**	180	< 180	180	< 170	170	< 170	170
Dibenzofuran	7,000	59,000	**130**	250	< 260	260	**330**	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Diethyl phthalate			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Dimethylphthalate			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Di-n-butylphthalate			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Di-n-octylphthalate			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Fluoranthene	100,000	100,000	**3,900**	250	**170**	260	**2,600**	250	< 250	250	**18,000**	2,600	**1,100**	280	**1,500**	260	**240**	250	**190**	260	**2,100**	250	< 240	240	< 250	250	**1,200**	250	**380**	260	< 240	240	**180**	240
Fluorene	30,000	100,000	**210**	250	< 260	260	**340**	250	< 250	250	**210**	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Hexachlorobenzene			< 180	180	< 190	190	< 180	180	< 180	180	< 180	180	< 200	200	< 180	180	< 180	180	< 190	190	< 180	180	< 170	170	< 180	180	< 180	180	< 180	180	< 170	170	< 170	170
Hexachlorobutadiene			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Hexachlorocyclopentadiene			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Hexachloroethane			< 180	180	< 190	190	< 180	180	< 180	180	< 180	180	< 200	200	< 180	180	< 180	180	< 190	190	< 180	180	< 170	170	< 180	180	< 180	180	< 180	180	< 170	170	< 170	170
Indeno(1,2,3-cd)pyrene	500	500	**940**	250	< 260	260	**550**	250	< 250	250	**6,000**	260	**1,100**	280	**650**	260	**150**	250	**160**	260	**600**	250	< 240	240	< 250	250	**400**	250	**140**	260	< 240	240	**160**	240
Isophorone			< 180	180	< 190	190	< 180	180	< 180	180	< 180	180	< 200	200	< 180	180	< 180	180	< 190	190	< 180	180	< 170	170	< 180	180	< 180	180	< 180	180	< 170	170	< 170	170
Naphthalene	12,000	100,000	< 250	250	< 260	260	**410**	250	< 250	250	**170**	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Nitrobenzene			< 180	180	< 190	190	< 180	180	< 180	180	< 180	180	< 200	200	< 180	180	< 180	180	< 190	190	< 180	180	< 170	170	< 180	180	< 180	180	< 180	180	< 170	170	< 170	170
N-Nitrosodimethylamine			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
N-Nitrosodi-n-propylamine			< 180	180	< 190	190	< 180	180	< 180	180	< 180	180	< 200	200	< 180	180	< 180	180	< 190	190	< 180	180	< 170	170	< 180	180	< 180	180	< 180	180	< 170	170	< 170	170
N-Nitrosodiphenylamine			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Pentachloronitrobenzene			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Pentachlorophenol	800	6,700	< 210	210	< 220	220	< 220	220	< 220	220	< 220	220	< 240	240	< 220	220	< 210	210	< 220	220	< 210	210	< 200	200	< 210	210	< 220	220	< 220	220	< 210	210	< 210	210
Phenanthrene	100,000	100,000	**2,000**	250	< 260	260	**3,000**	250	< 250	250	**3,200**	260	**610**	280	**780**	260	**140**	250	< 260	260	**1,200**	250	< 240	240	< 250	250	**720**	250	**210**	260	< 240	240	**110**	240
Phenol	330	100,000	< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240
Pyrene	100,000	100,000	**3,600**	250	**160**	260	**2,400**	250	< 250	250	**16,000**	2,600	**970**	280	**1,300**	260	**250**	250	**170**	260	**1,900**	250	< 240	240	< 250	250	**1,000**	250	**320**	260	< 240	240	**160**	240
Pyridine			< 250	250	< 260	260	< 250	250	< 250	250	< 260	260	< 280	280	< 260	260	< 250	250	< 260	260	< 250	250	< 240	240	< 250	250	< 250	250	< 260	260	< 240	240	< 240	240

Notes:

* - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

RL - Reporting Limit

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

Table 3
40 Bruckner Boulevard
Bronx, New York
Soil Analytical Results
Pesticides PCBs

	COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	EBC1		EBC2		EBC3				EBC4		EBC5		EBC6				EBC7		EBC8						EBC9				EBC10		EBC11	
				(0-2')		(0-3')		(0-2')		(10-12')		(0-2')		(0-2')		(0-2')		(6-8')		(0-2')		(0-2')		(5-7')		(10-12')		(0-2')		(8-10')		(0-2')		(0-2')	
				6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020	
		µg/Kg	µg/Kg	µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg		µg/Kg	
				Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
Pesticides	4,4' -DDD	3.3	13,000	< 2.1	2.1	< 2.3	2.3	< 2.2	2.2	< 2.2	2.2	< 2.2	2.2	< 2.4	2.4	< 2.2	2.2	< 2.1	2.1	< 2.2	2.2	< 2.1	2.1	< 2.1	2.1	< 2.1	2.1	< 2.2	2.2	< 2.2	2.2	< 2.1	2.1	< 2.1	2.1
	4,4' -DDE	3.3	8,900	< 3.3	3.3	< 2.3	2.3	< 2.2	2.2	< 2.2	2.2	< 2.2	2.2	< 2.4	2.4	< 2.2	2.2	< 2.1	2.1	< 2.2	2.2	**4**	2.1	< 2.1	2.1	< 2.1	2.1	< 2.2	2.2	< 2.2	2.2	< 2.1	2.1	< 2.1	2.1
	4,4' -DDT	3.3	7,900	< 2.1	2.1	< 2.3	2.3	< 2.2	2.2	< 2.2	2.2	< 2.2	2.2	< 2.4	2.4	< 2.7	2.7	< 2.1	2.1	< 2.2	2.2	**19**	2.1	< 2.1	2.1	< 2.1	2.1	**4.6**	2.2	< 2.2	2.2	< 2.1	2.1	< 2.1	2.1
	a-BHC	20	480	< 7.1	7.1	< 7.5	7.5	< 7.2	7.2	< 7.3	7.3	< 7.4	7.4	< 7.9	7.9	< 7.2	7.2	< 7.1	7.1	< 7.3	7.3	< 7.1	7.1	< 6.9	6.9	< 7.1	7.1	< 7.2	7.2	< 7.3	7.3	< 7.0	7.0	< 7.0	7.0
	a-Chlordane	94	4,200	< 3.5	3.5	< 3.8	3.8	< 3.6	3.6	< 3.6	3.6	< 3.7	3.7	< 3.9	3.9	< 3.6	3.6	< 3.5	3.5	< 3.7	3.7	< 3.5	3.5	< 3.4	3.4	< 3.5	3.5	< 3.6	3.6	< 3.6	3.6	< 3.5	3.5	< 3.5	3.5
	Aldrin	5	97	< 3.5	3.5	< 3.8	3.8	< 3.6	3.6	< 3.6	3.6	< 3.7	3.7	< 3.9	3.9	< 3.6	3.6	< 3.5	3.5	< 3.7	3.7	< 3.5	3.5	< 3.4	3.4	< 3.5	3.5	< 3.6	3.6	< 3.6	3.6	< 3.5	3.5	< 3.5	3.5
	b-BHC	36	360	< 7.1	7.1	< 7.5	7.5	< 7.2	7.2	< 7.3	7.3	< 7.4	7.4	< 7.9	7.9	< 7.2	7.2	< 7.1	7.1	< 7.3	7.3	< 7.1	7.1	< 6.9	6.9	< 7.1	7.1	< 7.2	7.2	< 7.3	7.3	< 7.0	7.0	< 7.0	7.0
	Chlordane			< 35	35	< 38	38	< 36	36	< 36	36	< 37	37	< 39	39	< 36	36	< 35	35	< 37	37	< 35	35	< 34	34	< 35	35	< 36	36	< 36	36	< 35	35	< 35	35
	d-BHC	40	100,000	< 7.1	7.1	< 7.5	7.5	< 7.2	7.2	< 7.3	7.3	< 7.4	7.4	< 7.9	7.9	< 7.2	7.2	< 7.1	7.1	< 7.3	7.3	< 7.1	7.1	< 6.9	6.9	< 7.1	7.1	< 7.2	7.2	< 7.3	7.3	< 7.0	7.0	< 7.0	7.0
	Dieldrin	5	200	< 3.5	3.5	< 3.8	3.8	< 3.6	3.6	< 3.6	3.6	< 3.7	3.7	< 3.9	3.9	< 3.6	3.6	< 3.5	3.5	< 3.7	3.7	< 3.5	3.5	< 3.4	3.4	< 3.5	3.5	< 3.6	3.6	< 3.6	3.6	< 3.5	3.5	< 3.5	3.5
	Endosulfan I	2,400	24,000	< 7.1	7.1	< 7.5	7.5	< 7.2	7.2	< 7.3	7.3	< 7.4	7.4	< 7.9	7.9	< 7.2	7.2	< 7.1	7.1	< 7.3	7.3	< 7.1	7.1	< 6.9	6.9	< 7.1	7.1	< 7.2	7.2	< 7.3	7.3	< 7.0	7.0	< 7.0	7.0
	Endosulfan II	2,400	24,000	< 7.1	7.1	< 7.5	7.5	< 7.2	7.2	< 7.3	7.3	< 7.4	7.4	< 7.9	7.9	< 7.2	7.2	< 7.1	7.1	< 7.3	7.3	< 7.1	7.1	< 6.9	6.9	< 7.1	7.1	< 7.2	7.2	< 7.3	7.3	< 7.0	7.0	< 7.0	7.0
	Endosulfan sulfate	2,400	24,000	< 7.1	7.1	< 7.5	7.5	< 7.2	7.2	< 7.3	7.3	< 7.4	7.4	< 7.9	7.9	< 7.2	7.2	< 7.1	7.1	< 7.3	7.3	< 7.1	7.1	< 6.9	6.9	< 7.1	7.1	< 7.2	7.2	< 7.3	7.3	< 7.0	7.0	< 7.0	7.0
	Endrin	14	11,000	< 7.1	7.1	< 7.5	7.5	< 7.2	7.2	< 7.3	7.3	< 7.4	7.4	< 7.9	7.9	< 7.2	7.2	< 7.1	7.1	< 7.3	7.3	< 7.1	7.1	< 6.9	6.9	< 7.1	7.1	< 7.2	7.2	< 7.3	7.3	< 7.0	7.0	< 7.0	7.0
	Endrin aldehyde			< 7.1	7.1	< 7.5	7.5	< 7.2	7.2	< 7.3	7.3	< 7.4	7.4	< 7.9	7.9	< 7.2	7.2	< 7.1	7.1	< 7.3	7.3	< 7.1	7.1	< 6.9	6.9	< 7.1	7.1	< 7.2	7.2	< 7.3	7.3	< 7.0	7.0	< 7.0	7.0
	Endrin ketone			< 7.1	7.1	< 7.5	7.5	< 7.2	7.2	< 7.3	7.3	< 7.4	7.4	< 7.9	7.9	< 7.2	7.2	< 7.1	7.1	< 7.3	7.3	< 7.1	7.1	< 6.9	6.9	< 7.1	7.1	< 7.2	7.2	< 7.3	7.3	< 7.0	7.0	< 7.0	7.0
	g-BHC			< 1.4	1.4	< 1.5	1.5	< 1.4	1.4	< 1.5	1.5	< 1.5	1.5	< 1.6	1.6	< 1.4	1.4	< 1.4	1.4	< 1.5	1.5	< 1.4	1.4	< 1.4	1.4	< 1.4	1.4	< 1.4	1.4	< 1.5	1.5	< 1.4	1.4	< 1.4	1.4
	g-Chlordane			< 3.5	3.5	< 3.8	3.8	< 3.6	3.6	< 3.6	3.6	< 3.7	3.7	< 3.9	3.9	< 3.6	3.6	< 3.5	3.5	< 3.7	3.7	< 3.5	3.5	< 3.4	3.4	< 3.5	3.5	< 3.6	3.6	< 3.6	3.6	< 3.5	3.5	< 3.5	3.5
	Heptachlor	42	2,100	< 7.1	7.1	< 7.5	7.5	< 7.2	7.2	< 7.3	7.3	< 7.4	7.4	< 7.9	7.9	< 7.2	7.2	< 7.1	7.1	< 7.3	7.3	< 7.1	7.1	< 6.9	6.9	< 7.1	7.1	< 7.2	7.2	< 7.3	7.3	< 7.0	7.0	< 7.0	7.0
	Heptachlor epoxide			< 7.1	7.1	< 7.5	7.5	< 7.2	7.2	< 7.3	7.3	< 7.4	7.4	< 7.9	7.9	< 7.2	7.2	< 7.1	7.1	< 7.3	7.3	< 7.1	7.1	< 6.9	6.9	< 7.1	7.1	< 7.2	7.2	< 7.3	7.3	< 7.0	7.0	< 7.0	7.0
	Methoxychlor			< 35	35	< 38	38	< 36	36	< 36	36	< 37	37	< 39	39	< 36	36	< 35	35	< 37	37	< 35	35	< 34	34	< 35	35	< 36	36	< 36	36	< 35	35	< 35	35
	Toxaphene			< 140	140	< 150	150	< 140	140	< 150	150	< 150	150	< 160	160	< 140	140	< 140	140	< 150	150	< 140	140	< 140	140	< 140	140	< 140	140	< 150	150	< 140	140	< 140	140
PCBs	PCB-1016	100	1,000	< 71	71	< 75	75	< 72	72	< 73	73	< 74	74	< 79	79	< 72	72	< 71	71	< 73	73	< 71	71	< 69	69	< 71	71	< 72	72	< 73	73	< 70	70	< 70	70
	PCB-1221	100	1,000	< 71	71	< 75	75	< 72	72	< 73	73	< 74	74	< 79	79	< 72	72	< 71	71	< 73	73	< 71	71	< 69	69	< 71	71	< 72	72	< 73	73	< 70	70	< 70	70
	PCB-1232	100	1,000	< 71	71	< 75	75	< 72	72	< 73	73	< 74	74	< 79	79	< 72	72	< 71	71	< 73	73	< 71	71	< 69	69	< 71	71	< 72	72	< 73	73	< 70	70	< 70	70
	PCB-1242	100	1,000	< 71	71	< 75	75	< 72	72	< 73	73	< 74	74	< 79	79	< 72	72	< 71	71	< 73	73	< 71	71	< 69	69	< 71	71	< 72	72	< 73	73	< 70	70	< 70	70
	PCB-1248	100	1,000	< 71	71	< 75	75	< 72	72	< 73	73	< 74	74	< 79	79	< 72	72	< 71	71	< 73	73	< 71	71	< 69	69	< 71	71	< 72	72	< 73	73	< 70	70	< 70	70
	PCB-1254	100	1,000	< 71	71	< 75	75	< 72	72	< 73	73	< 74	74	< 79	79	< 72	72	< 71	71	< 73	73	< 71	71	< 69	69	< 71	71	< 72	72	< 73	73	< 70	70	< 70	70
	PCB-1260	100	1,000	< 71	71	< 75	75	< 72	72	< 73	73	< 74	74	< 79	79	< 72	72	< 71	71	< 73	73	< 71	71	< 69	69	< 71	71	< 72	72	< 73	73	< 70	70	< 70	70
	PCB-1262	100		< 71	71	< 75	75	< 72	72	< 73	73	< 74	74	< 79	79	< 72	72	< 71	71	< 73	73	< 71	71	< 69	69	< 71	71	< 72	72	< 73	73	< 70	70	< 70	70
	PCB-1268	100		< 71	71	< 75	75	< 72	72	< 73	73	< 74	74	< 79	79	< 72	72	< 71	71	< 73	73	< 71	71	< 69	69	< 71	71	< 72	72	< 73	73	< 70	70	< 70	70

Notes:

* - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

RL - Reporting Limit

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

Table 4
40 Bruckner Boulevard
Bronx, New York
Soil Analytical Results
Metals

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	EBC1		EBC2		EBC3		EBC3		EBC4		EBC5		EBC6		EBC6		EBC7		EBC8		EBC8		EBC8		EBC9		EBC9		EBC10		EBC11	
			(0-2')		(0-3')		(0-2')		(10-12')		(0-2')		(0-2')		(0-2')		(6-8')		(0-2')		(0-2')		(5-7')		(10-12')		(0-2')		(8-10')		(0-2')		(0-2')	
			6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020		6/10/2020	
			mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
	mg/Kg	mg/Kg	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
Aluminum			8,670	36	1,010	3.6	8,890	34	3,820	36	7,990	38	3,910	40	8,480	34	7,310	34	8,600	40	10,300	34	6,060	31	9,320	33	6,170	35	5,320	38	9,020	38	8,010	37
Antimony			< 3.6	3.6	< 3.6	3.6	< 3.4	3.4	< 3.6	3.6	< 3.8	3.8	< 4.0	4.0	< 3.4	3.4	< 3.4	3.4	< 4.0	4.0	< 3.4	3.4	< 3.1	3.1	< 3.3	3.3	11.5	3.5	< 3.8	3.8	< 3.8	3.8	< 3.7	3.7
Arsenic	13	16	2.97	0.72	2.24	0.72	4.28	0.69	< 0.71	0.71	7.1	0.76	6.2	0.80	2.95	0.68	6.78	0.69	2.22	0.79	8.04	0.68	2.72	0.62	3.11	0.66	9.39	0.70	6.23	0.75	1.54	0.76	1.57	0.75
Barium	350	400	98.7	0.7	131	0.7	84.1	0.7	21.7	0.7	106	0.8	75.9	0.8	90.1	0.7	163	0.7	55.9	0.8	686	0.7	29.3	0.6	54.6	0.7	339	0.7	104	0.8	49.2	0.8	107	0.7
Beryllium	7.2	72	0.48	0.29	< 0.29	0.29	0.57	0.27	< 0.29	0.29	0.55	0.30	0.33	0.32	0.45	0.27	0.43	0.28	0.61	0.32	0.5	0.27	0.34	0.25	0.39	0.27	0.42	0.28	0.38	0.30	0.39	0.30	0.33	0.30
Cadmium	2.5	4.3	1.06	0.36	0.41	0.36	0.67	0.34	< 0.36	0.36	4.36	0.38	0.61	0.40	0.81	0.34	1.12	0.34	0.51	0.40	1.89	0.34	0.5	0.31	1.47	0.33	2.19	0.35	1.26	0.38	0.55	0.38	0.59	0.37
Calcium			32,300	36	915	3.6	28,200	34	1,080	3.6	36,100	38	4,270	4.0	17,700	34	3,100	3.4	26,400	40	27,200	34	1,040	3.1	658	3.3	14,800	35	5,280	3.8	7,590	3.8	35,500	37
Chromium	30	180	31.6	0.36	4.04	0.36	15	0.34	7.75	0.36	15.9	0.38	12.1	0.40	21.5	0.34	19	0.34	13.2	0.40	34.5	0.34	12.9	0.31	13.4	0.33	21.7	0.35	15	0.38	15.5	0.38	19.9	0.37
Cobalt			7.8	0.36	3.06	0.36	7.91	0.34	3.63	0.36	6.71	0.38	5.38	0.40	7.01	0.34	6.18	0.34	4.81	0.40	10.4	0.34	4.68	0.31	6.06	0.33	7.64	0.35	6.69	0.38	4.89	0.38	8.74	0.37
Copper	50	270	85.8	0.7	24.4	0.7	31.3	0.7	9.9	0.7	42.9	0.8	137	0.8	54.1	0.7	62.8	0.7	15.2	0.8	88.7	0.7	96.7	0.6	27.2	0.7	508	7.0	147	7.5	13.8	0.8	27.9	0.7
Iron			15,500	36	8,870	3.6	15,200	34	6,720	3.6	16,900	38	14,300	40	16,400	34	23,500	34	11,200	40	45,600	34	13,300	31	17,000	33	22,100	35	20,000	38	11,500	38	14,900	37
Lead	63	400	104	0.7	282	0.7	96.7	0.7	1.8	0.7	167	0.8	449	0.8	80.5	0.7	1,350	6.9	51.7	0.8	809	6.8	59	0.6	59.6	0.7	748	7.0	408	0.8	20.9	0.8	47.2	0.7
Magnesium			7,800	36	99	3.6	7,180	34	1,610	3.6	10,500	38	1,400	4.0	4,010	3.4	2,590	3.4	4,480	4.0	7,290	34	1,950	3.1	1,660	3.3	3,170	3.5	4,060	3.8	2,320	3.8	4,260	3.7
Manganese	1,600	2,000	283	3.6	34.1	0.36	315	3.4	109	0.36	349	3.8	161	4.0	233	3.4	617	3.4	302	4.0	353	3.4	205	3.1	261	3.3	270	3.5	247	3.8	200	3.8	176	3.7
Mercury	0.18	0.81	0.58	0.14	0.92	0.14	0.37	0.13	< 0.03	0.03	0.35	0.07	1.61	0.16	0.12	0.03	2.28	0.06	< 0.03	0.03	0.34	0.03	0.15	0.03	0.07	0.06	0.58	0.06	0.39	0.07	0.04	0.03	0.13	0.07
Nickel	30	310	23.8	0.36	7.43	0.36	14.3	0.34	6.7	0.36	13.7	0.38	12.7	0.40	16.4	0.34	12.3	0.34	9.82	0.40	22.1	0.34	10.5	0.31	13.7	0.33	24	0.35	15.9	0.38	10.3	0.38	16.3	0.37
Potassium			1,850	7	125	7	1,550	7	693	7	1,800	8	569	8	1,710	7	843	7	1,300	8	2,460	7	695	6	464	7	989	7	662	8	875	8	2,870	7
Selenium	3.9	180	< 1.4	1.4	< 1.4	1.4	< 1.4	1.4	< 1.4	1.4	< 1.5	1.5	< 1.6	1.6	< 1.4	1.4	< 1.4	1.4	< 1.6	1.6	< 1.4	1.4	< 1.2	1.2	< 1.3	1.3	< 1.4	1.4	< 1.5	1.5	< 1.5	1.5	< 1.5	1.5
Silver	2	180	< 0.36	0.36	< 0.36	0.36	< 0.34	0.34	< 0.36	0.36	< 0.38	0.38	< 0.40	0.40	< 0.34	0.34	< 0.34	0.34	< 0.40	0.40	< 0.34	0.34	< 0.31	0.31	< 0.33	0.33	0.57	0.35	< 0.38	0.38	< 0.38	0.38	< 0.37	0.37
Sodium			448	7	67	7	818	7	103	7	884	8	71	8	790	7	220	7	771	8	623	7	120	6	73	7	480	7	128	8	144	8	502	7
Thallium			< 1.4	1.4	< 1.4	1.4	< 1.4	1.4	< 1.4	1.4	< 1.5	1.5	< 1.6	1.6	< 1.4	1.4	< 1.4	1.4	< 1.6	1.6	< 1.4	1.4	< 1.2	1.2	< 1.3	1.3	< 1.4	1.4	< 1.5	1.5	< 1.5	1.5	< 1.5	1.5
Vanadium			28	0.36	8.07	0.36	25.6	0.34	10.1	0.36	21.7	0.38	19	0.40	28.4	0.34	17.6	0.34	16.5	0.40	52.6	0.34	13.4	0.31	14.6	0.33	22.3	0.35	19.7	0.38	18.9	0.38	24.4	0.37
Zinc	109	10,000	96.7	0.7	224	0.7	55.7	0.7	12.9	0.7	2,690	7.6	76.2	0.8	86.6	0.7	270	0.7	44.7	0.8	517	6.8	45.6	0.6	483	6.6	396	7.0	258	0.8	38.4	0.8	49.8	0.7

Notes:

* - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

RL - Reporting Limit

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

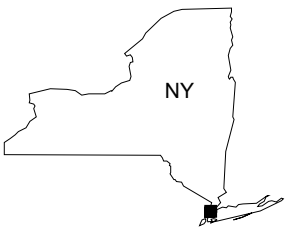
Table 5. Sampling and Analysis Plan
40 Bruckner Boulevard, Bronx, New York

Location	Sample Depth	Target Compound List VOCs (8260B)	Target Compound List SVOCs (8270C)	Total Analyte List Metals (6010)	PCBs (8082)	Pesticides (8081)	PFAS (537)	1,4-Dioxane (8270 SIM)	VOCs (TO-15)
SOIL									
SB1	0-2''	X	X	X	X	X	X	X	
	8-10'	X	X	X	X	X	X	X	
SB2	0-2''	X	X	X	X	X	X	X	
	8-10'	X	X	X	X	X	X	X	
SB3	0-2''	X	X	X	X	X	X	X	
	8-10'	X	X	X	X	X	X	X	
SB4	0-2''	X	X	X	X	X	X	X	
	8-10'	X	X	X	X	X	X	X	
SB5	0-2''	X	X	X	X	X	X	X	
	8-10'	X	X	X	X	X	X	X	
SB	0-2''	X	X	X	X	X	X	X	
	8-10'	X	X	X	X	X	X	X	
SB7	0-2''	X	X	X	X	X	X	X	
	8-10'	X	X	X	X	X	X	X	
SB8	0-2''	X	X	X	X	X	X	X	
	8-10'	X	X	X	X	X	X	X	
SB9	0-2''	X	X						
	8-10'	X	X						
SB10	0-2''	X	X						
	8-10'	X	X						
SB11	0-2''	X	X						
	8-10'	X	X						
SB12	0-2''	X	X	X					
	8-10'	X	X	X					
SB13	0-2''	X	X	X					
	8-10'	X	X	X					
SB14	0-2''	X	X	X					
	8-10'	X	X	X					
SB15	0-2''	X	X	X					
	8-10'	X	X	X					
SB16	0-2''	X	X	X					
	8-10'	X	X	X					
GS1	-	X	X	X					
GS2	-	X	X	X					
GS3	-	X	X	X					
GROUNDWATER									
MW1	-	X	X	X	X		X	X	
MW2	-	X	X	X	X		X	X	
MW3	-	X	X	X	X		X	X	
MW4	-	X	X	X	X		X	X	
MW5	-	X	X	X	X		X	X	
MW6	-	X	X	X	X		X	X	
MW7	-	X	X	X	X		X	X	
MW8	-	X	X	X	X		X	X	
SOIL VAPOR									
SV1	6-7'								X
SV2	6-7'								X
SV3	6-7'								X
SV4	6-7'								X
SV5	6-7'								X
SV6	6-7'								X
SV7	6-7'								X
SV8	6-7'								X
SV9	6-7'								X

Notes:
VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
PCBs - Polychlorinated biphenyls
PFAS - Per- and Polyfluoroalkyl Substances

QAQC samples include:
MS/MSD - 1 for every 20 samples
Field Duplicate - 1 for every 20 samples
Trip Blanks - 1 per cooler of samples to be analyzed for VOCs
Field Blanks - 1 for every 20 samples

FIGURES



MAP SOURCE: ESRI
SITE COORDINATES: 73°55'38"W 40°48'23"N

HALEY ALDRICH

40 BRUCKNER BOULEVARD
BRONX. NEW YORK

PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT
JANUARY 2021

FIGURE 1

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0200734\GISMaps\2021_0110200734_001_0001_PROJECT_LOCUS.mxd — USER: ajospe — LAST SAVED: 1/27/2021 9:41:28 PM

LEGEND

APPROXIMATE SITE BOUNDARY

N

NOTE
AERIAL IMAGERY SOURCE: ESRI

0 40 80
SCALE IN FEET

HALEY ALDRICH

40 BRUCKNER BOULEVARD
BRONX, NEW YORK

SITE MAP

JANUARY 2021

FIGURE 2

GIS FILE PATH: C:\ajospe\Projects\0200734\Maps\2021_01\0200734_001_0002_SITE_PLAN.mxd — USER: ajospe — LAST SAVED: 1/28/2021 9:30:57 PM

LEGEND

- APPROXIMATE SITE BOUNDARY
- PROPOSED SOIL BORING
- PROPOSED GRAB SAMPLE
- PROPOSED PERMANENT MONITORING WELL/SOIL BORING
- PROPOSED SOIL VAPOR POINT
- 2020 SOIL BORINGS BY ENVIRONMENTAL BUSINESS CONSULTANTS

N

0 40 80

SCALE IN FEET

NOTE
AERIAL IMAGERY SOURCE: ESRI

HALEY ALDRICH

40 BRUCKNER BOULEVARD
BRONX, NEW YORK

PROPOSED SAMPLE LOCATION MAP

FEBRUARY 2021

FIGURE 3

GIS FILE PATH: C:\ajospe\Projects\0200734\Maps\2021_01\0200734_001_0002_SITE_PLAN.mxd — USER: ajospe — LAST SAVED: 1/28/2021 9:30:57 PM

APPENDIX A

Previous Reports

APPENDIX B

Field Sampling Plan

HALEY ALDRICH

www.haleyaldrich.com

FIELD SAMPLING PLAN
40 BRUCKNER BOULEVAD
BRONX, NEW YORK

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

for
New York State Department of Environmental Conservation
Albany, NY

File No. 135597-002
February 2021

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APPENDIX A – Field Forms

1. Introduction

This Field Sampling Plan (FSP) has been prepared as a component of the Remedial Investigation Work Plan (RIWP) for the subject Site located at 40 Bruckner Boulevard in the Bronx, New York. This document was prepared to establish field procedures for field data collection to be performed in support of the RIWP for the Site.

The RIWP includes this Field Sampling Plan, a Quality Assurance Project Plan (QAPP), Health and Safety Plan (HASP), and Community Air Monitoring Plan (CAMP), which are included as part of this plan by reference.

The standard operating procedures (SOP) included as components of this plan will provide the procedures necessary to meet the project objectives. The SOPs will be used as reference for the methods to be employed for field sample collection and handling and the management of field data collected in the execution of the approved RIWP. The SOPs include numerous methods to execute the tasks of the RIWP. The Project Manager will select the appropriate method as required by field conditions and/or the objective the respective project task at the time of sample collection. Field procedures will be conducted in general accordance with the New York State Department of Conservation (NYSDEC) Technical Guidance for Site Investigation and Remediation (DER-10) and the Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) under NYSDEC Part 375 Remedial Program when applicable.

2. Field Program

This FSP provides the general purpose of sampling as well as procedural information. The RIWP contains the details on sampling and analysis (locations, depths, frequency, analyte lists, etc.).

The field program has been designed to acquire the necessary data to comply with the RIWP, and includes the following tasks:

- Soil sampling;
- Groundwater sampling;
- Soil vapor sampling;
- Sampling of investigation of derived wastes (IDW) as needed for disposal.

A Limited Phase II Subsurface Investigation (Ph II) was performed at the Site by Environmental Business Consultants (EBC) on 10 June 2020 for JCS Realty, for the anticipated contaminants based on the Site's uses and has partially determined the nature and extent of volatile organic compound (VOC), semi-volatile organic compound (SVOC), polychlorinated biphenyl (PCB), pesticide, and metal contaminants. The Site characterization did not identify a source of contamination on the Site and did not perform sampling of groundwater or soil vapor, therefore additional targeted soil sampling, and sampling of groundwater and soil vapor is proposed.

These SOPs presented herein may be changed as required, dependent on-site conditions, or equipment limitations, at the time of sample collection. If the procedures employed differ from the SOP, the deviations will be documented in the associated sampling report.

3. Utility Clearance

Invasive remedial activities such as excavation or remedial construction activities require location of underground utilities prior to initiating work. Such clearance is sound practice in that it minimizes the potential for damage to underground facilities and more importantly, is protective of the health and safety of personnel. Under no circumstances will invasive activities be allowed to proceed without obtaining proper utility clearance by the appropriate public agencies and/or private entities. This clearance requirement applies to all work on both public and private property, whether located in a dense urban area or a seemingly out-of-the-way rural location.

The drilling contractor performing the work will be responsible for obtaining utility clearance.

Utility clearance is required by law, and obtaining clearance includes contacting a public or private central clearance agency via a "one-call" telephone service and providing the proposed exploration location information. It is important to note that public utility agencies may not, and usually do not have information regarding utility locations on private property.

Before beginning subsurface work at any proposed exploration locations, it is critical that all readily-available information on underground utilities and structures be obtained. This includes publicly available information as well as information in the possession of private landowners. Any drawings obtained must be reviewed in detail for information pertaining to underground utilities.

Using the information obtained, the site should be viewed in detail for physical evidence of buried lines or structures, including pavement cuts and patches, variation in or lack of vegetation, variations in grading, etc. Care must also be taken to avoid overhead utilities as well. Presence of surface elements of buried utilities should be documented, such as manholes, gas or water service valves, catch basins, monuments or other evidence.

Overhead utility lines must be considered when choosing exploration and excavation locations. Most states require a minimum of 10 ft of clearance between equipment and energized wires. Such separation requirements may also be voltage-based and may vary depending on state or municipality regulations. In evaluating clearance from overhead lines, the same restrictions may apply to "drops", or wires on a utility pole connecting overhead and underground lines.

Using the information obtained and observations made, proposed exploration or construction locations should be marked in the field. Marking locations can be accomplished using spray paint on the ground, stakes, or other means. All markings of proposed locations should be made in white, in accordance with the generally-accepted universal color code for facilities identification (AWMA 4/99):

- White: Proposed Excavation or Drilling location
- Pink: Temporary Survey Markings
- Red: Electrical Power Lines, Cables, Conduit and Lighting Cables
- Yellow: Gas, Oil, Steam, Petroleum or Gaseous Materials
- Orange: Communication, Alarm or Signal Lines, Cables or Conduits
- Blue: Potable Water
- Purple: Reclaimed Water, Irrigation and Slurry Lines

- Green: Sewers and Drain Lines

In order to effectively evaluate the proposed locations with these entities, detailed, accurate measurements between the proposed locations and existing surface features should be obtained. Such features can be buildings, street intersections, utility poles, guardrails, etc.

Obtaining the utility clearance generally involves the designated "One-Call" underground facilities protection organization for the area and the landowner and one or both following entities:

- A third-party utility locator company will be utilized to locate underground utilities outside of the public right-of-way; and/or
- "Soft dig" excavation techniques to confirm or deny the presence of underground utilities in the area.

The proposed locations should be evaluated in light of information available for existing underground facilities. The detailed measurement information described above will be required by the "one call" agency. The owners of the applicable, participating underground utilities are obligated to mark their respective facilities at the site in the colors described above. Utility stake-out activities will typically not commence for approximately 72 hours after the initial request is made.

The public and private utility entities generally only mark the locations of their respective underground facilities within public rights-of-way. Determination of the locations of these facilities on private property will be the responsibility of the property owner or Contractor. If available information does not contain sufficient detail to locate underground facilities with a reasonable amount of confidence, alternate measures may be appropriate, as described below. In some cases, the memory of a long-time employee of a facility on private property may be the best or only source of information. It is incumbent on the Consultant or Contractor to exercise caution and use good judgement when faced with uncertainty.

Note: It is important to note that not all utilities are participants in the "one-call" agency or process. As such, inquiries must be made with the "one-call" agency to determine which entities do not participate, so they can be contacted independently.

Most utility stakeouts have a limited time period for which they remain valid, typically two to three weeks. It is critical that this time period be considered to prevent expiration of clearance prior to completion of the invasive activities, and the need to repeat the stake-out process.

Care must be exercised to document receipt of notice from the involved agencies of the presence or absence of utilities in the vicinity of the proposed locations.

Most agencies will generally provide a telephone or fax communication indicating the lack of facilities in the project area. If contact is not made by all of the agencies identified by the "one-call" process, do not assume that such utilities are not present. Re-contact the "one-call" agency to determine the status.

For complicated sites with multiple proposed locations and multiple utilities, it is advisable to arrange an on-site meeting with utility representatives. This will minimize the potential for miscommunication amongst the involved parties.

Completion of the utility stake out process is not a guarantee that underground facilities will not be encountered in excavations or boreholes; in fact, most "one-call" agencies and individual utilities do not offer guarantees, nor do they accept liability for damage that might occur. In areas outside the public right-of-way, a utility locating service may be utilized to locate underground utilities. It is advisable that any invasive activities proceed with extreme caution in the upper four to five feet in the event the clearance has failed to identify an existing facility. This may necessitate hand-excavation or probing to confirm potential presence of shallow utilities. If uncertainty exists for any given utility, extra activities can be initiated to solve utility clearance concerns. These options include:

- Screening the proposed work areas with utility locating devices, and/or hiring a utility locating service to perform this task.
- Hand digging, augering or probing to expose or reveal shallow utilities and confirm presence and location. In northern climates, this may require advancing to below frost line, typically at least four feet.
- Using "soft dig" techniques that utilize specialized tools and compressed air to excavate soils and locate utilities. This technique is effective in locating utilities to a depth of four to five feet.

Equipment/Materials:

- White Spray paint
- Wooden stakes, painted white or containing white flagging
- Color-code key
- Available drawings

4. Field Data Recording

This procedure describes protocol for documenting the investigation activities in the field. Field data serves as the cornerstone for an environmental project, not only for site characterization but for additional phases of investigation or remedial design. Producing defensible data includes proper and appropriate recording of field data as it is obtained in a manner to preserve the information for future use. This procedure provides guidelines for accurate, thorough collection and preservation of written and electronic field data.

Field data to be recorded during the project generally includes, but is not limited to, the following:

- general field observations;
- numeric field measurements and instrument readings;
- quantity estimates;
- sample locations and corresponding sample numbers;
- relevant comments and details pertaining to the samples collected;
- documentation of activities, procedures and progress achieved;
- contractor pay item quantities;
- weather conditions;
- a listing of personnel involved in site-related activities;
- a log of conversations, site meetings and other communications; and,
- field decisions and pertinent information associated with the decisions.

4.1 Written Field Data

Written field data will be collected using a standardized, pre-printed field log form. In general, use of a field log form is preferable as it prompts field personnel to make appropriate observations and record data in a standardized format. This promotes completeness and consistency from one person to the next. Otherwise, electronic data collection using a handheld device produces equal completeness and consistency using a preformatted log form.

In the absence of an appropriate pre-printed form, the data should be recorded in an organized and structured manner in a dedicated project field log book. Log books must be hard cover, bound so that pages cannot be added or removed, and should be made from high-grade 50% rag paper with a water-resistant surface.

The following are guidelines for use of field log forms and log books:

1. Information must be factual and complete.
2. All entries will be made in black indelible ink with a ballpoint pen and will be written legibly. Do not use “rollerball” or felt tip-style pens, since the water-soluble ink can run or smear in the presence of moisture.
3. Field log forms should be consecutively numbered.
4. Each day’s work must start a new form/page.
5. At the end of each day, the current log book page or forms must be signed and dated by the field personnel making the entries.

6. Make data entries immediately upon obtaining the data. Do not make temporary notes in other locations for later transfer; this only increases the potential for error or loss of data.
7. Entry errors are to be crossed out with a single line and initialed by the person making the correction.
8. Do not leave blanks on log forms, if no entry is applicable for a given data field, indicate so with "NA" or a dash ("--").
9. At the earliest practical time, photocopies or typed versions of log forms and log book pages should be made and placed in the project file as a backup in the event the book or forms are lost or damaged.
10. Log books should be dedicated to one project only, i.e., do not record data from multiple projects in one log book.

4.2 Electronic Data

Electronic data recording involves electronic measurement of field information through the use of monitoring instruments, sensors, gauges, and equipment controls. The following is a list of guidelines for proper recording and management of electronic field data:

1. Field data management should follow requirements of a project-specific data management plan (DMP), if applicable.
2. Use only instruments that have been calibrated in accordance with manufacturer's recommendations.
3. Usage of instruments, controls and computers for the purpose of obtaining field data should only be performed by personnel properly trained and experienced in the use of the equipment and software.
4. Use only fully-licensed software on personal computers and laptops.
5. Loss of electronic files may mean loss of irreplaceable data. Every effort should be made to back up electronic files obtained in the field as soon as practical. A backup file placed on the file server will minimize the potential for loss.
6. Electronic files, once transferred from field instruments or laptops to office computers, should be protected if possible, to prevent unwanted or inadvertent manipulation or modification of data. Several levels of protection are usually available for spreadsheets, including making a file "read-only" or assigning a password to access the file.
7. Protect CD disks from exposure to moisture, excessive heat or cold, magnetic fields, or other potentially damaging conditions.
8. Remote monitoring is often used to obtain stored electronic data from site environmental systems. A thorough discussion of this type of electronic field data recording is beyond the scope of this Section. Such on-site systems are generally capable of storing a limited amount of data as a comma-delimited or spreadsheet file. Users must remotely access the monitoring equipment files via modem or other access and download the data. In order to minimize the potential for loss of data, access and downloading of data should be performed frequently enough to ensure the data storage capacity of the remote equipment is not exceeded.

Equipment/Materials:

- Appropriate field log forms, or iPad® or equivalent with preformatted log forms.
- Indelible ball point pen (do not use "rollerball" or felt-tip style pens);
- Straight edge;

- Pocket calculator; and
- Laptop computer (if required).

5. Aquifer Characterization

This procedure describes measurement of water levels in groundwater monitoring.

A synoptic gauging round will be completed to obtain water levels in monitoring wells. Water levels will be acquired in a manner that provides accurate data that can be used to calculate vertical and horizontal hydraulic gradients and other hydrogeologic parameters. Accuracy in obtaining the measurements is critical to ensure the usability of the data.

5.1 Procedure

In order to provide reliable data, water level monitoring events should be collected over as short a period of time as practical. Barometric pressure can affect groundwater levels and, therefore, observation of significant weather changes during the period of water level measurements must be noted. Rainfall events and groundwater pumping can also affect groundwater level measurements. Personnel collecting water level data must note if any of these controls are in effect during the groundwater level collection period. Due to possible changes during the groundwater level collection period, it is imperative that the time of data collection at each station be accurately recorded. Water levels will also be collected prior to any sample collection that day.

The depth to groundwater will be measured with an electronic depth-indicating probe. Prior to obtaining a measurement, a fixed reference point on the well casing will be established for each well to be measured. Unless otherwise established, the reference point is typically established and marked on the north side of the well casing. Do not use protective casings or flush-mounted road boxes as a reference, due to the potential for damage or settlement. The elevation of the reference point shall be obtained by accepted surveying methods, to the nearest 0.01 ft.

The water level probe will be lowered into the well until the meter indicates (via indicator light or tone) the water is reached. The probe will be raised above water level and slowly lowered again until water is indicated. The cable will be held against the side of the inner protective casing at the point designated for water level measurements and a depth reading taken. This procedure will be followed three times or until a consistent value is obtained. The value will be recorded to the nearest 0.01 feet on the Groundwater Level Monitoring Report form.

Upon completion, the probe will be raised to the surface and together with the amount of cable that entered the well casing, will be decontaminated in accordance with methods described in Equipment Decontamination Procedure.

Equipment/Materials:

- Battery-operated, non-stretch electronic water level probe with permanent markings at 0.01 ft. increments, such as the Solinst Model 101 or equivalent.
- The calibrated cable on the depth indicator will be checked against a surveyor's steel tape once per quarter year. A new cable will be installed if the cable has changed by more than 0.01% (0.01 feet for a 100-foot cable). See also the Field Instruments – Use and Calibration Procedure.
- Groundwater Level Monitoring Report form.

6. Sample Collection for Laboratory Analysis

6.1 SOIL SAMPLE COLLECTION FOR LABORATORY ANALYSIS

The following procedure is an introduction to soil sampling techniques and an outline of field staff responsibilities. All samples will be collected with dedicated sampling equipment.

6.1.1 Preparatory Requirements

Prior to the beginning of any remedial investigation or remedial measures activities, staff must attend a project briefing for the purpose of reviewing the project work plan, site and utility plans, drawings, applicable regulations, sampling location, depth, and criteria, site contacts, and other related documents. Health and safety concerns will be documented in a site-specific Health & Safety Plan.

A file folder for the field activities should be created and maintained such that all relevant documents and log forms likely to be useful for the completion of field activities by others are readily available in the event of personnel changes.

6.1.2 Soil Classification

The stratigraphic log is a factual description of the soil at the borehole location and is relied upon to interpret the soil characteristics, and their influence and significance in the subsurface environment. The accuracy of the stratigraphic log is to be verified by the person responsible for interpreting subsurface conditions. An accurate description of the soil stratigraphy is essential for a reasonable understanding of the subsurface conditions. Confirmation of the field description by examination of representative soil samples by the project geologist, hydrogeologist, or geotechnical engineer (whenever practicable) is recommended.

The ability to describe and classify soil correctly is a skill that is learned from a person with experience and by systematic training and comparison of laboratory results to field descriptions.

6.1.2.1 Data Recording

Several methods for classifying and describing soils or unconsolidated sediments are in relatively widespread use. The Unified Soil Classification System (USCS) is the most common. With the USCS, a soil is first classified according to whether it is predominantly coarse-grained or fine-grained.

The description of fill soil is similar to that of natural undisturbed soil except that it is identified as fill and not classified by USCS group, relative density, or consistency. Those logging soils must attempt to distinguish between soils that have been placed (i.e., fill) and not naturally present; or soils that have been naturally present but disturbed (i.e., disturbed native).

It is necessary to identify and group soil samples consistently to determine the subsurface pattern or changes and non-conformities in soil stratigraphy in the field at the time of drilling. The stratigraphy in each borehole during drilling is to be compared to the stratigraphy found at the previously completed

boreholes to ensure that pattern or changes in soil stratigraphy are noted and that consistent terminology is used.

Visual examination, physical observations and manual tests (adapted from ASTM D2488, visual-manual procedures) are used to classify and group soil samples in the field and are summarized in this subsection. ASTM D2488 should be reviewed for detailed explanations of the procedures. Visual-manual procedures used for soil identification and classification include:

- visual determination of grain size, soil gradation, and percentage fines;
- dry strength, dilatancy, toughness, and plasticity (thread or ribbon test) tests for identification of inorganic fine-grained soil (e.g., CL, CH, ML, or MH); and
- soil compressive strength and consistency estimates based on thumb indent and pocket penetrometer (preferred) methods.

Soil characteristics like plasticity, strength and dilatancy should be determined using the Haley & Aldrich Soil Identification Field Form.

6.1.2.2 Field Sample Screening

Upon the collection of soil samples, the soil is screened with a photoionization detector (PID) for the presence of organic vapor. This is accomplished by running the PID across the soil sample. The highest reading and sustained readings are recorded.

Note: The PID measurement must be done upwind of the excavating equipment or any running engines so that exhaust fumes will not affect the measurements.

Another method of field screening is head space measurements. This consists of placing a portion of the soil sample in a sealable glass jar, placing aluminum foil over the jar top, and tightening the lid. Alternatively, plastic sealable bags may be utilized for field screen in lieu of glass containers. The jar should only be partially filled. Shake the jar and set aside for at least 30 minutes. After the sample has equilibrated, the lid of the jar can be opened; the foil is punctured with the PID probe and the air (headspace) above the soil sample is monitored. This headspace reading on the field form or in the field book is recorded. All head space measurements must be completed under similar conditions to allow comparability of results. Soil classification and PID readings will be recorded in the daily field report.

Equipment/Materials:

- Pocket knife or small spatula
- Small handheld lens
- Stratigraphic Log (Overburden) (Form 2001)
- Tape Measure
- When sampling for PFAS, acceptable materials for sampling include stainless steel, high density polyethylene (HDPE), PVC, silicone, acetate, and polypropylene.

6.1.3 Soil Sampling

Soil samples will be collected from acetate liners installed by a track-mounted direct push drill rig (Geoprobe®) operated by a licensed operator. Soil samples will be collected using a stainless-steel

trowel or sampling spoon into laboratory provided sample containers. If it is necessary to relocate any proposed sampling location due to terrain, utilities, access, etc., the Project Manager must be notified, and an alternate location will be selected.

Prior to use and between each sampling location at an environmental site, the sampling equipment must be decontaminated. All decontamination must be conducted in accordance with the project specific plans or the methods presented in SOP 7.0.

6.1.4 Sampling Techniques

The following procedure describes typical soil sample collection methods for submission of samples to a laboratory for chemical analysis. The primary goal of soil sampling is to collect representative samples for examination and chemical analysis (if required).

Environmental soil samples obtained for chemical analyses are collected with special attention given to the rationale behind determining the precise zone to sample, the specifics of the method of soil extraction and the requisite decontamination procedures. Preservation, handling and glassware for environmental soil samples varies considerably depending upon several factors including the analytical method to be conducted, and the analytical laboratory being used.

6.1.4.1 Grab Versus Composite Samples

A grab sample is collected to identify and quantify conditions at a specific location or interval. The sample is comprised of the minimum amount of soil necessary to make up the volume of sample dictated by the required sample analyses. Composite samples may be obtained from several locations or along a linear trend (in a test pit or excavation). Sampling may occur within or across stratification.

6.2 GROUNDWATER SAMPLE COLLECTION FOR LABORATORY ANALYSIS

The following section describes two techniques for groundwater sampling: "Low Stress/Low Flow Methods" and "Typical Sampling Methods."

"Low Stress/Low Flow" methods will be employed when collecting groundwater samples for the evaluation of volatile constituents (i.e. dissolved oxygen (DO)) or in fine-grained formations where sediment/colloid transport is possible. Analyses typically sensitive to colloidal transport issues include polychlorinated biphenyls (PCBs), polyaromatic hydrocarbons (PAHs) and metals.

The "Typical Sampling Methods" will be employed where the collection of parameters less sensitive to turbidity/sediment issues are being collected (general chemistry, pesticides and other semi-volatile organic compounds (SVOCs)).

NOTE: If non-aqueous phase liquids (NAPL) (light or dense) are detected in a monitoring well, groundwater sample collection will not be conducted, and the Project Manager must be contacted to determine a course of action.

6.2.1 Preparatory Requirements

- Verify well identification and location using borehole log details and location layout figures. Note the condition of the well and record any necessary repair work required.

- Prior to opening the well cap, measure the breathing space above the well casing with a handheld organic vapor analyzer to establish baseline breathing space VOC levels. Repeat this measurement once the well cap is opened. If either of these measurements exceeds the air quality criteria in the HASP, field personnel should adjust their PPE accordingly.

- Prior to commencing the groundwater purging/sampling, a water level must be obtained to determine the well volume for hydraulic purposes. In some settings, it may be necessary to allow the water level time to equilibrate. This condition exists if a water tight seal exists at the well cap and the water level has fluctuated above the top of screen; creating a vacuum or pressurized area in this air space. Three water level checks will verify static water level conditions have been achieved.

- Calculate the volume of water in the well. Typically overburden well volumes consider only the quantity of water standing in the well screen and riser; bedrock well volumes are calculated on the quantity of water within the open core hole and within the overburden casing.

6.2.2 Well Development

Well development is completed to remove fine grained materials from the well but in such a manner as to not introduce fines from the formation into the sand pack. Well development continues until the well responds to water level changes in the formation (i.e., a good hydraulic connection is established between the well and formation) and the well produces clear, sediment-free water to the extent practical.

- Attach appropriate pump and lower tubing into well.
- Gauge well and calculate one well volume. Turn on pump. If well runs dry, shut off pump and allow to recover.
- Surging will be performed by raising and lowering the pump several times to pull fine-grained material from the well. Periodically measure turbidity level using a La Motte turbidity reader.
- The second and third steps will be repeated until turbidity is less than 50 nephelometric turbidity units (NTU) or when 10 well volumes have been removed.
- All water generated during cleaning and development procedures will be collected and contained on site in 55-gallon drums for future analysis and appropriate disposal.

Equipment:

- Appropriate health and safety equipment
- Knife
- Power source (generator)
- Field book
- Well Development Form (Form 3006)
- Well keys

- Graduated pails
- Pump and tubing
- Cleaning supplies (including non-phosphate soap, buckets, brushes, laboratory-supplied distilled/deionized water, tap water, cleaning solvent, aluminum foil, plastic sheeting, etc.)
  Water level meter

6.2.3 Well Purging and Stabilization Monitoring (Low Stress/Low Flow Method)

The preferred method for groundwater sampling will be the low stress/low flow method described below.

- Slowly lower the pump, safety cable, tubing and electrical lines into the well to the depth specified by the project requirements. The pump intake must be at the midpoint of the well screen to prevent disturbance and resuspension of any sediment in the screen base.

- Before starting the pump, measure the water level again with the pump in the well leaving the water level measuring device in the well when completed.

- Purge the well at 100 to a maximum of 500 milliliters per minute (mL/min). During purging, the water level should be monitored approximately every 5 minutes, or as appropriate. A steady flow rate should be maintained that results in drawdown of 0.3 feet or less. The rate of pumping should not exceed the natural flow rate conditions of the well. Care should be taken to maintain pump suction and to avoid entrainment of air in the tubing. Record adjustments made to the pumping rates and water levels immediately after each adjustment.

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

  - pH: 0.1 pH units of the average value of the three readings;
  - Temperature: 3 percent of the average value of the three readings;
  - Conductivity: 0.005 milliSiemen per centimeter (mS/cm) of the average value of the three readings for conductivity <1 mS/cm and 0.01 mS/cm of the average value of the three readings for conductivity >1 mS/cm;
  - ORP: 10 millivolts (mV) of the average value of the three readings;
  - DO: 10 percent of the average value of the three readings; and
  - Turbidity: 10 percent of the average value of the three readings, or a final value of less than 50 nephelometric turbidity units (NTU).

- The pump must not be removed from the well between purging and sampling.

6.2.4 Sampling Techniques

- If an alternate pump is utilized, the first pump discharge volumes should be discarded to allow the equipment a period of acclimation to the groundwater.

- Samples are collected directly from the pump with the groundwater being discharged directly into the appropriate sample container. Avoid handling the interior of the bottle or bottle cap and don new gloves for each well sampled to avoid contamination of the sample.

- Order of sample collection:

  - Polyfluoroalkyl substances (PFAS)
  - Volatile organic compounds (VOC)
  - 1,4-Dioxane
  - Semi-volatile organic compounds (SVOC)
  - Total Analyte List (TAL) metals

- No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including plumbers tape and sample bottle cap liners with a PTFE layer.

- For low stress/low flow sampling, samples should be collected at a flow rate between 100 and 500 mL/min and such that drawdown of the water level within the well does not exceed the maximum allowable drawdown of 0.3 feet.

- The pumping rate used to collect a sample for VOC should not exceed 100 mL/min. Samples should be transferred directly to the final container 40 mL glass vials completely full and topped with a Teflon cap. Once capped the vial must be inverted and tapped to check for headspace/air presence (bubbles). If air is present, the sample will be discarded, and recollected until free of air.

- All samples must be labeled with:

  - A unique sample number
  - Date and time
  - Parameters to be analyzed
  - Project Reference ID
  - Samplers initials

- Labels should be written in indelible ink and secured to the bottle with clear tape.

Equipment/Materials:

- pH meter, conductivity meter, DO meter, ORP meter, nephelometer, temperature gauge
- Field filtration units (if required)
- Purging/sampling equipment
  - Peristaltic Pump
- Water level probe
- Sampling materials (containers, log book/forms, coolers, chain of custody)
- Work Plan
- Health and Safety Plan
- When sampling for PFAS, acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene.

Note: Peristaltic pump use for VOC collection is not acceptable on NYSDEC/EPA/RCRA sites; this technique has gained acceptance in select areas where it is permissible to collect VOCs using a peristaltic pump at a low flow rate (e.g. Michigan).

Note: 1,4-Dioxane and PFAS purge and sample techniques will be conducted following the NYSDEC guidance documents (see Appendix C of the RIWP). Acceptable groundwater pumps include stainless steel inertia pump with HDPE tubing, peristaltic pump equipped with HDPE tubing and silicone tubing, stainless steel bailer with stainless steel ball or bladder pump (identified as PFAS-free) with HDPE tubing.

Field Notes:

- Field notes must document all the events, equipment used, and measurements collected during the sampling activities. Section 2.0 describes the data/recording procedure for field activities.
- The log book should document the following for each well sampled:
  - Identification of well
  - Well depth
  - Static water level depth and measurement technique
  - Sounded well depth
  - Presence of immiscible layers and detection/collection method
  - Well yield – high or low
  - Purge volume and pumping rate
  - Time well purged
  - Measured field parameters
  - Purge/sampling device used
  - Well sampling sequence
  - Sampling appearance
  - Sample odors
  - Sample volume
  - Types of sample containers and sample identification
  - Preservative(s) used
  - Parameters requested for analysis
  - Field analysis data and method(s)
  - Sample distribution and transporter
  - Laboratory shipped to
  - Chain of custody number for shipment to laboratory
  - Field observations on sampling event
  - Name collector(s)
  - Climatic conditions including air temperature
  - Problems encountered and any deviations made from the established sampling protocol.

A standard log form for documentation and reporting groundwater purging and sampling events are presented on the Groundwater Sampling Record, Low Flow Groundwater Sampling Form, and Low Flow Monitored Natural Attenuation (MNA) Field Sampling Form. Refer to Appendix A for example field forms.

Groundwater/Decon Fluid Disposal:

- Groundwater disposal methods will vary on a case-by-case basis but may range from:
  - Off-site treatment at private treatment/disposal facilities or public owned treatment facilities
  - On-site treatment at Facility operated facilities
  - Direct discharge to the surrounding ground surface, allowing groundwater infiltration to the underlying subsurface regime
- Decontamination fluids should be segregated and collected separately from wash waters/groundwater containers.

6.3 SOIL VAPOR SAMPLING

The following procedure is an introduction to soil vapor sampling techniques and an outline of field staff responsibilities.

6.3.1 Preparatory Requirements

Prior to collecting the field sample, ensure the stainless steel oil vapor probe has been installed to the desired depth and sealed completely to the surface using a material such as bentonite. As part of the vapor intrusion evaluation, a tracer gas should be used in accordance with NYSDOH protocols to serve as a quality assurance/quality control (QA/QC) device to verify the integrity of the soil vapor probe seal. A container (box, plastic pail, etc.) will serve to keep the tracer gas in contact with the probe during testing. A portable monitoring device will be used to analyze a sample of soil vapor for the tracer gas prior to sampling. If the tracer sample results show a significant presence of the tracer, the probe seals will be adjusted to prevent infiltration. At the conclusion of the sampling round, tracer monitoring should be performed a second time to confirm the integrity of the probe seals.

6.3.2 Sampling Techniques

Samples will be collected in appropriate sized Summa canisters that have been certified clean by the laboratory and samples will be analyzed by using USEPA Method TO-15. Flow rate for both purging and sampling will not exceed 0.2 L/min. One to three implant volumes shall be purged prior to the collection of any soil-gas samples. A sample log sheet will be maintained summarizing sample identification, date and time of sample collection, sampling depth, identity of samplers, sampling methods and devices, soil vapor purge volumes, volume of the soil vapor extracted, vacuum of canisters before and after the samples are collected, apparent moisture content of the sampling zone, and chain of custody protocols.

6.4 SAMPLE HANDLING AND SHIPPING

Sample management is the continuous care given to each sample from the point of collection to receipt at the analytical laboratory. Good sample management ensures that samples are properly recorded, properly labeled, and not lost, broken, or exposed to conditions which may affect the sample's integrity.

All sample submissions must be accompanied with a chain of custody (COC) document to record sample collection and submission. Personnel performing sampling tasks must check the sample preparation and preservation requirements to ensure compliance with the Quality Assurance Project Plan.

The following sections provide the minimum standards for sample management.

6.4.1 Sample Handling

Prior to entering the field area where sampling is to be conducted, especially at sites with defined exclusion zones, the sampler should ensure that all materials necessary to complete the sampling are on hand. If samples must be maintained at a specified temperature after collection, dedicated coolers and ice must be available for use. Conversely, when sampling in cold weather, proper protection of water samples, trip blanks, and field blanks must be considered. Sample preservation will involve pH adjustment, cooling to 4°C, and sample filtration and preservation.

6.4.2 Sample Labeling

Samples must be properly labeled immediately upon collection.

Note that the data shown on the sample label is the minimum data required. The sample label data requirements are listed below for clarity.

- Project name
- Sample name/number/unique identifier
- Sampler's initials
- Date of sample collection
- Time of sample collection
- Analysis required
- Preservatives

To ensure that samples are not confused, a clear notation should be made on the container with a permanent marker. If the containers are too soiled for marking, the container can be put into a "zip lock" bag which can then be labeled.

All sample names will be as follows:

- Sample unique identifier: Enter the sample name or number. There should be NO slashes, spaces or periods in the date.
- Date: Enter the six-digit date when the sample was collected. Note that for one-digit days, months, and/or years, add zeros so that the format is MMDDYY (050210). There should be NO slashes, dashes, or periods in the date.

The QA/QC samples will be numbered consecutively as collected with a sample name, date and number of sample collected throughout the day (i.e. when multiple QA/QC samples are collected in one day).

Examples of this naming convention are as follows:

Sample Name:	Comments
TB-050202-0001	TRIP BLANK
TB-050202-0002	TRIP BLANK
FD-050202-0001	FIELD DUPLICATE
FD-050202-0002	FIELD DUPLICATE

NOTE: The QA/QC Sample # resets to 0001 EACH DAY, this will avoid having to look back to the previous day for the correct sequential number.

6.4.3 Field Code

The field code will be written in the 'Comments' field on the chain of custody for EVERY sample but will not be a part of the actual sample name. Enter the one/two-character code for type of sample (must be in CAPITALS):

N	Normal Field Sample
FD	Field Duplicate (note sample number (i.e. 0001) substituted for time)
TB	Trip Blank (note sample number (i.e. 0001) substituted for time)
EB	Equipment Blank (note sample number (i.e. 0001) substituted for time)
FB	Field Blank (note sample number (i.e. 0001) substituted for time)
KD	Known Duplicate
FS	Field Spike Sample
MS	Matrix Spike Sample (note on 'Comments' field of COC – laboratory to spike matrix.
MD	Matrix Spike Duplicate Sample (note on 'Comments' field of COC – laboratory to spike matrix.
RM	Reference Material

The sample labeling – both chain and sample bottles must be EXACTLY as detailed above. In addition, the Field Sample Key for each sample collected must be filled out.

6.4.4 Packaging

Sample container preparation and packing for shipment should be completed in a well-organized and clean area, free of any potential cross contamination. The following is a list of standard guidelines which must be followed when packing samples for shipment.

- Double bag ice in "Zip Lock" bags.
- Double check to ensure trip and temperature blanks have been included for all shipments containing VOCs, or where otherwise specified in the QAPP.
- Enclose the Chain of Custody form in a "Zip Lock" bag.
- Ensure custody seals (two, minimum) are placed on each cooler. Coolers with hinged lids should have both seals placed on the opening edge of the lid. Coolers with "free" lids should have seals placed on opposite diagonal corners of the lid. Place clear tape over custody seals.
- Containers should be wiped clean of all debris/water using paper towels (paper towels must be disposed of with other contaminated materials).
- Clear, wide packing tape should be placed over the sample label for protection.
- Do not bulk pack. Each sample must be individually padded.
- Large glass containers (1 liter and up) require much more space between containers.
- Ice is not a packing material due to the reduction in volume when it melts.

Note: Never store sterile sample containers in enclosures containing equipment which use any form of fuel or volatile petroleum-based product. When conducting sampling in freezing conditions at sites without a heated storage area (free of potential cross contaminants), unused trip blanks should be

isolated from coolers immediately after receipt. Trip blanks should be double bagged and kept from freezing.

6.4.5 Chain-of-Custody Records

Chain of custody (COC) forms will be completed for all samples collected. The form documents the transfer of sample containers. The COC record, completed at the time of sampling, will contain, but not be limited to, the sample number, date and time of sampling, and the name of the sampler. The COC document will be signed and dated by the sampler when transferring the samples.

Each sample cooler being shipped to the laboratory will contain a COC form. The cooler will be sealed properly for shipment. The laboratory will maintain a copy for their records. One copy will be returned with the data deliverables package.

The following list provides guidance for the completion and handling of all COCs:

- COCs used should be a Haley & Aldrich standard form or supplied by the analytical laboratory.
- COCs must be completed in black ball point ink only.
- COCs must be completed neatly using printed text.
- If a simple mistake is made, cross out the error with a single line and initial and date the correction.
- Each separate sample entry must be sequentially numbered.
- If numerous repetitive entries must be made in the same column, place a continuous vertical arrow between the first entry and the next different entry.
- When more than one COC form is used for a single shipment, each form must be consecutively numbered using the "Page ___ of ___" format.
- If necessary, place additional instructions directly onto the COC in the Comment Section. Do not enclose separate instructions.
- Include a contact name and phone number on the COC in case there is a problem with the shipment.
- Before using an acronym on a COC, define clearly the full interpretation of your designation [i.e., polychlorinated biphenyls (PCBs)].

6.4.6 Shipment

Prior to the start of the field sampling, the carrier should be contacted to determine if pickup will be at the field site location. If pick-up is not available at the Site, the nearest pick-up or drop off location should be determined. Sample shipments must not be left at unsecured drop locations.

Copies of all shipment manifests must be maintained in the field file.

7. Field Instruments – Use and Calibration

A significant number of field activities involve usage of electronic instruments to monitor for environmental conditions and health and safety purposes. It is imperative the instruments are used and maintained properly to optimize their performance and minimize the potential for inaccuracies in the data obtained. This section provides guidance on the usage, maintenance and calibration of electronic field equipment.

- All monitoring equipment will be in proper working order and operated in accordance with manufacturer's recommendations.
- Field personnel will be responsible for ensuring that the equipment is maintained and calibrated in the field in accordance with manufacturer's recommendations.
- Instruments will be operated only by personnel trained in the proper usage and calibration.
- Personnel must be aware of the range of conditions such as temperature and humidity for instrument operation. Usage of instruments in conditions outside these ranges will only proceed with approval of the Project Manager and/or Health and Safety Officer as appropriate.
- Instruments that contain radioactive source material, such as x-ray fluorescence (XRF) analyzers or moisture-density gauges require specific transportation, handling and usage procedures that are generally associated with a license from the Nuclear Regulatory Commission (NRC) or an NRC-Agreement State. Under no circumstance will operation of such instruments be allowed on site unless by properly authorized and trained personnel, using the proper personal dosimetry badges or monitoring instruments.

7.1 GENERAL PROCEDURE DISCUSSION

Care must be taken to minimize the potential for transfer of contaminated materials to the ground or onto other materials. Regardless of the size or nature of the equipment being decontaminated, the process will utilize a series of steps that involve removal of gross material (dirt, grease, oil etc.), washing with a detergent, and multiple rinsing steps. In lieu of a series of washes and rinse steps, steam cleaning with low-volume, high-pressure equipment (i.e., steam cleaner) is acceptable.

Exploration equipment, and all monitoring equipment in contact with the sampling media must be decontaminated prior to initiating site activities, in between exploration locations to minimize cross-contamination, and prior to mobilizing off site after completion of site work.

The following specific decontamination procedure is recommended for sampling equipment and tools:

- Brush loose soil off equipment;
- Wash equipment with laboratory grade detergent (i.e., Alconox or equivalent);
- Rinse with tap water;
- Rinse equipment with distilled water;
- Allow water to evaporate before reusing equipment; and

- Wrap equipment in aluminum foil when not being used.

7.2 DECONTAMINATION OF MONITORING EQUIPMENT

Because monitoring equipment is difficult to decontaminate, care should be exercised to prevent contamination. Sensitive monitoring instruments should be protected when they are at risk of exposure to contaminants. This may include enclosing them in plastic bags allowing an opening for the sample intake. Ventilation ports should not be covered.

If contamination does occur, decontamination of the equipment will be required; however, immersion in decontamination fluids is not possible. As such, care must be taken to wipe the instruments down with detergent-wetted wipes or sponges, and then with de-ionized water-wetted wipes or sponges.

7.3 DISPOSAL OF WASH SOLUTIONS AND CONTAMINATED EQUIPMENT

All contaminated wash water, rinses, solids and materials used in the decontamination process that cannot be effectively decontaminated (such as polyethylene sheeting) will be containerized and disposed of in accordance with applicable regulations. All containers will be labeled with an indelible marker as to contents and date of placement in the container, and any appropriate stickers required (such as PCBs). Storage of decontamination wastes on site will not exceed 90 days under any circumstances.

Equipment/Materials:

Decontamination equipment and solutions are generally selected based on ease of decontamination and disposability.

- Polyethylene sheeting;
- Metal racks to hold equipment;
- Soft-bristle scrub brushes or long-handle brushes for removing gross contamination and scrubbing with wash solutions;
- Large galvanized wash tubs, stock tanks, or wading pools for wash and rinse solutions;
- Plastic buckets or garden sprayers for rinse solutions;
- Large plastic garbage cans or other similar containers lined with plastic bags can be used to store contaminated clothing;
- Contaminated liquids and solids should be segregated and containerized in DOT-approved plastic or metal drums, appropriate for offsite shipping/disposal if necessary.

8. Investigation Derived Waste Disposal

8.1 RATIONALE/ASSUMPTIONS

This procedure applies to the disposition of investigation derived waste (IDW) including soils and/or groundwater. IDW is dealt with the following "Best Management Practices" and is not considered a listed waste due to the lack of generator knowledge concerning chemical source, chemical origin, and timing of chemical introduction to the subsurface.

Consequently, waste sampling and characterization is performed to determine if the wastes exhibit a characteristic of hazardous waste. The disposal of soil cuttings, test pit soils and/or purged groundwater will be reviewed on a case by case basis prior to initiation of field activities. Two scenarios typically exist:

- When no information is available in the area of activity or investigation, and impacted media/soils are identified. Activities such as new construction and /or maintenance below grade may encounter environmental conditions that were unknown.
- Disposal Required/Containerization Required – When sufficient Site information regarding the investigative Site conditions warrant that all materials handled will be contained and disposed.

If a known listed hazardous and/or characteristically hazardous waste/contaminated environmental media is being handled, then handling must be performed in accordance with RCRA Subtitle C (reference 2, Part V, Section 1(a),(b),(c)).

The following outlines the waste characterization procedures to be employed when IDW disposal is required.

The following procedure describes the techniques for characterization of IDW for disposal purposes. IDW may consist of soil cuttings (augering, boring, well installation soils, test pit soils), rock core or rock flour (from coring, reaming operations), groundwater (from well development, purging and sampling activities), decontamination fluids, personal protective equipment (PPE), and disposal equipment (DE).

8.2 PROCEDURE

The procedures for handling and characterization of field activity generated wastes are:

A.) Soil Cuttings - Soils removed from boring activities will be contained within an approved container, suitable for transportation and disposal.

- Once placed into the approved container, any free - liquids (i.e., groundwater) will be removed for disposal as waste fluids or solidified within the approved container using a solidification agent such as Speedy Dri (or equivalent).
- Contained soils will be screened for the presence of Volatile Organic Compounds (VOCs), using a Photo ionization detector (PID); this data will be logged for future reference.
- Once screened, full and closed; the container will be labeled and placed into the container storage area. At a minimum, the following information will be shown on each container

label: date of filling/generation, Site name, source of soils (i.e., borehole or well), and contact.

- Prior to container closure, representative samples from the containers will be collected for waste characterization purposes and submitted to the project laboratory.
- Typically, at a location where an undetermined site-specific parameter group exists, sampling and analysis may consist of the full RCRA Waste Characterization (ignitability, corrosivity, reactivity, toxicity), or a subset of the above based upon data collected, historical information, and generator knowledge.

B.) Groundwater - purging, and sampling groundwater, which requires disposal, will be contained.

- Containment may be performed in 55-gallon drums, tanks suitable for temporary storage (i.e., Nalgene tanks 500 to 1,000 gallons) or if large volumes of groundwater are anticipated, tanker trailer (5,000 to 10,000 gallons ±), or drilling "Frac" tanks may be utilized (20,000 gallons ±). In all cases the container/tank used for groundwater storage must be clean before use such that cross contamination does not occur.

C.) Decon Waters/Decon Fluids - Decon waters and/or fluids will be segregated, contained, and disposed accordingly.

- Decon waters may be disposed of with the containerized groundwater once analytical results have been acquired.

D.) PPE/DE – A number of disposal options exists for spent PPE/DE generated from investigation tasks. The options typically employed are:

- Immediately disposed of within on-Site dumpster/municipal trash; or
- If known to be contaminated with RCRA hazardous waste, dispose off-Site at a RCRA Subtitle C facility.
- Spent Solvent/Acid Rinses - The need for sampling must be determined in consultation with the waste management organization handling the materials. If known that only the solvent and/or acids are present, then direct disposal/treatment using media specific options may be possible without sampling (i.e., incineration).
- PPE/DE – Typically not sampled and included with the disposal of the solid wastes.

Equipment/Materials:

- Sample spoons, trier, auger,
- Sample mixing bowl,
- Sampling bailer, or pump,
- Sample glassware.

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References

1. American Public Works Association, April 1999, Uniform Color Code (http://www.apwa.net/)
2. ASTM Standard D 2487, “Classification of Soils for Engineering Purposes (Unified Soil Classification System)”.
3. ASTM 4750 Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well (Observation Well)
4. ASTM D6000 Guide for Presentation of Water Level Information from Ground Water Sites
5. ASTM D5474: Guide for Selection of Data Elements for Groundwater Investigations
6. ASTM D4696: Guide for Pore-liquid Sampling from the Vadose Zone
7. ASTM D5979: Guide for Conceptualization and Characterization of Groundwater Systems
8. ASTM D5903: Guide for Planning and Preparing for a Groundwater Sampling Event
9. ASTM D4448: Standard Guide for Sampling Groundwater Wells
10. ASTM D6001: Standard Guide for Direct Push Water Sampling for Geo-environmental Investigations.
11. ASTM (1991), Standard D1452-80, “Practice for Soil Investigation and Sampling by Auger Borings”, Annual Book of ASTM Standard, Section 4, Volume 04.08.
12. ASTM Standards on Environmental Sampling (1995), Standard D 2488-93, “Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)”
13. ASTM Standards on Environmental Sampling (1995), Standard D 4700-91, “Guide for Soil Sampling from the Vadose Zone”.
14. ASTM Standards on Environmental Sampling (1995), Standard D 1586-92, “Test Method for Penetration Test and Split-Barrel Sampling of Soils”.
15. ASTM D5088 - Practice for Decontamination of Field Equipment Used at Non-Radioactive Waste Sites
16. Geotechnical Gauge, Manufactured by W.F. McCollough, Beltsville, MD.
17. New York State Code Rule 753
18. New York State Department of Environmental Conservation Technical Guidance for Site Investigation and Remediation, DER-10, (3 May 2010).
19. New York State Department of Environmental Conservation, Division of Environmental Remediation, Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) under NYSDEC Part 375 Remedial Program (January 2021).
20. Sand Grading Chart, by Geological Specialty Company, Northport, Alabama.
21. USEPA Office of Solid Waste- SW846 Chapter 9 Sampling Plan, Chapter 10 Sampling Methods (September 1986).

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22. USEPA (1986), RCRA Ground-Water Monitoring Technical Enforcement Guidance Document, OSWER-9950.1.
23. USEPA (1987), A Compendium of Superfund Field Operations Methods, EPA/540/P-87/001.
24. USEPA (1988), Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, OSWER-9950.1.
25. USEPA RCRA - Guidance and Policies: Management of Remediation Waste Under RCRA (October 1998).
26. USEPA RCRA - Management of Contaminated Media (October 1998).
27. USEPA CERCLA Guidance (Options Relevant to RCRA Facilities): Guide to Management of Investigation - Derived Wastes (January 1992).
28. USEPA: Low-flow (Minimal Drawdown) Groundwater Sampling Procedures (EPA/540/S-95/504)
29. USEPA: RCRA Groundwater Monitoring: Draft Technical guidance (EPA/530 R 93 001)
30. The Occupational Safety and Health Administration's (OSHA) Excavation and Trenching Standard Title 29 of the Code of Federal Regulation (CFR) Part 1926.650.

APPENDIX A
Field Forms

EQUIPMENT CALIBRATION LOG

Project: _____

Location: _____

Model Name: _____

Model Number: _____ **Serial Number:** _____

Cal. Standards: _____

_____

_____

Instruments will be calibrated in accordance with manufacturer's recommendations at least once per day.

Date	Time	Calibration Satandard Solution	Calibration Result	Calibrated by

Other Comments: _____

_____

_____

_____

_____

_____

_____

_____

Groundwater Field Sampling Form

Location:

Job Number: _____
Well ID: _____
Field Sampling Crew: _____

Date: _____
Start Time: _____
Finished Time: _____

Initial Depth to Water: _____
Well Depth: _____
Depth to top of screen: _____
Depth to bottom of screen: _____
Depth of Pump Intake: _____

Purging Device: _____
Tubing present in well? _____
Tubing type: _____

Time Elapsed (24 hour)	Depth to Water (from casing)	Pump Setting (ml/min or gal/min)	Purge Rate (ml/min or gal/min)	Cumulative Purge Volume (liters or gallons)	Temperature (degrees Celsius)	pH	Conductivity us/cm	Dissolved Oxygen (mg/L)	Turbidity (NTU)	ORP/eH (mv)	Comments

Comments:

HALEY ALDRICH

SAMPLE IDENTIFICATION KEY

Page of

PROJECT _____ **H&A FILE NO.** _____

LOCATION _____ **PROJECT MGR.** _____

CLIENT _____

CONTRACTOR _____

Sample ID	Parent Sample ID	Location ID	Sample Date	Sample Time (military)	Sample Type Code	Filtered (Water Only T/D/N)	Composite Y/N	Soil Type	Depth To Top Of Sample	Depth To Bottom Of Sample	C.O.C. Number	Notes	Collected By

Notes:

Common Sample Type Codes:

N Normal Environmental Samp	WG Groundwater	WS Surface Water	SO Soil	GS Soil Gas	SE Sediment
WQ Water for Quality Control	FD Field Duplicate	EB Equipment Blank	TB Trip Blank	MS Matris Spike	MSD Matrix Spike Duplicate

see Memorandum dated 08/08/05 from Melanie Satanek "Sample Labeling for Submission to Analytical Laboratory" for less common codes

DAILY FIELD REPORT

Page of

Project		Report No.	
Location		Date	
Client		Page	of
Contractor		File No.	
Weather		Temperature	

Field Representative(s)	Time on site	Report/Travel/Other	Total hours

Distribution:

Haley & Aldrich, Inc.

GEOPROBE BORING REPORT

BORING NO.

Page 1 of

PROJECT
LOCATION
CLIENT
CONTRACTOR
DRILLER

PROJECT MGR.
FIELD REP.
DATE STARTED
DATE FINISHED

Elevation ft. Datum

Boring Location

Item	Casing	Sampler	Core Barrel
Type			
Inside Diameter (in.)			
Hammer Weight (lb.)			
Hammer Fall (in.)			

Rig Make & Model

☐ Truck ☐ Tripod ☐ Cat-Head
☐ ATV ☐ Geoprobe ☐ Winch
☐ Track ☐ Air Track ☐ Roller Bit
☐ Skid ☐ _____ ☐ Cutting Head

Hammer Type: ☐ Safety ☐ Doughnut ☐ Automatic

Drilling Mud: ☐ Bentonite ☐ Polymer ☐ None

Casing Advance: Type Method Depth

Drilling Notes:

Depth (ft.)	Casing Blows	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft)	Elev./ Depth (ft)	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth in feet to: Bottom of Casing	Bottom of Hole	Water
Date					

Sample ID

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon Sample
G Geoprobe

Summary

Overburden (Linear ft.) _____
Rock Cored (Linear ft.) _____
Number of Samples _____

BORING NO.

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil descriptions based on a modified Burmister method of visual-manual identification

Form #3000

APPENDIX C

Quality Assurance Project Plan

HALEY ALDRICH

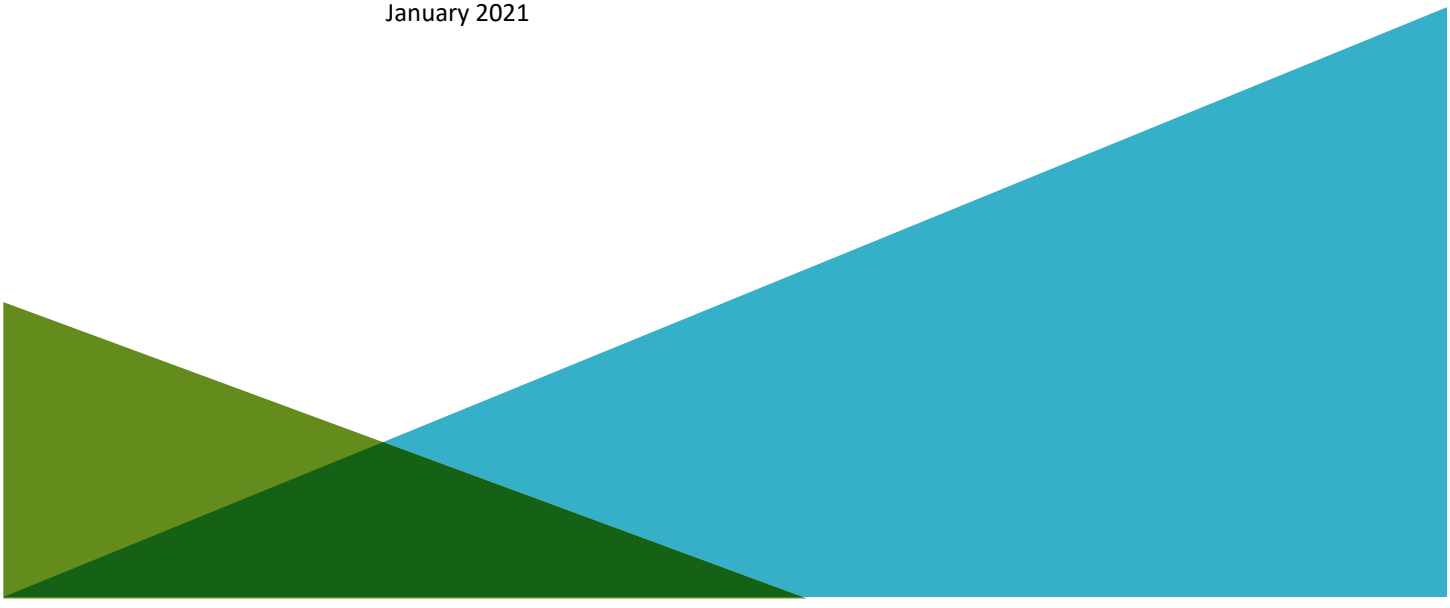
www.haleyaldrich.com

QUALITY ASSURANCE PROJECT PLAN
40 BRUCKNER BOULEVARD
BRONX, 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. 0200734-002
January 2021



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 Investigation Work Plan (RIWP) for 40 Bruckner Boulevard (Site) in the Bronx, 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 RIWP for the 40 Bruckner Boulevard Site in the Bronx, 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 RIWP appended to the Brownfield Cleanup Program application for the Site and incorporated herein by reference.

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 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 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 January 2021 and Sampling for 1,4-Dioxane and Per- and Polyfluoroalkyl Substances (PFAS) Under DEC's Part 375 Remedial Programs release June 2019.

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

Laboratory parameters for disposal samples will be determined by the disposal facility after an approved facility has been determined.

1.4 SAMPLING LOCATIONS

The RIWP provides the locations of soil samples and groundwater monitoring wells that will be sampled.

2. Project Organization and Responsibilities

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

2.2 QUALITY ASSURANCE RESPONSIBILITIES

The Quality Assurance team will consist of a Quality Assurance Officer and the Data Validation staff. Quality Assurance responsibilities are described as follows:

2.2.1 Quality Assurance (QA) Officer

The QA Officer reports directly to the Project Manager and will be responsible for overseeing the review of field and laboratory data. Additional responsibilities include the following:

- Assure the application and effectiveness of the QAPP by the analytical laboratory and the project staff;
- Provide input to the Project Manager as to corrective actions that may be required as a result of the above-mentioned evaluations;
- Prepare and/or review data validation and audit reports.

The QA Officer will be assisted by the data validation staff in the evaluation and validation of field and laboratory generated data.

2.2.2 Data Validation Staff

The data validation staff will be independent of the laboratory and familiar with the analytical procedures performed. The validation will include a review of each validation criterion as prescribed by the guidelines presented in Section 9.2 of this document and be presented in a Data Usability Summary Report (DUSR) for submittal to the QA Officer.

2.3 LABORATORY RESPONSIBILITIES

Laboratory services in support of the RIWP 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 RIWP 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 of soil and groundwater required by the RIWP.

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:

- Sample Identifier-Month Day Year

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 RIWP. 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 RIWP is designed to produce data of the quality necessary to achieve the minimum standard requirements of the field and laboratory analytical objectives described below. These data are being obtained with the primary objective to assess levels of contaminants of concern associated with the Site.

The overall project data quality objective (DQO) is to implement procedures for field data collection, sample collection, handling, and laboratory analysis and reporting that achieve the project objectives. The following section is a general discussion of the criteria that will be used to measure achievement of the project DQO.

8.1 PRECISION

8.1.1 Definition

Precision is defined as a quantitative measure of the degree to which two or more measurements are in agreement. Precision will be determined by collecting and analyzing field duplicate samples and by creating and analyzing laboratory duplicates from one or more of the field samples. The overall precision of measurement data is a mixture of sampling and analytical factors. The analytical results from the field duplicate samples will provide data on sampling precision. The results from duplicate samples created by the laboratory will provide data on analytical precision. The measurement of precision will be stated in terms of relative percent difference (RPD).

8.1.2 Field Precision Sample Objectives

Field precision will be assessed through collection and measurement of field duplicate samples at a rate of 1 duplicate per 20 investigative samples. The RPD criteria for the project field duplicate samples will be +/- 100% for soil, +/- 35 % for groundwater for parameters of analysis detected at concentrations greater than 5 times (5X) the laboratory reporting limit (RL).

8.1.3 Laboratory Precision Sample Objectives

Laboratory precision will be assessed through the analysis of laboratory control and laboratory control duplicate samples (LCS/LCSD) and matrix spike and matrix spike duplicate (MS/MSD) samples for groundwater and soil samples and the analysis of laboratory duplicate samples for air and soil vapor samples. Air and soil vapor laboratory duplicate sample analyses will be performed by analyzing the same SUMMA canister twice. The RPD criteria for the air/soil vapor laboratory duplicate samples will be +/- 35 % for parameters of analysis detected at concentrations greater than 5 times (5X) the laboratory reporting limit (RL).

8.2 ACCURACY

8.2.1 Definition

Accuracy relates to the bias in a measurement system. Bias is the difference between the observed and the "true" value. Sources of error are the sampling process, field contamination, preservation techniques, sample handling, sample matrix, sample preparation and analytical procedure limitations.

8.2.2 Field Accuracy Objectives

Sampling bias will be assessed by evaluating the results of field equipment rinse and trip blanks. Equipment rinse and trip blanks will be collected as appropriate based on sampling and analytical methods for each sampling effort.

If non-dedicated sampling equipment is used, equipment rinse blanks will be collected by passing ASTM Type II water over and/or through the respective sampling equipment utilized during each sampling effort. One equipment rinse blank will be collected for each type of non-dedicated sampling equipment used for the sampling effort. Equipment rinse blanks will be analyzed for each target parameter for the respective sampling effort for which environmental media have been collected. (Note: If dedicated or disposable sampling equipment is used, equipment rinse samples will not be collected as part of that field effort.)

Trip blank samples will be prepared by the laboratory and provided with each shipping container that includes containers for the collection of groundwater samples for the analysis of VOC. Trip blank samples will be analyzed for each VOC for which groundwater samples have been collected for analysis.

8.3 LABORATORY ACCURACY OBJECTIVES

Analytical bias will be assessed through the use of laboratory control samples (LCS) and Site-specific matrix spike (MS) sample analyses. LCS analyses will be performed with each analytical batch of project samples to determine the accuracy of the analytical system.

One (1) set of MS/MSD analyses will be performed with each batch of twenty (20) project samples collected for analysis to assess the accuracy of the identification and quantification of analytes within the Site-specific sample matrices. Additional sample volume will be collected at sample locations selected for the preparation of MS/MSD samples so that the standard laboratory reporting limits (RLs) are achieved.

The accuracy of analyses that include a sample extraction procedure will be evaluated through the use of system monitoring or surrogate compounds. Surrogate compounds will be added to each sample, standard, blank, and QC sample prior to sample preparation and analysis. Surrogate compound percent recoveries will provide information on the effect of the sample matrix on the accuracy of the analyses.

8.4 REPRESENTATIVENESS

8.4.1 Definition

Representativeness expresses the degree to which sample data represent a characteristic of a population, a parameter variation at a sampling point or an environmental condition. Representativeness is a qualitative parameter that is dependent upon the design of the sampling program. The representativeness criterion is satisfied through the proper selection of sampling locations, the quantity of samples and the use of appropriate procedures to collect and analyze the samples.

8.4.2 Measures to Ensure Representativeness of Field Data

Representativeness will be addressed by prescribing sampling techniques and the rationale used to select sampling locations. Sampling locations may be biased (based on existing data, instrument surveys, observations, etc.) or unbiased (completely random or stratified-random approaches).

8.5 COMPLETENESS

8.5.1 Definition

Completeness is a measure of the amount of valid (usable) data obtained from a measuring system compared to the total amount of the anticipated to be obtained. The completeness goal for all data uses is that a sufficient amount of valid data be generated so that determinations can be made related to the intended data use with a sufficient degree of confidence.

8.5.2 Field Completeness Objectives

Completeness is a measure of the amount of valid measurements obtained from measurements taken in this project versus the number planned. Field completeness objective for this project will be greater than (>) 90%.

8.5.3 Laboratory Completeness Objectives

Laboratory data completeness objective is a measure of the amount of valid data obtained from laboratory measurements. The evaluation of the data completeness will be performed at the conclusion of each sampling and analysis effort.

The completeness of the data generated will be determined by comparing the amount of valid data, based on independent validation, with the total laboratory data set. The completeness goal will be >90%.

8.6 COMPARABILITY

8.6.1 Definition

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another.

8.6.2 Measures to Ensure Comparability of Laboratory Data

Comparability of laboratory data will be measured from the analysis of Standard Reference Materials (SRM) obtained from either EPA Cooperative Research and Development Agreement (CRADA) suppliers or the National Institute of Standards and Technology (NIST). The reported analytical data will also be presented in standard units of mass of contaminant within a known volume of environmental media. The standard units for various sample matrices are as follows:

- Solid Matrices – mg/kg of media (Dry Weight).
- Aqueous Matrices – ng/L for PFAS analyses, ug/L of media for organic analyses, and mg/L for inorganic analyses.

8.7 LEVEL OF QUALITY CONTROL EFFORT

If non-dedicated sampling equipment is used, equipment rinse blanks will be prepared by field personnel and submitted for analysis of target parameters. Equipment rinse blank samples will be analyzed to check for potential cross-contamination between sampling locations that may be introduced during the investigation. One (1) equipment rinse blank will be collected per sampling event to the extent that non-dedicated sampling equipment is used.

If necessary, A separate equipment rinse blank sample will be collected for PFAS using the sample collection procedure described in Section 8.1.1 of the NYSDEC-approved Avangrid Field Sampling Plan. (Note: If dedicated or disposable sampling equipment is used, equipment rinse samples will not be collected as part of that field effort.)

Trip blanks will be used to assess the potential for contamination during sample storage and shipment. Trip blanks will be provided with the sample containers to be used for the collection of groundwater samples for the analysis of VOC. Trip blanks will be preserved and handled in the same manner as the project samples. One (1) trip blank will be included along with each shipping container containing project samples to be analyzed for VOC.

Method blank samples will be prepared by the laboratory and analyzed concurrently with all project samples to assess potential contamination introduced during the analytical process.

Field duplicate samples will be collected and analyzed to determine sampling and analytical reproducibility. One (1) field duplicate will be collected for every 20 or fewer investigative samples collected for off-Site laboratory analysis.

Matrix spikes will provide information to assess the precision and accuracy of the analysis of the target parameters within the environmental media collected. One (1) matrix spike/matrix spike duplicate (MS/MSD) will be collected for every 20 or fewer investigative samples per sample matrix.

(Note: Soil MS/MSD samples require triple sample volume for VOC only. Aqueous MS/MSD samples require triple the normal sample volume for VOC analysis and double the volume for the remaining parameters.)

9. Data Reduction, Validation and Reporting

Data generated by the laboratory operation will be reduced and validated prior to reporting in accordance with the following procedures:

9.1 DATA REDUCTION

9.1.1 Field Data Reduction Procedures

Field data reduction procedures will be minimal in scope compared to those implemented in the laboratory setting. The pH, conductivity, temperature, turbidity, DO, ORP and breathing zone VOC readings collected in the field will be generated from direct read instruments. The data will be written into field logbooks immediately after measurements are taken. If errors are made, data will be legibly crossed out, initialed and dated by the field member, and corrected in a space adjacent to the original entry.

9.1.2 Laboratory Data Reduction Procedures

Laboratory data reduction procedures are provided by the appropriate chapter of USEPA, "Test Methods for Evaluating Solid Waste", SW-846, Third Edition. Errors will be noted; corrections made with the original notations crossed out legibly. Analytical results for soil samples will be calculated and reported on a dry weight basis.

9.1.3 Quality Control Data

Quality control data (e.g., laboratory duplicates, surrogates, matrix spikes, and matrix spike duplicates) will be compared to the method acceptance criteria. Data determined to be acceptable will be entered into the laboratory information management system.

Unacceptable data will be appropriately qualified in the project report. Case narratives will be prepared which will include information concerning data that fell outside acceptance limits and any other anomalous conditions encountered during sample analysis.

9.2 DATA VALIDATION

Data validation procedures of the analytical data will be performed by the Haley & Aldrich QA Officer or designee using the following documents as guidance for the review process:

- "U.S. EPA National Functional Guidelines for Organic Data Review", and the "U.S. EPA National Functional Guidelines for Inorganic Data Review".

- The specific data qualifiers used will be applied to the reported results as presented and defined in the EPA National Functional Guidelines. Validation will be performed by qualified personnel at the direction of the Haley & Aldrich QAO.

- 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

1. United States Environmental Protection Agency, (1999). EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations. EPA QA/R-5 Interim Final, November 1999.

2. United States Environmental Protection Agency (1991). Preparation Aids for the Development of Category I Quality Assurance Project Plans. U.S. EPA/600/8-91/003, Risk Reduction Engineering Laboratory, Office of Research and Development, Cincinnati, Ohio, February 1991.

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.

5. United States Environmental Protection Agency. U.S. EPA National Functional Guidelines for Organic Data Review. U.S. EPA 540/R-2017-002.

6. United States Environmental Protection Agency. U.S. EPA National Functional Guidelines for Organic Data Review. U.S. EPA 540/R-2017-001.

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
40 Bruckner Boulevard
Bronx, 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
Pesticides/8081B	Soil	Cool, 4 ± 2 °C	14 days	250 mL	1 - 8 oz Glass
Herbicides/8151A	Soil	Cool, 4 ± 2 °C	14 days	250 mL	1 - 8 oz Glass
Polychlorinated Biphenyls/8082A	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
Volatile Organic Compounds/8260C	Groundwater	HCl, Cool, 4 ± 2 ^{o}C	14 days	120 mL	3 - 40ml glass vials
1,4-Dioxane	Groundwater	Cool, 4 ± 2 °C	7 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 ^{o}C	180 days	500 mL	1 - 500 mL plastic bottle
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 D

NYSDEC Emerging Contaminant Field Sampling Guidance

NEW YORK STATE OF OPPORTUNITY.

Department of Environmental Conservation

SAMPLING, ANALYSIS, AND ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

Under NYSDEC's Part 375 Remedial Programs

January 2021

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ERRATA SHEET for

SAMPLING, ANALYSIS, AND ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) Under NYSDEC's Part 375 Remedial Programs Issued January 17, 2020

Citation and Page Number	Current Text	Corrected Text	Date
Title of Appendix I, page 32	Appendix H	Appendix I	2/25/2020
Document Cover, page 1	Guidelines for Sampling and Analysis of PFAS	Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs	9/15/2020
Routine Analysis, page 9	"However, laboratories analyzing environmental samples…PFOA and PFOS in drinking water by EPA Method 537, 537.1 or ISO 25101."	"However, laboratories analyzing environmental samples…PFOA and PFOS in drinking water by EPA Method 537, 537.1, ISO 25101, or Method 533."	9/15/2020
Additional Analysis, page 9, new paragraph regarding soil parameters	None	"In cases where site-specific cleanup objectives for PFOA and PFOS are to be assessed, soil parameters, such as Total Organic Carbon (EPA Method 9060), soil pH (EPA Method 9045), clay content (percent), and cation exchange capacity (EPA Method 9081), should be included in the analysis to help evaluate factors affecting the leachability of PFAS in site soils."	9/15/2020
Data Assessment and Application to Site Cleanup Page 10	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFAS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Target levels for cleanup of PFAS in other media, including biota and sediment, have not yet been established by the DEC.	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Preliminary target levels for cleanup of PFOA and PFOS in other media, including biota and sediment, have not yet been established by the DEC.	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Water Sample Results Page 10	PFAS should be further assessed and considered as a potential contaminant of concern in groundwater or surface water (…) If PFAS are identified as a contaminant of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.	PFOA and PFOS should be further assessed and considered as potential contaminants of concern in groundwater or surface water (…) If PFOA and/or PFOS are identified as contaminants of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.	9/15/2020
Soil Sample Results, page 10	"The extent of soil contamination for purposes of delineation and remedy selection should be determined by having certain soil samples tested by Synthetic Precipitation Leaching Procedure (SPLP) and the leachate analyzed for PFAS. Soil exhibiting SPLP results above 70 ppt for either PFOA or PFOS (individually or combined) are to be evaluated during the cleanup phase."	"Soil cleanup objectives for PFOA and PFOS will be proposed in an upcoming revision to 6 NYCRR Part 375-6. Until SCOs are in effect, the following are to be used as guidance values. " [Interim SCO Table] "PFOA and PFOS results for soil are to be compared against the guidance values listed above. These guidance values are to be used in determining whether PFOA and PFOS are contaminants of concern for the site and for determining remedial action objectives and cleanup requirements. Site-specific remedial objectives for protection of groundwater can also be presented for evaluation by DEC. Development of site-specific remedial objectives for protection of groundwater will require analysis of additional soil parameters relating to leachability. These additional analyses can include any or all the parameters listed above (soil pH, cation exchange capacity, etc.) and/or use of SPLP. As the understanding of PFAS transport improves, DEC welcomes proposals for site-specific remedial objectives for protection of groundwater. DEC will expect that those may be dependent on additional factors including soil pH, aqueous pH, % organic carbon, % Sand/Silt/Clay, soil cations: K, Ca, Mg, Na, Fe, Al, cation exchange capacity, and anion exchange capacity. Site-specific remedial objectives should also consider the dilution attenuation factor (DAF). The NJDEP publication on DAF can be used as a reference: https://www.nj.gov/dep/srp/guidance/rs/daf.pdf. "	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Testing for Imported Soil Page 11	Soil imported to a site for use in a soil cap, soil cover, or as backfill is to be tested for PFAS in general conformance with DER-10, Section 5.4(e) for the PFAS Analyte List (Appendix F) using the analytical procedures discussed below and the criteria in DER-10 associated with SVOCs. If PFOA or PFOS is detected in any sample at or above 1 µg/kg, then soil should be tested by SPLP and the leachate analyzed for PFAS. If the SPLP results exceed 10 ppt for either PFOA or PFOS (individually) then the source of backfill should be rejected, unless a site-specific exemption is provided by DER. SPLP leachate criteria is based on the Maximum Contaminant Levels proposed for drinking water by New York State's Department of Health, this value may be updated based on future Federal or State promulgated regulatory standards. Remedial parties have the option of analyzing samples concurrently for both PFAS in soil and in the SPLP leachate to minimize project delays. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.	Testing for PFAS should be included any time a full TAL/TCL analyte list is required. Results for PFOA and PFOS should be compared to the applicable guidance values. If PFOA or PFOS is detected in any sample at or above the guidance values then the source of backfill should be rejected, unless a site-specific exemption is provided by DER based on SPLP testing, for example. If the concentrations of PFOA and PFOS in leachate are at or above 10 ppt (the Maximum Contaminant Levels established for drinking water by the New York State Department of Health), then the soil is not acceptable. PFOA, PFOS and 1,4-dioxane are all considered semi-volatile compounds, so composite samples are appropriate for these compounds when sampling in accordance with DER-10, Table 5.4(e)10. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Footnotes	None	[1] TOP Assay analysis of highly contaminated samples, such as those from an AFFF (aqueous film-forming foam) site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances. [2] The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the soil cleanup objective for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	9/15/2020
Additional Analysis, page 9	In cases… soil parameters, such as Total Organic Carbon (EPA Method 9060), soil…	In cases… soil parameters, such as Total Organic Carbon (Lloyd Kahn), soil…	1/8/2021
Appendix A, General Guidelines, fourth bullet	List the ELAP-approved lab(s) to be used for analysis of samples	List the ELAP- certified lab(s) to be used for analysis of samples	1/8/2021
Appendix E, Laboratory Analysis and Containers	Drinking water samples collected using this protocol are intended to be analyzed for PFAS by ISO Method 25101.	Drinking water samples collected using this protocol are intended to be analyzed for PFAS by EPA Method 537, 537.1, 533, or ISO Method 25101	1/8/2021

Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs

Objective

New York State Department of Environmental Conservation's Division of Environmental Remediation (DER) performs or oversees sampling of environmental media and subsequent analysis of PFAS as part of remedial programs implemented under 6 NYCRR Part 375. To ensure consistency in sampling, analysis, reporting, and assessment of PFAS, DER has developed this document which summarizes currently accepted procedures and updates previous DER technical guidance pertaining to PFAS.

Applicability

All work plans submitted to DEC pursuant to one of the remedial programs under Part 375 shall include PFAS sampling and analysis procedures that conform to the guidelines provided herein.

As part of a site investigation or remedial action compliance program, whenever samples of potentially affected media are collected and analyzed for the standard Target Analyte List/Target Compound List (TAL/TCL), PFAS analysis should also be performed. Potentially affected media can include soil, groundwater, surface water, and sediment. Based upon the potential for biota to be affected, biota sampling and analysis for PFAS may also be warranted as determined pursuant to a Fish and Wildlife Impact Analysis. Soil vapor sampling for PFAS is not required.

Field Sampling Procedures

DER-10 specifies technical guidance applicable to DER's remedial programs. Given the prevalence and use of PFAS, DER has developed "best management practices" specific to sampling for PFAS. As specified in DER-10 Chapter 2, quality assurance procedures are to be submitted with investigation work plans. Typically, these procedures are incorporated into a work plan, or submitted as a stand-alone document (e.g., a Quality Assurance Project Plan). Quality assurance guidelines for PFAS are listed in Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS.

Field sampling for PFAS performed under DER remedial programs should follow the appropriate procedures outlined for soils, sediments or other solids (Appendix B), non-potable groundwater (Appendix C), surface water (Appendix D), public or private water supply wells (Appendix E), and fish tissue (Appendix F).

QA/QC samples (e.g. duplicates, MS/MSD) should be collected as specified in DER-10, Section 2.3(c). For sampling equipment coming in contact with aqueous samples only, rinsate or equipment blanks should be collected. Equipment blanks should be collected at a minimum frequency of one per day per site or one per twenty samples, whichever is more frequent.

Analysis and Reporting

As of October 2020, the United States Environmental Protection Agency (EPA) does not have a validated method for analysis of PFAS for media commonly analyzed under DER remedial programs (non-potable waters, solids). DER has developed the following guidelines to ensure consistency in analysis and reporting of PFAS.

The investigation work plan should describe analysis and reporting procedures, including laboratory analytical procedures for the methods discussed below. As specified in DER-10 Section 2.2, laboratories should provide a full Category B deliverable. In addition, a Data Usability Summary Report (DUSR) should be prepared by an independent, third party data validator. Electronic data submissions should meet the requirements provided at: https://www.dec.ny.gov/chemical/62440.html.

DER has developed a *PFAS Analyte List* (Appendix F) for remedial programs to understand the nature of contamination at sites. It is expected that reported results for PFAS will include, at a minimum, all the compounds listed. If lab and/or matrix specific issues are encountered for any analytes, the DER project manager, in consultation with the DER chemist, will make case-by-case decisions as to whether certain analytes may be temporarily or permanently discontinued from analysis at each site. As with other contaminants that are analyzed for at a site, the *PFAS Analyte List* may be refined for future sampling events based on investigative findings.

Routine Analysis

Currently, New York State Department of Health's Environmental Laboratory Approval Program (ELAP) does not offer certification for PFAS in matrices other than finished drinking water. However, laboratories analyzing environmental samples for PFAS (e.g., soil, sediments, and groundwater) under DER's Part 375 remedial programs need to hold ELAP certification for PFOA and PFOS in drinking water by EPA Method 537, 537.1, ISO 25101, or Method 533. Laboratories should adhere to the guidelines and criteria set forth in the DER's laboratory guidelines for PFAS in non-potable water and solids (Appendix H - Laboratory Guidelines for Analysis of PFAS in Non-Potable Water and Solids). Data review guidelines were developed by DER to ensure data comparability and usability (Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids).

LC-MS/MS analysis for PFAS using methodologies based on EPA Method 537.1 is the procedure to use for environmental samples. Isotope dilution techniques should be utilized for the analysis of PFAS in all media. Reporting limits for PFOA and PFOS in aqueous samples should not exceed 2 ng/L. Reporting limits for PFOA and PFOS in solid samples should not exceed 0.5 µg/kg. Reporting limits for all other PFAS in aqueous and solid media should be as close to these limits as possible. If laboratories indicate that they are not able to achieve these reporting limits for the entire *PFAS Analyte List*, site-specific decisions regarding acceptance of elevated reporting limits for specific PFAS can be made by the DER project manager in consultation with the DER chemist.

Additional Analysis

Additional laboratory methods for analysis of PFAS may be warranted at a site, such as the Synthetic Precipitation Leaching Procedure (SPLP) and Total Oxidizable Precursor Assay (TOP Assay).

In cases where site-specific cleanup objectives for PFOA and PFOS are to be assessed, soil parameters, such as Total Organic Carbon (Lloyd Kahn), soil pH (EPA Method 9045), clay content (percent), and cation exchange capacity (EPA Method 9081), should be included in the analysis to help evaluate factors affecting the leachability of PFAS in site soils.

SPLP is a technique used to determine the mobility of chemicals in liquids, soils and wastes, and may be useful in determining the need for addressing PFAS-containing material as part of the remedy. SPLP by EPA Method 1312 should be used unless otherwise specified by the DER project manager in consultation with the DER chemist.

Impacted materials can be made up of PFAS that are not analyzable by routine analytical methodology. A TOP Assay can be utilized to conceptualize the amount and type of oxidizable PFAS which could be liberated in the environment, which approximates the maximum concentration of perfluoroalkyl substances that could be generated

if all polyfluoroalkyl substances were oxidized. For example, some polyfluoroalkyl substances may degrade or transform to form perfluoroalkyl substances (such as PFOA or PFOS), resulting in an increase in perfluoroalkyl substance concentrations as contaminated groundwater moves away from a source. The TOP Assay converts, through oxidation, polyfluoroalkyl substances (precursors) into perfluoroalkyl substances that can be detected by routine analytical methodology.[1]

Commercial laboratories have adopted methods which allow for the quantification of targeted PFAS in air and biota. The EPA's Office of Research and Development (ORD) is currently developing methods which allow for air emissions characterization of PFAS, including both targeted and non-targeted analysis of PFAS. Consult with the DER project manager and the DER chemist for assistance on analyzing biota/tissue and air samples.

Data Assessment and Application to Site Cleanup

Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Preliminary target levels for cleanup of PFOA and PFOS in other media, including biota and sediment, have not yet been established by the DEC.

Water Sample Results

PFOA and PFOS should be further assessed and considered as potential contaminants of concern in groundwater or surface water if PFOA or PFOS is detected in any water sample at or above 10 ng/L (ppt) and is determined to be attributable to the site, either by a comparison of upgradient and downgradient levels, or the presence of soil source areas, as defined below. In addition, further assessment of water may be warranted if either of the following screening levels are met:

a. any other individual PFAS (not PFOA or PFOS) is detected in water at or above 100 ng/L; or
b. total concentration of PFAS (including PFOA and PFOS) is detected in water at or above 500 ng/L

If PFOA and/or PFOS are identified as contaminants of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.

Soil Sample Results

Soil cleanup objectives for PFOA and PFOS will be proposed in an upcoming revision to 6 NYCRR Part 375-6. Until SCOs are in effect, the following are to be used as guidance values.

Guidance Values for Anticipated Site Use	PFOA (ppb)	PFOS (ppb)
Unrestricted	0.66	0.88
Residential	6.6	8.8
Restricted Residential	33	44
Commercial	500	440
Industrial	600	440
Protection of Groundwater[2]	1.1	3.7

[1] TOP Assay analysis of highly contaminated samples, such as those from an AFFF (aqueous film-forming foam) site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances.
[2] The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).

PFOA and PFOS results for soil are to be compared against the guidance values listed above. These guidance values are to be used in determining whether PFOA and PFOS are contaminants of concern for the site and for determining remedial action objectives and cleanup requirements. Site-specific remedial objectives for protection of groundwater can also be presented for evaluation by DEC. Development of site-specific remedial objectives for protection of groundwater will require analysis of additional soil parameters relating to leachability. These additional analyses can include any or all the parameters listed above (soil pH, cation exchange capacity, etc.) and/or use of SPLP.

As the understanding of PFAS transport improves, DEC welcomes proposals for site-specific remedial objectives for protection of groundwater. DEC will expect that those may be dependent on additional factors including soil pH, aqueous pH, % organic carbon, % Sand/Silt/Clay, soil cations: K, Ca, Mg, Na, Fe, Al, cation exchange capacity, and anion exchange capacity. Site-specific remedial objectives should also consider the dilution attenuation factor (DAF). The NJDEP publication on DAF can be used as a reference: https://www.nj.gov/dep/srp/guidance/rs/daf.pdf.

Testing for Imported Soil

Testing for PFAS should be included any time a full TAL/TCL analyte list is required. Results for PFOA and PFOS should be compared to the applicable guidance values. If PFOA or PFOS is detected in any sample at or above the guidance values then the source of backfill should be rejected, unless a site-specific exemption is provided by DER based on SPLP testing, for example. If the concentrations of PFOA and PFOS in leachate are at or above 10 ppt (the Maximum Contaminant Levels established for drinking water by the New York State Department of Health), then the soil is not acceptable.

PFOA, PFOS and 1,4-dioxane are all considered semi-volatile compounds, so composite samples are appropriate for these compounds when sampling in accordance with DER-10, Table 5.4(e)10. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.

Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS

The following guidelines (general and PFAS-specific) can be used to assist with the development of a QAPP for projects within DER involving sampling and analysis of PFAS.

General Guidelines in Accordance with DER-10

- Document/work plan section title – Quality Assurance Project Plan
- Summarize project scope, goals, and objectives
- Provide project organization including names and resumes of the project manager, Quality Assurance Officer (QAO), field staff, and Data Validator
    - The QAO should not have another position on the project, such as project or task manager, that involves project productivity or profitability as a job performance criterion
- List the ELAP certified lab(s) to be used for analysis of samples
- Include a site map showing sample locations
- Provide detailed sampling procedures for each matrix
- Include Data Quality Usability Objectives
- List equipment decontamination procedures
- Include an "Analytical Methods/Quality Assurance Summary Table" specifying:
    - Matrix type
    - Number or frequency of samples to be collected per matrix
    - Number of field and trip blanks per matrix
    - Analytical parameters to be measured per matrix
    - Analytical methods to be used per matrix with minimum reporting limits
    - Number and type of matrix spike and matrix spike duplicate samples to be collected
    - Number and type of duplicate samples to be collected
    - Sample preservation to be used per analytical method and sample matrix
    - Sample container volume and type to be used per analytical method and sample matrix
    - Sample holding time to be used per analytical method and sample matrix
- Specify Category B laboratory data deliverables and preparation of a DUSR

Specific Guidelines for PFAS

- Include in the text that sampling for PFAS will take place
- Include in the text that PFAS will be analyzed by LC-MS/MS for PFAS using methodologies based on EPA Method 537.1
- Include the list of PFAS compounds to be analyzed (*PFAS Analyte List*)
- Include the laboratory SOP for PFAS analysis
- List the minimum method-achievable Reporting Limits for PFAS
    - Reporting Limits should be less than or equal to:
        - Aqueous – 2 ng/L (ppt)
        - Solids – 0.5 µg/kg (ppb)
- Include the laboratory Method Detection Limits for the PFAS compounds to be analyzed
- Laboratory should have ELAP certification for PFOA and PFOS in drinking water by EPA Method 537, 537.1, EPA Method 533, or ISO 25101
- Include detailed sampling procedures
    - Precautions to be taken
    - Pump and equipment types
    - Decontamination procedures
    - Approved materials only to be used
- Specify that regular ice only will be used for sample shipment
- Specify that equipment blanks should be collected at a minimum frequency of 1 per day per site for each matrix

Appendix B - Sampling Protocols for PFAS in Soils, Sediments and Solids

General

The objective of this protocol is to give general guidelines for the collection of soil, sediment and other solid samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Containers

Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in to contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel spoon
- stainless steel bowl
- steel hand auger or shovel without any coatings

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Sampling is often conducted in areas where a vegetative turf has been established. In these cases, a pre-cleaned trowel or shovel should be used to carefully remove the turf so that it may be replaced at the conclusion of sampling. Surface soil samples (e.g. 0 to 6 inches below surface) should then be collected using a pre-cleaned, stainless steel spoon. Shallow subsurface soil samples (e.g. 6 to ~36 inches below surface) may be collected by digging a hole using a pre-cleaned hand auger or shovel. When the desired subsurface depth is reached, a pre-cleaned hand auger or spoon shall be used to obtain the sample.

When the sample is obtained, it should be deposited into a stainless steel bowl for mixing prior to filling the sample containers. The soil should be placed directly into the bowl and mixed thoroughly by rolling the material into the middle until the material is homogenized. At this point the material within the bowl can be placed into the laboratory provided container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A soil log or sample log shall document the location of the sample/borehole, depth of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix C - Sampling Protocols for PFAS in Monitoring Wells

General

The objective of this protocol is to give general guidelines for the collection of groundwater samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including plumbers tape and sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel inertia pump with HDPE tubing
- peristaltic pump equipped with HDPE tubing and silicone tubing
- stainless steel bailer with stainless steel ball
- bladder pump (identified as PFAS-free) with HDPE tubing

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Monitoring wells should be purged in accordance with the sampling procedure (standard/volume purge or low flow purge) identified in the site work plan, which will determine the appropriate time to collect the sample. If sampling using standard purge techniques, additional purging may be needed to reduce turbidity levels, so samples contain a limited amount of sediment within the sample containers. Sample containers that contain sediment may cause issues at the laboratory, which may result in elevated reporting limits and other issues during the sample preparation that can compromise data usability. Sampling personnel should don new nitrile gloves prior to sample collection due to the potential to contact PFAS containing items (not related to the sampling equipment) during the purging activities.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Additional equipment blank samples may be collected to assess other equipment that is utilized at the monitoring well
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A purge log shall document the location of the sample, sampling equipment, groundwater parameters, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix D - Sampling Protocols for PFAS in Surface Water

General

The objective of this protocol is to give general guidelines for the collection of surface water samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel cup

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Where conditions permit, (e.g. creek or pond) sampling devices (e.g. stainless steel cup) should be rinsed with site medium to be sampled prior to collection of the sample. At this point the sample can be collected and poured into the sample container.

If site conditions permit, samples can be collected directly into the laboratory container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A sample log shall document the location of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix E - Sampling Protocols for PFAS in Private Water Supply Wells

General

The objective of this protocol is to give general guidelines for the collection of water samples from private water supply wells (with a functioning pump) for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Drinking water samples collected using this protocol are intended to be analyzed for PFAS by EPA Method 537, 537.1, 533, or ISO Method 25101. The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials (e.g. plumbers tape), including sample bottle cap liners with a PTFE layer.

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Locate and assess the pressure tank and determine if any filter units are present within the building. Establish the sample location as close to the well pump as possible, which is typically the spigot at the pressure tank. Ensure sampling equipment is kept clean during sampling as access to the pressure tank spigot, which is likely located close to the ground, may be obstructed and may hinder sample collection.

Prior to sampling, a faucet downstream of the pressure tank (e.g., washroom sink) should be run until the well pump comes on and a decrease in water temperature is noted which indicates that the water is coming from the well. If the homeowner is amenable, staff should run the water longer to purge the well (15+ minutes) to provide a sample representative of the water in the formation rather than standing water in the well and piping system including the pressure tank. At this point a new pair of nitrile gloves should be donned and the sample can be collected from the sample point at the pressure tank.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- If equipment was used, collect one equipment blank per day per site and a minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers.
- A field reagent blank (FRB) should be collected at a rate of one per 20 samples. The lab will provide a FRB bottle containing PFAS free water and one empty FRB bottle. In the field, pour the water from the one bottle into the empty FRB bottle and label appropriately.
- Request appropriate data deliverable (Category B) and an electronic data deliverable
- For sampling events where multiple private wells (homes or sites) are to be sampled per day, it is acceptable to collect QC samples at a rate of one per 20 across multiple sites or days.

Documentation

A sample log shall document the location of the private well, sample point location, owner contact information, sampling equipment, purge duration, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate and available (e.g. well construction, pump type and location, yield, installation date). Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appendix F - Sampling Protocols for PFAS in Fish

This appendix contains a copy of the latest guidelines developed by the Division of Fish and Wildlife (DFW) entitled “General Fish Handling Procedures for Contaminant Analysis” (Ver. 8).

Procedure Name: General Fish Handling Procedures for Contaminant Analysis

Number: FW-005

Purpose: This procedure describes data collection, fish processing and delivery of fish collected for contaminant monitoring. It contains the chain of custody and collection record forms that should be used for the collections.

Organization: Environmental Monitoring Section
Bureau of Ecosystem Health
Division of Fish and Wildlife (DFW)
New York State Department of Environmental Conservation (NYSDEC)
625 Broadway
Albany, New York 12233-4756

Version: 8

Previous Version Date: 21 March 2018

Summary of Changes to this Version: Updated bureau name to Bureau of Ecosystem Health. Added direction to list the names of all field crew on the collection record. Minor formatting changes on chain of custody and collection records.

Originator or Revised by: Wayne Richter, Jesse Becker

Date: 26 April 2019

Quality Assurance Officer and Approval Date: Jesse Becker, 26 April 2019

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

GENERAL FISH HANDLING PROCEDURES FOR CONTAMINANT ANALYSES

A. Original copies of all continuity of evidence (i.e., Chain of Custody) and collection record forms must accompany delivery of fish to the lab. A copy shall be directed to the Project Leader or as appropriate, Wayne Richter. All necessary forms will be supplied by the Bureau of Ecosystem Health. Because some samples may be used in legal cases, it is critical that each section is filled out completely. Each Chain of Custody form has three main sections:

   1. The top box is to be filled out **and signed** by the person responsible for the fish collection (e.g., crew leader, field biologist, researcher). This person is responsible for delivery of the samples to DEC facilities or personnel (e.g., regional office or biologist).

   2. The second section is to be filled out **and signed** by the person responsible for the collections while being stored at DEC, before delivery to the analytical lab. This may be the same person as in (1), but it is still required that they complete the section. Also important is the **range of identification numbers** (i.e., tag numbers) included in the sample batch.

   3. Finally, the bottom box is to record any transfers between DEC personnel and facilities. Each subsequent transfer should be **identified, signed, and dated**, until laboratory personnel take possession of the fish.

B. The following data are required on each **Fish Collection Record** form:

   1. Project and Site Name.

   2. DEC Region.

   3. All personnel (and affiliation) involved in the collection.

   4. Method of collection (gill net, hook and line, etc.)

   5. Preservation Method.

C. The following data are to be taken on each fish collected and recorded on the **Fish Collection Record** form:

   1. Tag number - Each specimen is to be individually jaw tagged at time of collection with a unique number. Make sure the tag is turned out so that the number can be read without opening the bag. Use tags in sequential order. For small fish or composite samples place the tag inside the bag with the samples. The Bureau of Ecosystem Health can supply the tags.

   2. Species identification (please be explicit enough to enable assigning genus and species). Group fish by species when processing.

   3. Date collected.

   4. Sample location (waterway and nearest prominent identifiable landmark).

   5. Total length (nearest mm or smallest sub-unit on measuring instrument) and weight (nearest g or

smallest sub-unit of weight on weighing instrument). Take all measures as soon as possible with calibrated, protected instruments (e.g. from wind and upsets) and prior to freezing.

6. Sex - fish may be cut enough to allow sexing or other internal investigation, but do not eviscerate. Make any incision on the right side of the belly flap or exactly down the midline so that a left-side fillet can be removed.

D. General data collection recommendations:

1. It is helpful to use an ID or tag number that will be unique. It is best to use metal striped bass or other uniquely numbered metal tags. If uniquely numbered tags are unavailable, values based on the region, water body and year are likely to be unique: for example, R7CAY11001 for Region 7, Cayuga Lake, 2011, fish 1. If the fish are just numbered 1 through 20, we have to give them new numbers for our database, making it more difficult to trace your fish to their analytical results and creating an additional possibility for errors.

2. Process and record fish of the same species sequentially. Recording mistakes are less likely when all fish from a species are processed together. Starting with the bigger fish species helps avoid missing an individual.

3. If using Bureau of Ecosystem Health supplied tags or other numbered tags, use tags in sequence so that fish are recorded with sequential Tag Numbers. This makes data entry and login at the lab and use of the data in the future easier and reduces keypunch errors.

4. Record length and weight as soon as possible after collection and before freezing. Other data are recorded in the field upon collection. An age determination of each fish is optional, but if done, it is recorded in the appropriate “Age” column.

5. For composite samples of small fish, record the number of fish in the composite in the Remarks column. Record the length and weight of each individual in a composite. All fish in a composite sample should be of the same species and members of a composite should be visually matched for size.

6. Please submit photocopies of topographic maps or good quality navigation charts indicating sampling locations. GPS coordinates can be entered in the Location column of the collection record form in addition to or instead for providing a map. These records are of immense help to us (and hopefully you) in providing documented location records which are not dependent on memory and/or the same collection crew. In addition, they may be helpful for contaminant source trackdown and remediation/control efforts of the Department.

7. When recording data on fish measurements, it will help to ensure correct data recording for the data recorder to call back the numbers to the person making the measurements.

E. Each fish is to be placed in its own individual plastic bag. For small fish to be analyzed as a composite, put all of the fish for one composite in the same bag but use a separate bag for each composite. It is important to individually bag the fish to avoid difficulties or cross contamination when processing the fish for chemical analysis. Be sure to include the fish’s tag number inside the bag, preferably attached to the fish with the tag number turned out so it can be read. Tie or otherwise secure the bag closed. **The Bureau of Ecosystem Health will supply the bags.** If necessary, food grade bags may be procured from a suitable vendor (e.g., grocery store). It is preferable to redundantly label each bag with a manila tag tied between the knot and the body of the bag. This tag should be labeled with the project name, collection location, tag number, collection date, and fish species. If scales are collected, the scale envelope should be labeled with

the same information.

F. Groups of fish, by species, are to be placed in one large plastic bag per sampling location. **The Bureau of Ecosystem Health will supply the larger bags.** Tie or otherwise secure the bag closed. Label the site bag with a manila tag tied between the knot and the body of the bag. The tag should contain: project, collection location, collection date, species and **tag number ranges**. Having this information on the manila tag enables lab staff to know what is in the bag without opening it.

G. Do not eviscerate, fillet or otherwise dissect the fish unless specifically asked to. If evisceration or dissection is specified, the fish must be cut along the exact midline or on the right side so that the left side fillet can be removed intact at the laboratory. If filleting is specified, the procedure for taking a standard fillet (SOP PREPLAB 4) must be followed, including removing scales.

H. Special procedures for PFAS: Unlike legacy contaminants such as PCBs, which are rarely found in day to day life, PFAS are widely used and frequently encountered. Practices that avoid sample contamination are therefore necessary. While no standard practices have been established for fish, procedures for water quality sampling can provide guidance. The following practices should be used for collections when fish are to be analyzed for PFAS:

No materials containing Teflon.
No Post-it notes.
No ice packs; only water ice or dry ice.
Any gloves worn must be powder free nitrile.
No Gore-Tex or similar materials (Gore-Tex is a PFC with PFOA used in its manufacture).
No stain repellent or waterproof treated clothing; these are likely to contain PFCs.
Avoid plastic materials, other than HDPE, including clipboards and waterproof notebooks.
Wash hands after handling any food containers or packages as these may contain PFCs.
Keep pre-wrapped food containers and wrappers isolated from fish handling.
Wear clothing washed at least six times since purchase.
Wear clothing washed without fabric softener.
Staff should avoid cosmetics, moisturizers, hand creams and similar products on the day of sampling as many of these products contain PFCs (Fujii et al. 2013). Sunscreen or insect repellent should not contain ingredients with “fluor” in their name. Apply any sunscreen or insect repellent well downwind from all materials. Hands must be washed after touching any of these products.

I. All fish must be kept at a temperature <45° F (<8° C) immediately following data processing. As soon as possible, freeze at -20° C ± 5° C. Due to occasional freezer failures, daily freezer temperature logs are required. The freezer should be locked or otherwise secured to maintain chain of custody.

J. In most cases, samples should be delivered to the Analytical Services Unit at the Hale Creek field station. Coordinate delivery with field station staff and send copies of the collection records, continuity of evidence forms and freezer temperature logs to the field station. For samples to be analyzed elsewhere, non-routine collections or other questions, contact Wayne Richter, Bureau of Ecosystem Health, NYSDEC, 625 Broadway, Albany, New York 12233-4756, 518-402-8974, or the project leader about sample transfer. Samples will then be directed to the analytical facility and personnel noted on specific project descriptions.

K. A recommended equipment list is at the end of this document.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF FISH AND WILDLIFE
FISH COLLECTION RECORD

Project and Site Name _____ DEC Region _____

Collections made by (include all crew) _____

Sampling Method: □Electrofishing □Gill netting □Trap netting □Trawling □Seining □Angling □Other _____

Preservation Method: □Freezing □Other _____ Notes (SWFDB survey number): _____

FOR LAB USE ONLY- LAB ENTRY NO.	COLLECTION OR TAG NO.	SPECIES	DATE TAKEN	LOCATION	AGE	SEX &/OR REPROD. CONDIT	LENGTH ( )	WEIGHT ( )	REMARKS

richter: revised 2011, 5/7/15, 10/4/16, 3/20/17; becker: 3/23/17, 4/26/19

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
CHAIN OF CUSTODY

I, _____, of _____ collected the
(Print Name) (Print Business Address)

following on _____, 20____ from _____
(Date) (Water Body)

in the vicinity of _____
(Landmark, Village, Road, etc.)

Town of _____, in _____ County.

Item(s) _____

_____

Said sample(s) were in my possession and handled according to standard procedures provided to me prior to collection. The sample(s) were placed in the custody of a representative of the New York State Department of Environmental Conservation on _____, 20_____.

_____ _____
Signature Date

I, _____, received the above mentioned sample(s) on the date specified and assigned identification number(s) _____ to the sample(s). I have recorded pertinent data for the sample(s) on the attached collection records. The sample(s) remained in my custody until subsequently transferred, prepared or shipped at times and on dates as attested to below.

_____ _____
Signature Date

SECOND RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
THIRD RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
FOURTH RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
RECEIVED IN LABORATORY BY (Print Name)	TIME & DATE	REMARKS
SIGNATURE	UNIT	
LOGGED IN BY (Print Name)	TIME & DATE	ACCESSION NUMBERS
SIGNATURE	UNIT	

richter: revised 21 April 2014; becker: 23 March 2017, 26 April, 2019

NOTICE OF WARRANTY

By signature to the chain of custody (reverse), the signatory warrants that the information provided is truthful and accurate to the best of his/her ability. The signatory affirms that he/she is willing to testify to those facts provided and the circumstances surrounding the same. Nothing in this warranty or chain of custody negates responsibility nor liability of the signatories for the truthfulness and accuracy of the statements provided.

HANDLING INSTRUCTIONS

On day of collection, collector(s) name(s), address(es), date, geographic location of capture (attach a copy of topographic map or navigation chart), species, number kept of each species, and description of capture vicinity (proper noun, if possible) along with name of Town and County must be indicated on reverse.

Retain organisms in manila tagged plastic bags to avoid mixing capture locations. Note appropriate information on each bag tag.

Keep samples as cool as possible. Put on ice if fish cannot be frozen within 12 hours. If fish are held more than 24 hours without freezing, they will not be retained or analyzed.

Initial recipient (either DEC or designated agent) of samples from collector(s) is responsible for obtaining and recording information on the collection record forms which will accompany the chain of custody. This person will seal the container using packing tape and writing his signature, the time and the date across the tape onto the container with indelible marker. Any time a seal is broken, for whatever purpose, the incident must be recorded on the Chain of Custody (reason, time, and date) in the purpose of transfer block. Container then is resealed using new tape and rewriting signature, with time and date.

EQUIPMENT LIST

Scale or balance of appropriate capacity for the fish to be collected.

Fish measuring board.

Plastic bags of an appropriate size for the fish to be collected and for site bags.

Individually numbered metal tags for fish.

Manila tags to label bags.

Small envelops, approximately 2” x 3.5”, if fish scales are to be collected.

Knife for removing scales.

Chain of custody and fish collection forms.

Clipboard.

Pens or markers.

Paper towels.

Dish soap and brush.

Bucket.

Cooler.

Ice.

Duct tape.

Appendix G – PFAS Analyte List

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonates	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluoroalkyl carboxylates	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUA/PFUdA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTriA/PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTA/PFTeDA	376-06-7
Fluorinated Telomer Sulfonates	6:2 Fluorotelomer sulfonate	6:2 FTS	27619-97-2
	8:2 Fluorotelomer sulfonate	8:2 FTS	39108-34-4
Perfluorooctane-sulfonamides	Perfluroroctanesulfonamide	FOSA	754-91-6
Perfluorooctane-sulfonamidoacetic acids	N-methyl perfluorooctanesulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethyl perfluorooctanesulfonamidoacetic acid	N-EtFOSAA	2991-50-6

Appendix H - Laboratory Guidelines for Analysis of PFAS in Non-Potable Water and Solids

General

New York State Department of Environmental Conservation's Division of Environmental Remediation (DER) developed the following guidelines for laboratories analyzing environmental samples for PFAS under DER programs. If laboratories cannot adhere to the following guidelines, they should contact DER's Quality Assurance Officer, Dana Barbarossa, at dana.barbarossa@dec.ny.gov prior to analysis of samples.

Isotope Dilution

Isotope dilution techniques should be utilized for the analysis of PFAS in all media.

Extraction

For water samples, the entire sample bottle should be extracted, and the sample bottle rinsed with appropriate solvent to remove any residual PFAS.

For samples with high particulates, the samples should be handled in one of the following ways:

1. Spike the entire sample bottle with isotope dilution analytes (IDAs) prior to any sample manipulation. The sample can be passed through the SPE and if it clogs, record the volume that passed through.
2. If the sample contains too much sediment to attempt passing it through the SPE cartridge, the sample should be spiked with isotope dilution analytes, centrifuged and decanted.
3. If higher reporting limits are acceptable for the project, the sample can be diluted by taking a representative aliquot of the sample. If isotope dilution analytes will be diluted out of the sample, they can be added after the dilution. The sample should be homogenized prior to taking an aliquot.

If alternate sample extraction procedures are used, please contact the DER remedial program chemist prior to employing. Any deviations in sample preparation procedures should be clearly noted in the case narrative.

Signal to Noise Ratio

For all target analyte ions used for quantification, signal to noise ratio should be 3:1 or greater.

Blanks

There should be no detections in the method blanks above the reporting limits.

Ion Transitions

The ion transitions listed below should be used for the following PFAS:

PFOA	413 > 369
PFOS	499 > 80
PFHxS	399 > 80
PFBS	299 > 80
6:2 FTS	427 > 407
8:2 FTS	527 > 507
N-EtFOSAA	584 > 419
N-MeFOSAA	570 > 419

Branched and Linear Isomers

Standards containing both branched and linear isomers should be used when standards are commercially available. Currently, quantitative standards are available for PFHxS, PFOS, NMeFOSAA, and NEtFOSAA. As more standards become available, they should be incorporated in to the method. All isomer peaks present in the standard should be integrated and the areas summed. Samples should be integrated in the same manner as the standards.

Since a quantitative standard does not exist for branched isomers of PFOA, the instrument should be calibrated using just the linear isomer and a technical (qualitative) PFOA standard should be used to identify the retention time of the branched PFOA isomers in the sample. The total response of PFOA branched and linear isomers should be integrated in the samples and quantitated using the calibration curve of the linear standard.

Secondary Ion Transition Monitoring

Quantifier and qualifier ions should be monitored for all target analytes (PFBA and PFPeA are exceptions). The ratio of quantifier ion response to qualifier ion response should be calculated for each target analyte and the ratio compared to standards. Lab derived criteria should be used to determine if the ratios are acceptable.

Reporting

Detections below the reporting limit should be reported and qualified with a J qualifier.

The acid form of PFAS analytes should be reported. If the salt form of the PFAS was used as a stock standard, the measured mass should be corrected to report the acid form of the analyte.

Appendix I - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids

General

These guidelines are intended to be used for the validation of PFAS analytical results for projects within the Division of Environmental Remediation (DER) as well as aid in the preparation of a data usability summary report. Data reviewers should understand the methodology and techniques utilized in the analysis. Consultation with the end user of the data may be necessary to assist in determining data usability based on the data quality objectives in the Quality Assurance Project Plan. A familiarity with the laboratory's Standard Operating Procedure may also be needed to fully evaluate the data. If you have any questions, please contact DER's Quality Assurance Officer, Dana Barbarossa, at dana.barbarossa@dec.ny.gov.

Preservation and Holding Time

Samples should be preserved with ice to a temperature of less than 6°C upon arrival at the lab. The holding time is 14 days to extraction for aqueous and solid samples. The time from extraction to analysis for aqueous samples is 28 days and 40 days for solids.

Temperature greatly exceeds 6ºC upon arrival at the lab*	Use professional judgement to qualify detects and non-detects as estimated or rejected
Holding time exceeding 28 days to extraction	Use professional judgement to qualify detects and non-detects as estimated or rejected if holding time is grossly exceeded

*Samples that are delivered to the lab immediately after sampling may not meet the thermal preservation guidelines. Samples are considered acceptable if they arrive on ice or an attempt to chill the samples is observed.

Initial Calibration

The initial calibration should contain a minimum of five standards for linear fit and six standards for a quadratic fit. The relative standard deviation (RSD) for a quadratic fit calibration should be less than 20%. Linear fit calibration curves should have an R^2 value greater than 0.990.

The low-level calibration standard should be within 50% - 150% of the true value, and the mid-level calibration standard within 70% - 130% of the true value.

%RSD >20%	J flag detects and UJ non detects
R^2 >0.990	J flag detects and UJ non detects
Low-level calibration check <50% or >150%	J flag detects and UJ non detects
Mid-level calibration check <70% or >130%	J flag detects and UJ non detects

Initial Calibration Verification

An initial calibration verification (ICV) standard should be from a second source (if available). The ICV should be at the same concentration as the mid-level standard of the calibration curve.

ICV recovery <70% or >130%	J flag detects and non-detects

Continuing Calibration Verification

Continuing calibration verification (CCV) checks should be analyzed at a frequency of one per ten field samples. If CCV recovery is very low, where detection of the analyte could be in question, ensure a low level CCV was analyzed and use to determine data quality.

CCV recovery <70 or >130%	J flag results

Blanks

There should be no detections in the method blanks above the reporting limits. Equipment blanks, field blanks, rinse blanks etc. should be evaluated in the same manner as method blanks. Use the most contaminated blank to evaluate the sample results.

Blank Result	Sample Result	Qualification
Any detection	<Reporting limit	Qualify as ND at reporting limit
Any detection	>Reporting Limit and >10x the blank result	No qualification
>Reporting limit	>Reporting limit and <10x blank result	J+ biased high

Field Duplicates

A blind field duplicate should be collected at rate of one per twenty samples. The relative percent difference (RPD) should be less than 30% for analyte concentrations greater than two times the reporting limit. Use the higher result for final reporting.

RPD >30%	Apply J qualifier to parent sample

Lab Control Spike

Lab control spikes should be analyzed with each extraction batch or one for every twenty samples. In the absence of lab derived criteria, use 70% - 130% recovery criteria to evaluate the data.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects

Matrix Spike/Matrix Spike Duplicate

One matrix spike and matrix spike duplicate should be collected at a rate of one per twenty samples. Use professional judgement to reject results based on out of control MS/MSD recoveries.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only
RPD >30%	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only

Extracted Internal Standards (Isotope Dilution Analytes)

Problematic analytes (e.g. PFBA, PFPeA, fluorotelomer sulfonates) can have wider recoveries without qualification. Qualify corresponding native compounds with a J flag if outside of the range.

Recovery <50% or >150%	Apply J qualifier
Recovery <25% or >150% for poor responding analytes	Apply J qualifier
Isotope Dilution Analyte (IDA) Recovery <10%	Reject results

Secondary Ion Transition Monitoring

Quantifier and qualifier ions should be monitored for all target analytes (PFBA and PFPeA are exceptions). The ratio of quantifier ion response to qualifier ion response should be calculated from the standards for each target analyte. Lab derived criteria should be used to determine if the ratios are acceptable. If the ratios fall outside of the laboratory criteria, qualify results as an estimated maximum concentration.

Signal to Noise Ratio

The signal to noise ratio for the quantifier ion should be at least 3:1. If the ratio is less than 3:1, the peak is discernable from the baseline noise and symmetrical, the result can be reported. If the peak appears to be baseline noise and/or the shape is irregular, qualify the result as tentatively identified.

Branched and Linear Isomers

Observed branched isomers in the sample that do not have a qualitative or quantitative standard should be noted and the analyte should be qualified as biased low in the final data review summary report. Note: The branched isomer peak should also be present in the secondary ion transition.

Reporting Limits

If project-specific reporting limits were not met, please indicate that in the report along with the reason (e.g. over dilution, dilution for non-target analytes, high sediment in aqueous samples).

Peak Integrations

Target analyte peaks should be integrated properly and consistently when compared to standards. Ensure branched isomer peaks are included for PFAS where standards are available. Inconsistencies should be brought to the attention of the laboratory or identified in the data review summary report.

APPENDIX E

Health and Safety Plan

HALEY & ALDRICH, INC.

SITE-SPECIFIC SAFETY PLAN

FOR

40 Bruckner Boulevard
Project/File No. 0200734-002

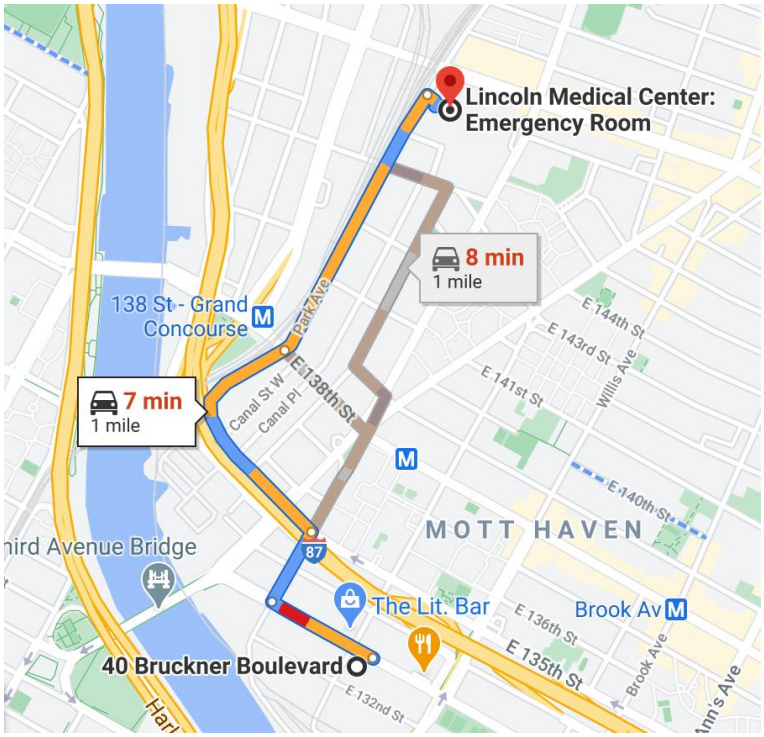
Prepared By: Commisso, Sarah	**Date: 02-01-2021**
Revised By:	**Date:**

EMERGENCY INFORMATION

Project Name: 40 Bruckner Boulevard	**H&A File No:** 0200734-002
Location: **40 Bruckner Boulevard, Bronx, New York**	
Client/Site Contact: Office Phone Number:	40 Bruckner Realty LLC Schwimmer, Jacob 718.701.5680
Contractor: **Superintendent:** Phone Number:	Eastern Environmental Solutions Hamarich, Scott 631.727.2700
H&A Project Manager: Office Phone Number: Cell Phone Number:	Conlon, Mari Cate 646.277.5688 347.271.1521
Field 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:	**Lincoln Medical Center: Emergency Room** 234 E 149th Street Bronx, NY 10451 718.579.5784
Nearest Occ. Health Clinic: Address: (see map on next page) Phone Number:	**NYC Health and Hospitals/Gotham Health, Belvis** 545 E 142nd Street Bronx, NY 10454 844.692.4692
Liberty Mutual Claim Policy	**WC6Z111254100031**
Other Local Emergency Response Number:	911
Other Ambulance, Fire, Police, or Environmental Emergency Resources:	911

Emergency Hospital

Lincoln Medical Center: Emergency Room
234 E 149th Street
Bronx, NY, 10451
718.579.5784



40 Bruckner Blvd

The Bronx, NY 10454

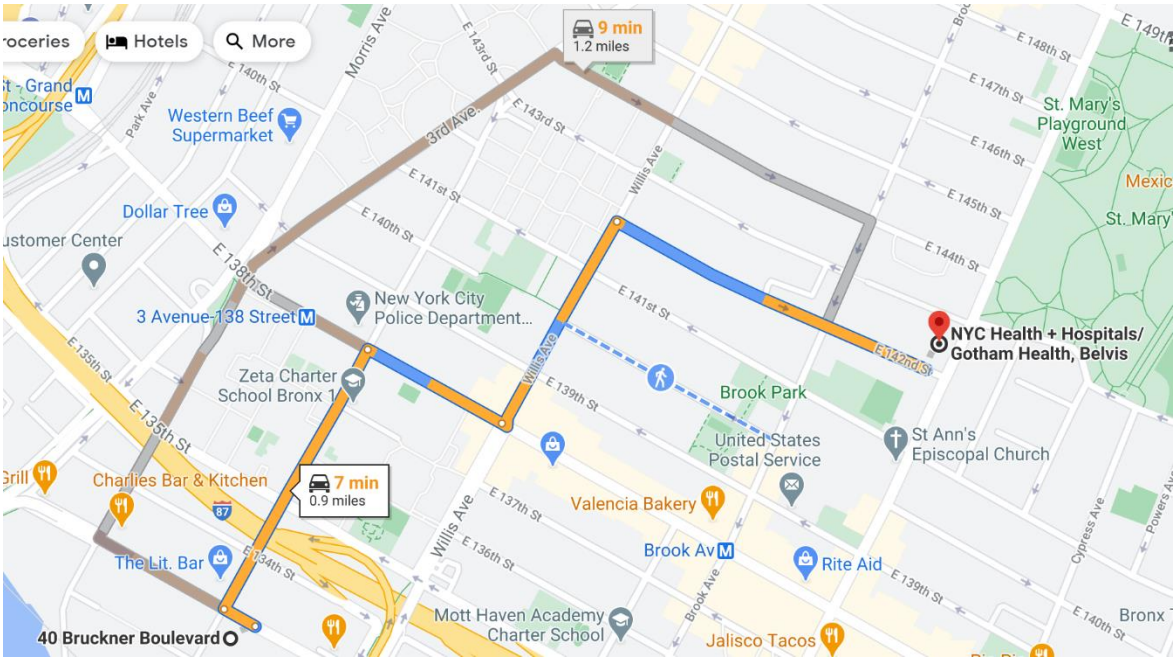
1. Head northwest on Bruckner Blvd toward Alexander Ave — 0.2 mi
2. Turn right onto Lincoln Ave — 0.1 mi
3. Turn left onto E 135th St — 0.3 mi
4. Continue onto Park Ave — 0.4 mi
5. Turn right — 148 ft

Lincoln Medical Center: Emergency Room

234 E 149th St, The Bronx, NY 10451

Clinic

NYC Health and Hospitals/Gotham Health, Belvis
545 E 142nd Street
Bronx, NY 10454
844.692.4692



40 Bruckner Blvd

The Bronx, NY 10454

1. Head northwest on Bruckner Blvd toward Alexander Ave

164 ft

2. Turn right at the 1st cross street onto Alexander Ave

0.3 mi

3. Turn right onto E 138th St

0.1 mi

4. Turn left onto Willis Ave

0.2 mi

5. Turn right onto E 142nd St/Piccirilli Pl

Continue to follow E 142nd St

0.3 mi

NYC Health + Hospitals/Gotham Health, Belvis

545 E 142nd St, The Bronx, NY 10454

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.

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ADMINISTRATIVE INFORMATION

Project Name	40 Bruckner Boulevard	**Project Number**	0200734-002
Project Start Date	6/1/2021	**Project End Date**	6/1/2022
Client Site/Contact: Office Phone Number:	Schwimmer, Jacob 718.701.5680		
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		
Subcontractor: Phone: Emergency Phone number:	Eastern Environmental Solutions 631.727.2700 631.774.9821		

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

Electronic Signature

Project Manager – Mari Cate Conlon

Date

Corporate Health & Safety – Brian Ferguson

03-01-2021
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	Occupied	**Site Status**	Occupied commercial uses	**Regulatory Authority**	OSHA

Project Summary

The approximately 41,240 square-foot property located in the Mott Haven neighborhood of the Bronx is identified as Block 2295, Lot 51 on the New York City Tax Map. Currently the Site is vacant.

The project is currently within the New York City E-Designation database under E-143. The requirements under the E-Designation program are satisfaction of the requirements for Hazardous Material and Air components with the New York City Office of Environmental Remediation (NYCOER). The air requirement for this E-Designation is that HVAC fuel is limited to natural gas. Additionally, the E-Designation requires underground gasoline storage tanks testing protocol, and window wall attenuation and alternate ventilation. The proposed development will include the construction of a 12-story residential building with a one-level cellar encompassing the entire Site footprint and extending approximately 20 feet below grade.

Scope of Work: Remedial Investigation

Project Tasks

Task 1	**Task Name:** Drilling
Oversee installation of soil borings, permanent groundwater monitoring wells, and temporary soil vapor implants by Eastern Environmental Solutions using a track mounted Geoprobe drilling rig. Eastern Environmental Solutions will provide a one call markout prior to drilling.	
Start Date: 6-1-2021	End Date: 7-1-2021
H&A Site Supervisor: Zach Simmel	Subcontractor: Eastern Environmental Solutions
Task 2	**Task Name:** Soil, Soil Vapor & Groundwater Sampling
Collect soil samples, groundwater samples, and soil vapor samples into laboratory provided containers.	
Start Date: 6-1-2021	End Date: 7-1-2021
H&A Site Supervisor: Zach Simmel	Subcontractor: Eastern Environmental Solutions

HAZARD ASSESSMENT AND CONTROLS

The following site and task specific hazards have been identified. Associated controls have been defined and are also listed below.

Site Chemical Hazards

Potential contaminants of concern at the site include volatile organic compounds (VOCs) and semi volatile organic compounds (SVOCs).

Source of Information: Unknown contaminants/not well characterized, potential for contaminants based on urban fill and site knowledge.

COC	Location/Media	Concentration (Soil)	Concentration (Groundwater)	Units
Tetrachlorethene (PCE)	**Soil**	**2.5**	**NA**	**mg/kg**
Trichloroethylene (TCE)	**Soil**	**unknown**	**NA**	**mg/kg**
PAHs	**Soil**	**12 - 15**	**NA**	**mg/kg**
Lead	**Soil**	**1350**	**NA**	**mg/kg**
Mercury	**Soil**	**2.28**	**NA**	**Mg/kg**

Polycyclic Aromatic Hydrocarbons (PAHs)

General Information - Polycyclic aromatic hydrocarbons (PAHs) are a class of chemicals that occur naturally in coal, crude oil, and gasoline. They also are produced when coal, oil, gas, wood, garbage, and tobacco are burned. PAHs generated from these sources can bind to or form small particles in the air. High-temperature cooking will form PAHs in meat and in other foods. Naphthalene is a PAH that is produced commercially in the United States to make other chemicals and mothballs. Cigarette smoke contains many PAHs.

Toxicity - Human health effects from environmental exposure to low levels of PAHs are unknown. Large amounts of naphthalene in air can irritate eyes and breathing passages. Workers who have been exposed to large amounts of naphthalene from skin contact with the liquid form and from breathing naphthalene vapor have developed blood and liver abnormalities. Several of the PAHs and some specific mixtures of PAHs are considered to be cancer-causing chemicals. The most carcinogenic PAH is benzo(a)pyrene.

Flammability - PAHs are ubiquitous environmental pollutants generated primarily during the incomplete combustion of organic materials (e.g. coal, oil, petrol, and wood).

Reactivity – A key factor in PAH toxicity is the formation of reactive metabolites. Not all PAHs are of the same toxicity because of differences in structure that affect metabolism. The mechanism of PAH-induced carcinogenesis is believed to be via the binding of PAH metabolites to deoxyribonucleic acid (DNA).

First Aid Procedures
Eye: Immediately flush out eyes with large amounts of water for 20 minutes and occasionally lift the upper and lower eyelids. Get medical attention immediately.

Skin: Promptly flush the contaminated skin with water for 20 minutes. If this chemical penetrates the clothing, promptly remove the clothing and flush the skin with water. If irritation persists after washing, seek medical attention.

Inhalation: Move the exposed person into fresh air immediately. Other measures are usually unnecessary.

Ingestion: Seek medical attention.

Air Monitoring -
Personal air sampling for PAHs can be conducted by utilizing NIOSH Method 5506 or 5515.

Occupational Exposure Limit(s)	
8 Hour TWA – 0.2 ppm	**STEL** - N/A
Ceiling - N/A	**IDLH** - NA

In areas of known contamination, a Photoionization Detector (PID) will be used for personal air monitoring.

Trichloroethylene (TCE)

General Information - Trichloroethylene is a nonflammable colorless liquid with a sweet odor. Trichloroethylene vapor is heavier than air and is found in low lying areas.

Toxicity - Acute (short-term) exposure to Trichloroethylene may cause irritation to the eyes and the skin. If this liquid is swallowed, it may result in fluid entering the lower respiratory system and cause inflammation of the lungs. The substance may cause effects on the central nervous system, resulting in respiratory failure. Exposure could cause lowering of consciousness. Repeated or prolonged contact with skin may cause chronic dryness and irritation. The substance may have effects on the central nervous system, resulting in loss of memory. The substance may have effects on the liver and kidneys if individual is a regular drinker. This substance is probably carcinogenic to humans.

Flammability - Trichloroethylene is nonflammable.

Reactivity – On contact with hot surfaces or flames Trichloroethylene decomposes forming toxic and corrosive fumes (phosgene, hydrogen chloride). The substance decomposes on contact with strong alkali producing dichloroacetylene, which increases fire hazard. It reacts violently with metal powders such as magnesium, aluminum, titanium, and barium. It is slowly decomposed by light in presence of moisture, with formation of corrosive hydrochloric acid.

First Aid Procedures
Eye: Immediately wash (irrigate) the eyes with large amounts of water for 20 minutes, occasionally lifting the lower and upper lids. Further medical care is required.
Skin: Remove contaminated clothing and promptly flush the contaminated skin with water for 20 minutes.
Inhalation: Move the exposed person to fresh air at once. Artificial respiration may be required.
Ingestion: Rinse the individual's mouth. Do not induce vomiting. Seek medical attention immediately.

Air Monitoring -
Vapor monitoring is required to determine Trichloroethylene concentrations. Monitoring can be specific for Trichloroethylene using integrated sampling or with a direct reading vapor monitor.

Occupational Exposure Limit(s)	
8 Hour TWA – 25 ppm	**STEL** – 100 ppm
Ceiling – 300 ppm	**IDLH** – 1000 ppm

In areas of known contamination, a Photoionization Detector (PID) will be used for personal air monitoring.

tetrachloroethylene (PCE)

General Information - Tetrachloroethylene is a colorless liquid with a sharp sweet odor. Tetrachloroethylene vapor is heavier than air and will be found in low lying areas.

Toxicity - Acute (short-term) exposure to Tetrachloroethylene may result in irritation to the eyes, skin, and respiratory tract. If this liquid is swallowed, results fluid entering the lower respiratory system and cause inflammation of the lungs. The substance may cause effects on the central nervous system. Exposure at high levels may result in unconsciousness. Repeated or prolonged contact with skin may cause chronic dryness and irritation of the skin. The substance may have effects on the liver and kidneys. This substance is probably carcinogenic to humans.

Flammability - Tetrachloroethylene is nonflammable.

Reactivity – On contact with hot surfaces or flames Tetrachloroethylene decomposes forming toxic and corrosive fumes (hydrogen chloride,phosgene, chlorine). The substance decomposes slowly on contact with moisture producing trichloroacetic acid and hydrochloric acid. It reacts with metals such as aluminum, lithium, barium, and beryllium.

First Aid Procedures

Eye: Immediately wash (irrigate) the eyes with large amounts of water for 20 minutes, occasionally lifting the lower and upper lids. Further medical care is required.

Skin: Remove contaminated clothing and promptly flush the contaminated skin with water for 20 minutes.

Inhalation: Move the exposed person to fresh air at once. Artificial respiration may be required.

Ingestion: Rinse the individual's mouth. Do not induce vomiting. Give plenty of water and allow the individual to rest.

Air Monitoring -

Vapor monitoring is required to determine Tetrachloroethylene concentrations. Monitoring can be specific for Tetrachloroethylene using integrated sampling or with a direct reading vapor monitor.

Occupational Exposure Limit(s)

8 Hour TWA – 25 ppm	**STEL** – 100 ppm
Ceiling – 300 ppm	**IDLH** – 1000 ppm

In areas of known contamination, a Photoionization Detector (PID) will be used for personal air monitoring.

Lead

General Information - Lead can be used as a pure metal, combined with another metal to form an alloy, or in the form of a chemical compound. The primary use of lead in the U.S. is for automobile lead-acid storage batteries, a type of rechargeable electric battery which uses an almost pure lead alloy. Lead-formed alloys are typically found in ammunition, pipes, cable covering, building material, solder, radiation shielding, collapsible tubes, and fishing weights. Lead is also used in ceramic glazes and as a stabilizer in plastics. Lead was used extensively as a corrosion inhibitor and pigment in paints for residential and public buildings.

Toxicity - Prolonged (chronic) or repeated contact may have effects on the blood, bone marrow, central nervous system, peripheral nervous system, and kidneys. This could result in low blood-iron content, convulsions caused by neural decay, decreased motor function / paralysis, abdominal cramps, and kidney impairment. Lead causes toxicity to human reproduction or development. The substance is probably carcinogenic to humans.

Flammability - Lead is not flammable.

Reactivity - When Lead is heated it forms toxic fumes. Lead reacts with oxidants. It reacts with hot concentrated nitric acid, boiling concentrated hydrochloric acid and sulfuric acid.

First Aid Procedures
Eye: Immediately wash (irrigate) the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately.
Skin: Promptly flush the contaminated skin with water. If this chemical penetrates the clothing, promptly remove the clothing and flush the skin with water. If irritation persists after washing, get medical attention.
Inhalation: move the exposed person to fresh air at once. Other measures are usually unnecessary.
Ingestion: In the event of ingestion rinse exposed individual´s mouth. Do not induce vomiting.

Air Monitoring -Particulate monitoring is required to determine lead concentrations. Monitoring can be specific for lead using integrated sampling or with a direct reading aerosol monitor. When monitoring with the direct reading instrument, dust equivalent action levels must be calculated prior to sampling. Particulate monitoring will be conducted during operations that produce visible dust, which are not expected during this work.

Occupational Exposure Limit(s)

8 Hour TWA - 0.05 mg/m3	**IDLH** - 100 mg/m3

Mercury

General Information - An odorless, silvery metallic liquid. Insoluble in water. Toxic by ingestion, absorption and inhalation of the fumes. Corrosive to aluminum. Used as a catalyst in instruments, boilers, mirror coatings.

Toxicity - Upon heating, toxic fumes are formed. Decomposes on heating. This produces toxic fumes. The substance can be absorbed into the body by inhalation of its vapor and through the skin also as a vapor. The substance is irritating to the skin and inhalation of the vapor may cause pneumonitis. The substance may cause effects on the central nervous system and kidneys. The effects may be delayed. Medical observation is indicated. A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C and may have effects on the central nervous system and kidneys, which could result in irritability, emotional instability, tremors, mental and memory disturbances and speech disorders. May cause inflammation and discoloration of gums. Cumulative effects are possible.

Flammability - Mercury itself does not burn but poisonous gases are produced in fire.

Reactivity - MERCURY forms an explosive acelylide when mixed with acetylene. Can form explosive compounds with ammonia (a residue resulting from such a reaction exploded when an attempt was made to clean it off a steel rod. Chlorine dioxide (also other oxidants, such as: chlorine, bromine, nitric acid, performic acid), and mercury explode when mixed. Methyl azide in the presence of mercury is potentially explosive. Ground mixtures of sodium carbide and mercury can react vigorously. Ammonia forms explosive compounds with gold, mercury, or silver.

First Aid Procedures

Eye: Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while flushing. Seek medical attention immediately.

Skin: If this chemical contacts the skin, promptly wash the contaminated skin with soap and water. If this chemical penetrates the clothing, promptly remove the clothing and wash the skin with soap and water. Get medical attention promptly.

Inhalation: If a person breathes large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform mouth-to-mouth resuscitation. Keep the affected person warm and at rest. Get medical attention as soon as possible.

Ingestion: If this chemical has been swallowed, get medical attention immediately.

Air Monitoring -Any mercury reading above 0.0003 mg/m3 [the ambient air guideline] will require pregnant or potentially pregnant staff to leave the area or use appropriate respiratory protection. Personnel should not work for extended periods of time [over 30 minutes] where mercury reading are above 0.0125 mg/m3 (1/2 of the ACGIH TLV of 0.025 mg/m3) without a half-face respirator with cartridges specific for mercury vapor. Mercury reading above 0.025 mg/m3 (1/2 of the NIOSH REL) require personnel to leave the area or a half-face respirator with cartridges specific for mercury vapor. Any exposures over 0.025 mg/m3 should be reported on the Hank Incident Reporting Form.

Occupational Exposure Limit(s)

8 Hour TWA – 0.025 ppm	**STEL** – 0.05 ppm
Ceiling – 0.1 ppm	**IDLH** – 10 ppm

Site Hazard Summary		
Sun	Slips, Trips, Falls	Urban Fill
Public Right of Way	Cold Temperatures	

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.

URBAN FILL

Hazard Information

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

Controls

- Physical Hazards: Urban fill can contain debris such as glass, ceramics, rebar, wire, wood, nails, and other objects that contain sharp edges. Personnel should use caution and wear appropriate gloves (e.g., leather) to prevent cuts associated with handling material containing sharp and abrasive edges.
- Personal Hygiene: Always wash hands prior to 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 riverbed 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.

PUBLIC RIGHT OF WAY

Hazard Information

H&A staff and their subcontractors conducting work on public roads and/or right of ways can be exposed to vehicular traffic and expose the public to the hazards of the job site. Where a hazard exists to site workers because of traffic or haulage conditions at work sites that encroach public streets or highways, a system of traffic controls in conformance with the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), or state program, is required. A Temporary Traffic Control Plan (TCP) describes traffic controls to be used for facilitating vehicle and pedestrian traffic through a temporary traffic control zone TCPs are required to provide for worker protection and safe passage of traffic through and around job sites with as little inconvenience and delay as possible.

The plan may range in scope from being very detailed, to merely referencing typical drawings contained in the MUTCD. The degree of detail in the TCP depends entirely on the complexity of the

situation, and TCP's should be prepared by persons knowledgeable about the fundamental principles of temporary traffic control and the work activities to be performed.

Controls

H&A Project Managers or their subcontractors need to establish appropriate control measures and obtain any permits when project work is on or encroaches public roadways. You may need flaggers or police details. Cease work and notify the field supervisor immediately if any conditions are such that safety is jeopardized. Utilize protective vehicles whenever appropriate or position equipment so in between the work and oncoming traffic.

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.

Task Specific Hazards

TASK 1

Task 1 – Drilling – Drilling, such as associated with installation of soil borings, monitoring wells, and soil vapor probes is conducted for a range of services. Familiarity with basic drilling safety is an essential component of all drilling projects. Potential hazards related to drilling operations include but are not limited to encountering underground or overhead utilities, traffic, heavy equipment, hoisting heavy tools, steel impacts, open rotation entanglement, and the planned or unexpected encountering of toxic or hazardous substances. While staff members do not operate drilling equipment, they may work in close proximity to operating drilling 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

Overhead Utilities	Ground Disturbance	Underground Utilities	Noise
Heavy Equipment	Line of Fire	Ergonomics	Generated Waste
Rotating Equipment			

Task 2 – Sampling – Soil sampling by H&A staff can be conducted in conjunction with a wide range activities. These activities can include, but are not limited to: drill spoil characterization and management during building foundation element installation, characterization of excavated soils for management/disposal/reuse during earthwork activities, and as part of environmental remedial activities such as delineation and confirmation sampling. 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. Potential hazards related to soil sampling at construction sites include, but are not limited to: encountering site vehicle traffic and heavy equipment operations, manual lifting, generated waste, contact or exposure to impacted soil, and encountering unknown toxic or hazardous substances. Although soil sampling is commonly performed within active excavations, from stockpiles, or within trench excavations, sampling locations and situations will vary depending on site conditions. Care should be taken ensuring that the sampling area is not being actively accessed by construction equipment. Care should also be taken with handling of potentially environmentally impacted soil during sampling, with appropriate PPE identified and used. At no time during classification activities are personnel to reach for debris near machinery that is in operation, place any samples in their mouth, or come in contact with the soils without the use of gloves. Staff will have to carry and use a variety of sampling tools, equipment, containers, and potentially heavy sample bags. It is imperative that staff are aware of emergency / communication protocols with the Contractor prior to the start of work.

Potential Hazards

Rotating Equipment	Ergonomics	Generated Waste	Line of Fire

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 location with the property owner or knowledgeable site representative;
- Perform a geophysical survey to locate utilities;
- Hire a private line locating firm to determine the location of utility lines that are present at the property;
- Identifying a no-drill or dig zone;
- Hand dig or use vacuum excavation in the proposed ground disturbance locations if insufficient data is unavailable to accurately determine the location of the utility lines.

Noise

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

See OP 1031 Hearing Conservation for additional information.

Controls

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

Heavy Equipment

Staff members must be careful and alert when working around heavy equipment since equipment failure or breakage and limited visibility can lead to accidents and worker injury. Heavy equipment such as cranes, drills, haul trucks, or others 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, vehicles, and heavy equipment.

Controls

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.

Rotating Equipment

Exposure to rotating parts can occur when working near a drilling rig, or other similar equipment. All rotating parts should be covered with guards to prevent access by workers. When performing maintenance activities that require the rotating parts to be exposed, workers should not allow loose clothing, hands, or tools to approach the rotating parts. Energy isolation procedures must be followed, and guards must be replaced as soon as possible after completing the maintenance task.

Operation of drilling equipment also creates hazards associated with pinch points and rotating equipment. These are hazards where the body and extremities, especially the hands, can be caught in moving equipment and crushed.

Controls

- Evaluate work procedures to avoid placing the body and extremities in the path of rotating equipment and tools to avoid being struck by moving equipment, tools and machinery.
- Evaluate equipment and tool use to identify pinch points and develop procedures to avoid placing body parts in a position where they can be caught in moving equipment, tools and machinery.
- Follow energy isolation procedures if required
- Do not work near rotating equipment with long loose hair, loose clothing or jewelry.

TASK PPE AND SAFETY EQUIPMENT

The personal protective equipment and safety equipment (if listed) is specific to the associated task. The required PPE and equipment listed must be on site during the task being performed. Work shall not commence unless the required PPE is present.

The purpose of PPE is to provide a barrier, which will shield or isolate staff members from the physical, biological, chemical, and/or radiological hazards that may be encountered during task activities.

Required PPE	TASK 1	TASK 2
Hard hat	X	X
Safety glasses	X	X
Hard-toed Boots	X	X
Gloves	X	X
Long pants and 4-inch long sleeve shirt	X	X
Safety vest (Class 2)	X	X
Hearing Protection	X	
Facial Covering	X	X
COVID-19 PPE & Supplies	X	X

TRAINING REQUIREMENTS

The table below lists the training requirements staff must have respective to their assigned tasks and that required to access the site.

Task Specific Training	
Required Training: OSHA 40-hour HAZWOPER, 8-hour HAZWOPER Refresher, On Site training	**Task 1 and Task 2**

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 and 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

Restrooms
Available nearby restrooms include the following (COVID PPE to be worn and hand sanitization to occur before and after use of facilities)

- Shell Gas Station- 119 Bruckner Blvd, Bronx, NY
- Western Beef Supermarket- 301 Morris Ave, Bronx, NY
- Amoco Gas Station- 164 Willis Ave, Bronx, NY

SPILL CONTAINMENT

An evaluation was conducted to determine the potential for hazardous substance spills at this site. This evaluation indicates that there is no potential for a hazardous spill of sufficient size to require containment planning, equipment, and procedures.

DECONTAMINATION

All possible and necessary steps shall be taken to reduce or minimize contact with chemicals and contaminated/impacted materials while performing field activities (e.g., avoid sitting or leaning on, walking through, dragging equipment through or over, tracking, or splashing potential or known contaminated/impacted materials, etc.).

Personal Hygiene Safeguards

The following minimum personal hygiene safeguards shall be adhered to:

1. No smoking or tobacco products on any Hazwoper project.
2. No eating or drinking in the exclusion zone.
3. It is required that personnel present on site wash hands before eating, smoking, taking medication, chewing gum/tobacco, using the restroom, or applying cosmetics and before leaving the site for the day.
4. It is recommended that personnel present on site shower or bathe at home at the end of each day of working on the site.

Personal Decontamination

Outer gloves and boots should be decontaminated periodically as necessary and at the end of the day. Brush off solids with a hard brush and clean with soap and water or other appropriate cleaner whenever possible. Remove inner gloves carefully by turning them inside out during removal. Wash hands and forearms frequently. It is good practice to wear work-designated clothing while on-site which can be removed as soon as possible. Non-disposable overalls and outer work clothing should be bagged onsite prior to laundering. If gross contamination is encountered on-site contact the Project Manager and Regional Health and Safety Manager to discuss proper decontamination procedures.
The steps required for decontamination will depend upon the degree and type of contamination but will generally follow the sequence below.

1. Remove and wipe clean hard hat
2. Rinse boots and gloves of gross contamination
3. Scrub boots and gloves clean
4. Rinse boots and gloves
5. Remove outer boots (if applicable)
6. Remove outer gloves (if applicable)
7. Remove Tyvek coverall (if applicable)
8. Remove respirator, wipe clean and store (if applicable)
9. Remove inner gloves (if out gloves were used)

PPE that is not grossly contaminated can be bagged and disposed in regular trash receptacles

This decontamination procedure is applicable to Task(s): 1

Small Equipment Decontamination

Pretreatment of heavily contaminated equipment may be conducted as necessary:

1. Remove gross contamination using a brush or wiping with a paper towel

2. Soak in a solution of Alconox and water (if possible)
3. Wipe off excess contamination with a paper towel

Standard decontamination procedure:

1. Wash using a solution of Alconox and water
2. Rinse with potable water
3. Rinse with methanol
4. Rinse with distilled/deionized water

Inspect the equipment for any remaining contamination and repeat, as necessary.

This decontamination procedure is applicable to Task(s): 1

Standard Disposal Methods for Contaminated Materials

Excess sample solids, decontamination materials, rags, brushes, poly sheeting, etc. that are determined to be free of contamination through field screening can usually be disposed into client-approved, on-site trash receptacles. Contaminated materials must be segregated into liquids or solids and drummed separately for off-site disposal as defined by and in accordance with applicable regulatory requirements.

Standard Disposal Methods for Contaminated Soils

Contaminated soil cuttings and spoils must be drummed for disposal off-site. Soil cuttings and spoils determined to be free of contamination through field screening can usually be returned to the boreholes or excavations from which they came

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 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 illnesses 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 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

FIELD SAFETY MANAGER (FSM)

The Haley & Aldrich FSM, 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 FSM.
Specific duties of the FSM include:

- Approving and amending the Safety Plan for this project
- Advising the PM and SSOs on matters 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 FSM;
- 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 Field Safety Manager (FSM) as needed.

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

FIELD PERSONNEL

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

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

VISITORS

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

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

APPENDICES

Appendix A – COVID-19 Fact Sheets and Forms

Appendix B – Job Hazard Analyses

APPENDIX A
COVID-19 FACTSHEETS AND FORMS

COVID-19 ADDENDUM

ATTACHMENTS

- COVID-19 Policy

- COVID-19 HASP Addendum - Job Hazard Analyses

- Tailgate Meeting Form

- Work and Hygiene Procedures

- What to do If you have been Exposed

- Face Covering

- Sub Contractor Self Declaration

- Field Office/Trailer Use

- Project Shutdown

- Roles and Responsibilities

COVID 19 Policy
HASP Addendum Instructions

Safety
in everything we do

HEALTH & SAFETY FACTSHEET

Incorporate the following into the HASP Addendum to protect field staff, business partners, clients, and the general public at project sites:

- COVID-19 is part of H&S planning and will be risk assessed prior to mobilization and approved by the Field Safety Manager.
- If we are not the controlling employer, ensure we understand what the project is doing for COVID-19 mitigation methods prior to mobilization.
- **Most sites have a COVID-19 Plan, it is your duty to obtain a copy of that plan.**

Fit for Duty –

All subcontractors (if subcontracted to H&A), and visitors (if H&A is Controlling Employer) will sign the Self-Declaration form at the start of the project. Everyone must acknowledge the Fit for Duty of the Daily Tailgate form to affirm staff report fit for duty and symptom free each day.

- All employees working on a site controlled by another employer will self-certify to them that they have no COVID-19 symptoms, tested positive, nor have had known "close contact" with an individual who has tested positive and have not been asked to self-isolate by their doctor or local public health official.
- If you can't self-certify, you must leave the site. If others can't self-certify remove them from the site or notify their supervisor to remove them.

ZERO TOLERANCE - Do not come to the site if you are sick, tested positive, or if you have been in close personal contact with someone with symptoms of COVID-19.

If others come to the site while sick, isolate yourself from them and ask them to leave or notify their supervisor.

Limit Potential Exposure –

- Do not enter job trailers or offices if possible. If you do enter, follow all requirements found in the Field Office/Trailer Use policy.
- Do not congregate with others and maintain a minimum distance of 6'. If you can maintain greater distances, please do so.
  - Tailgates should be done at distance
  - Bring food from home if possible and avoid the food truck. Do not congregate with other at breaks and at the food trucks.
- Clean all the surfaces you touch at least twice each day using the recommended disinfectants. This includes desks, tablets, phones, and laptops.
- Do all you can to maintain your good health by getting adequate sleep, eating a healthy diet, avoid alcohol, and consuming plenty of fluids.
- Face coverings are mandatory unless an approved task specific risk assessment has been completed.
- Avoid restaurants and food trucks and do not eat meals in a group.

The risk associated with potential exposure to COVID-19 will be considered as part of the project planning and HASP development cycle.

Have H&S review the HASP.

Business partners for sites managed by H&A (H&A Controlling Employer) will have completed the Self Declaration Form.

Approved and appropriate Personal Protective Equipment and supplies are used as indicated by the HASP.

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COVID 19 Policy
HASP Addendum Instructions

Cleaning/sanitizing/disinfecting

- If a job office/trailer is present, See Field Office/Trailer policy for further guidance.
- Clean and disinfect rental vehicles and hotel spaces (see Fact Sheet).

Personal Hygiene

- Wear gloves at all times. At a minimum cut resistant gloves should be worn at all times while on site.
- Handwashing or hand sanitizing should happen after using restrooms, before and after eating, coming onsite, and going offsite. If handwashing equipment isn't available, hand sanitizing products should be used (see Fact Sheet).
- Wear cloth face covering if there is a potential for staff and/or subcontractors to be within 6 feet of one another. See Fact Sheet for further guidance on Face Cloth Coverings.
- Avoid touching the face area (eyes, nose, mouth) at all times, even when wearing gloves (see Fact Sheet).

❖ **Please complete the following two pages for EACH project prior to beginning work**. Staff shall ensure that a COVID HASP Addendum is completed and reviewed prior to entering the field each day and includes the additions of any new tasks.

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COVID 19 Policy
HASP Addendum

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HEALTH & SAFETY FACTSHEET

COVID-19 PROJECT SPECIFIC JOB HAZARD ANALYSIS

Does the client or Controlling Employer (if H&A is not controlling employer) have specific requirements related to COVID-19?
If yes, please attach the requirements. ☑ Yes ☐ No

Do we have the necessary supplies on hand? ☑ Yes ☐ No
(Supplies include face coverings, disinfectant, hand washing stations or sanitizer, and PPE.)

The following **must** be onsite(☑ to acknowledge):

- ☐ Has the Tailgate Meeting Form been provided?
- ☐ Has the Work and Hygiene Procedures Policy been provided?
- ☐ Has the What To Do if You Have Been Exposed policy been provided?
- ☐ Has the Face Covering policy been provided?
- ☐ Has the Sub-Contractor Self Declaration form been completed by all H&A subs? (leave blank if no subs on site)
- ☐ Has the Field Office/Trailer Use Policy been provided?
- ☐ Has the Project Shutdown/Suspension policy been provided?

Is there staff travel involved with this project? (If yes please answer the following questions) ☐ Yes ☑ No
Has the Travel Procedure policy been provided? ☐ Yes ☐ No
Has the Interstate Travel Form been approved by the BU GM? ☐ Yes ☐ No

❖ Complete the Job Hazard Analysis on the following page and return to H&S for review.

- Be as **detailed as possible** when breaking down the task being performed into individual steps that will be performed.
  - Example Tasks: Traveling to site, Drilling, Sampling, Breaks, Tailgate meetings, Equipment Breakdown etc.
- Identify if any of the steps will require staff or subcontractors to break the 6-foot social distance, and if so, what is the duration of that step.
- Identify what control measures will be implemented for each step to prevent the potential spread of COVID-19. For projects involving numerous tasks, each with several steps, extra space is required to complete a thorough JHA.
  - Example control measure: Sanitize after use, Drive in separate cars, Do not use field trailer, Use gloves when handling, Eat/Drink away from others etc.
- Use blank copies of the following page as needed.
- If staff have any questions or concerns when completing the JHA, please reach out to their Regional Health & Safety Manager or HealthSafetyHelp@HaleyAldrich.com for support.

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COVID-19 PROJECT SPECIFIC JOB HAZARD ANALYSIS

Task and Associated Steps	6-ft Distance Achieved?	Task Time	What Procedures are going to be put in place?
Travel to/from project site	Yes	30 min	Staff will drive to site in own vehicles. Will maintain 6 ft distancing
			while getting supplies and fueling vehicle. Gloves and face covering
			will be worn, if necessary.
Communication with Crew	Yes	15 min	Maintain 6 ft distancing, wear gloves and mask
Site Check-in	Yes	15 min	Wear face Covering and gloves while getting temp taken/tool box talks.
Coffee Breaks	Yes	15 min	Take in separate locations. maintain 6 ft distancing.
Bathroom Breaks	Yes	5 min	Use hand sanitizer or wash stations.
Lunch Breaks	Yes	30 min	Take in separate locations. maintain 6 ft distancing.
			Wash hands before eating
Drilling/Soil Sampling	Yes	8 hrs	Wear face coverings and cut resistant gloves.
			Maintain 6 ft distancing,
Personal Interactions	Yes		Follow guidance, avoid or minimize personal interactions.
			Maintain 6 ft distancing. Wear face covering.
			No Hand Shaking.

PM Signature: Mari Cate Conlon Date: 03-01-2021

FSM Signature: [signature] Date: 03-01-2021

Daily COVID Self-Declaration and H&S Tailgate Meeting Form

Project:	Project No.:
Location:	Project Manager:
Subcontractor(s):	Date:
Site Safety & Health Officer (SSHO):	SSHO Contact Info:

Worker Acknowledgement

By signing here, I am stating the following:

1. I understand the hazards and risk control actions associated with each task I am about to perform.
2. I understand the permit to work requirements pertinent to the work I am about to perform (if applicable).
3. I am aware that no tasks or work that is not risk-assessed is to be performed.
4. I am also aware of my obligation to implement 'Safe Work'.
5. I arrived and departed fit for duty.
6. I am physically and mentally fit for duty.
7. I am not under the influence of any type of medication, drugs, or alcohol that could affect my ability to work safely.
8. I am aware of my responsibility to bring any illness, injury (regardless of where or when it occurred), or fatigue issue I may have to the attention of the SSHO.
9. I signed out uninjured unless I have otherwise informed the SSHO.
10. I acknowledge that in the past 14 days I have not had any COVID related symptoms or illness, nor have I been in close contact with anyone who has or had COVID related symptoms or illness.

Common COVID-19 Symptoms:

- **Fever**
- **Sinus Pain**
- **Cough**
- **Altered smell or taste**
- **Expectoration**
- **Stuffy nose**
- **Chills**
- **Fatigue**
- **Sore Throat**
- **Headache**
- **Difficulty Breathing**
- **Joint or Muscle Pain**
- **Diarrhea**
- **Vomiting**

Name (print)	Company	Initials & Sign In/Out Time	
		In & Fit	Out & Fit

Visitor Log (*Site Visitors not involved in the work activities*)

Name (print)	Company	Initials & Sign In/Out Time	
		In & Fit	Out & Fit

Emergency Procedures

If an emergency occurs, follow procedure outlined in the HASP and contact numbers below. If non-life-threatening injury occurs, contact PM to report the incident. Seek first-aid treatment from the Occupational Health Center, as outlined in the HASP.

Emergency Dispatch phone number if other than 911:	
Local Hospital:	Local Hospital Phone #:
Evacuation/Muster Point:	Alt Evacuation/Muster Point:

Simultaneous Operations (SIMOPS)

SIMOPS or Multi-Crew Activity	☐ Yes	☐ No	If yes, describe SIMOPS:	
Has SIMOPS been communicated to all workforce?	☐ Yes	☐ No		
SIMOPS PIC:			**Phone Number:**	

Task Identification

Task	**Responsible Company**	**Task Supervisor**

Required Permits/Forms (*check all that apply*)

☐None	☐Lifting Plan	☐Other:
☐Confined Space Entry Permit	☐Hot Work Permit	☐Other:
☐Lock-out / Tag-out (LOTO)	☐Ground Disturbance Permit	☐Other:
☐Excavation Permit	☐Other:	☐Other:

Discussion of Work Hazards *(check all that apply)*

☐Chemical	☐Hazardous materials (lead, asbestos, etc.)	☐Radiological
☐Confined space	☐Hoisting and rigging	☐Stored energy LOTO
☐Congested work area	☐Hot work	☐Traffic control
☐Elevated work	☐Material handling	☐Weather and/or temp extremes
☐Ergonomics	☐Noise pollution	☐Waste generation
☐Emergency egress	☐Oxygen deficiency	☐Other:

Required PPE *(check all that apply)*

										
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Hearing Protection	Safety Eyewear	Hard Hat	Safety Toed Shoes	Leather or Palm Protective	Safety Vest	Protective Clothing	Respiratory Protection	PFD	Face Shield	Fall Protection

Tailgate Topic / Hazard Discussion

Item	Discussion

Management of Change (MoC)

Does the work activity require a MoC? If yes, has it been authorized by applicable management? ☐No ☐Yes
Has the safety information been updated to incorporate any change in product, equipment, material, or process? This information should include how to investigate accidents, audit compliance with safety procedures, and plan for emergency responses. ☐No ☐Yes
Have the procedures for a MoC been reviewed and evaluated? ☐No ☐Yes
Have all affected staff been informed and trained on the new equipment, process, or other changes? Health and safety hazards must be emphasized including processes/procedures in an emergency. The training must occur before any staff is allowed to operate the equipment or perform the job relating to the changes. ☐No ☐Yes
Have written procedures been put into place for the next time there is a change in safety management? ☐No ☐Yes

Best Practice(s) Observed? ☐ Yes ☐ No If yes, describe:	**H&S Observations/ Near Misses/ Incidents Reported?** ☐ Yes ☐ No If yes, describe:
Safe Work Interventions? ☐ Yes ☐ No If yes, describe:	**Have additional hazards and risk controls been identified for future work?** ☐ Yes ☐ No If yes, update appropriate job hazard analysis (JHA).

Site Safety & Health Officer Acknowledgement

At the conclusion of the day, I certify that the work site has been inspected and is being left in a safe and clean condition and any incidents have been properly reported.

Signature Date

COVID 19 Policy
Work and Hygiene Procedures

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HEALTH & SAFETY FACTSHEET

The following must be completed and implemented prior to each time you enter the work environment (office, field, client site, travel or any other place you are to perform work duties):

- **Staff must self-declare through Gensuite each morning before leaving their house to come into work.**
  - Staff must enter a self-declaration each time they enter the office, and
  - Staff must enter a separate self-declaration for project site. Staff may list multiple sites in the text field of the form.
- **Do not come in, if you are sick, have symptoms, or were in close contact with someone with COVID-19.**
- **Isolate others that are sick or have COVID-19 symptoms.** If another person on site does come into work or to the site sick, isolate them, and send them home if Haley & Aldrich is the controlling employer. If Haley & Aldrich is not the controlling employer, isolate yourself from the person, and inform the controlling employer accordingly. Report symptoms, illness, or close contact to COVIDHelp@haleyaldrich.com immediately.
- **Staff must wear a face covering at all times in the work environment** regardless of physical distancing, unless specifically exempted by H&S.
  - Staff shall use Company provided face covering while in our offices.
- **Staff should make every effort to host meetings virtually and avoid in person contact**.
- **All in-person meetings deemed essential must be pre-approved by the Office COVID Leader.** All Staff must always wear face coverings during meetings. Staff shall wear face coverings regardless of whether the meeting takes place in our office or off-site.
- **Staff must keep at least 6' apart at all times.** Floor markings and conference room markings have been put in place to illustrate appropriate distance for areas where employee(s) may congregate (i.e., administrator's desk, printer).
- **H&A staff will not host or participate in gatherings that require staff to remove their masks. Currently, the Company does not allow lunch, dinner, and/or drink meetings.**
- No communal food such as snacks, bagels, coffee, or creamers.
- All Personal Protective Equipment, supplies, and cleaning and disinfectants are ordered through Desmond Crawford.

Employees sign in through Gensuite and self-declare:

- **They have no symptoms:**
  - Fever
  - Cough
  - Sinus pain
  - Reduced or altered sense of smell or taste
  - Expectoration
  - Stuffy nose
  - Chills, repeated shaking with chills
  - Fatigue
  - Sore throat
  - Headache
  - Difficulty breathing, shortness of breath
  - Joint or muscle pain
  - Diarrhea
  - Vomiting
- **They have not been exposed to someone who has symptoms or has tested positive for COVID-19 within the past 14 days.**

All staff are expected to comply with this policy and the Office Specific HASP.

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COVID 19 Policy
Work and Hygiene Procedures

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HEALTH & SAFETY FACTSHEET

Employ the following good hygiene practices:

- **Practice social distancing.** Stay 6 feet away from other people. If possible, avoid use of shared site/job trailers. If shared spaces need to be utilized see Field Trailer Cleaning and Disinfection Guide.
- **Bring your own food.** If you can, bring your own food to the site. Avoid restaurants and food trucks to reduce potential exposure.
- **Cover your mouth**. Cover your mouth when you cough or sneeze by using a tissue that you immediately discard into a waste container or cough or sneeze into the inside of your elbow.
- **Wash frequently**. Wash your hands routinely with each change of glove or use hand sanitizer with greater than 60% ethanol or 70% isopropanol. Wash hands or use hand sanitizer after each time you cough or sneeze.
- **Don't touch your face, eyes, mouth**. Avoid touching your face throughout the day.
- **Do not reuse single use PPE.** Do not insert single use ear plugs with gloves on. Disinfect hands and then insert ear plugs.
- **Clean and disinfect.** Carry disinfectant from the EPA list with you and wipe down surfaces you touch prior to starting work and routinely throughout the day, including rental cars and hotel spaces as appropriate.
- **Frequently disinfect common touch points**. Clean and disinfect all supplies (pens, clipboards, etc.), tablets, cellphones, reusable equipment (meters, pumps, etc.), and non-disposable PPE (hardhats, safety glasses, earmuffs) at the end of each day.
- **Take care of your face covering.** When using face coverings, carefully remove, contain after use and launder. See Face Covering Fact Sheet.

Office Reopening

- Staff shall not work in offices that are currently deemed closed. Contact Health & Safety if you have a need to work in a closed office.
- All re-opened offices will be audited to ensure adherence.

- Change and discard gloves routinely and after each time you cough or sneeze (see Fact Sheet, Glove Removal).

- Wash hands or use hand sanitizer with more than 60% ethanol or 70% isopropanol immediately after removing gloves.

- Avoid touching your face (eyes, nose, mouth), even when wearing gloves

https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2

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COVID 19 Policy
What to do if you have been exposed

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HEALTH & SAFETY FACTSHEET

Per CDC: Look for **emergency warning signs*** (trouble breathing, persistent pain or pressure in the chest, new confusion, inability to wake or stay awake, bluish lips or face) for COVID-19. If someone is showing any of these signs, **seek emergency medical care immediately**

*This list is not all possible symptoms. Please call your medical provider for any other symptoms that are severe or concerning to you.

- **Separate and isolate immediately** - If you are at work when notified or at the time of symptom onset, isolate and leave work immediately.
  - **Close Contact**: someone who was within 6 feet of an infected person for a cumulative total of 15 minutes or more over a 24-hour period starting from 2 days before illness onset (or, for asymptomatic patients, 2 days prior to test specimen collection) until the time the patient is isolated.
  - **Symptoms or illness**: fever, cough, sinus pain, reduced or altered sense of smell or taste, expectoration, stuffy nose, chills, repeated shaking with chills, fatigue, sore throat, headache, difficulty breathing, shortness of breath, joint or muscle pain, diarrhea, vomiting.
  - **Positive Test Result (Asymptomatic):** You have received a positive test result. When you receive the result, you are confirmed positive. The day you receive the result will be considered Day 0.
- Contact COVIDHelp@haleyaldrich.com as soon as it is safe to do so.
- A member of the Health & Safety staff will reach out to you to ask:
  - Specific details about your individual case
  - Who you have been in contact with at work
  - Any contact from state contact tracers
  - Project specific information
  - Other

If your state contact tracers contact you, you are obligated to follow their direction. Please record their direction and make this information available to H&S when they call.

Continue to monitor for symptoms (fever, cough, sinus pain, reduced or altered sense of smell or taste, expectoration, stuffy nose, chills, repeated shaking with chills, fatigue, sore throat, headache, difficulty breathing, shortness of breath, joint or muscle pain, diarrhea, vomiting). Seek medical attention if warranted.

HALEY ALDRICH

COVID 19 Policy
What to do if you have been exposed

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HEALTH & SAFETY FACTSHEET

CDC Guidance for Close Contact

- https://www.cdc.gov/coronavirus/2019-ncov/if-you-are-sick/quarantine.html

CDC Guidance for Symptoms

- https://www.cdc.gov/coronavirus/2019-ncov/if-you-are-sick/steps-when-sick.html

CDC Guidance for Positive Test (Asymptomatic)

- https://www.cdc.gov/coronavirus/2019-ncov/testing/diagnostic-testing.html#who-should-get-tested

H&A Policy for Case Management

- Staff members are required to report any close contact, symptoms, or positive test immediately to COVIDHelp@haleyaldrich.com any time that they have or had plans to enter the work environment during their COVID case (2 days prior to symptoms, positive test results, or close contact and 14 days after such time):
  - Any time staff leave their home for work, e.g., working on a project site, working in an H&A office, traveling for work, meeting with a client, etc.
  - They have been in or will be in contact with other staff, clients, sub-contractors or other work parties.
- Staff members are required to work with Health & Safety to detail their case. It is important that Health & Safety notify all potentially contacted parties as soon as possible.
  - Notification will be completely anonymous per privacy laws.
  - Notification will only be made, if there has been close contact, other potential for infection exists, or as required by site specific COVID protocol.
- Staff members are required to work with Health & Safety to quarantine until such time they are cleared to return to work.
  - Health & Safety will review CDC and State requirements for each case to ensure we provide appropriate direction to the staff member.
  - If the staff member is contacted by their state contact tracing program, they are expected to follow their direction, and to contact Health & Safety to share that direction.
  - Staff member will not return to work until approved by Health & Safety.
- H&A may provide a test kit to staff to expedite testing and to shorten quarantine times. These test kits are PCR saliva test kits.
- Due to the variation in state rules and cases, each case may be different as we ensure we address the person's concerns, the state's requirements, and the nature of the case.

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COVID 19 Policy
Face Covering Requirement

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HEALTH & SAFETY FACTSHEET

When entering the work environment, employ the following face covering practices:

- **Face covering is mandatory, unless an approved task specific risk assessment has been done stating it can be removed. 6' of social distancing is also required, the use of face coverings does not preclude you from social distancing.**
- Face coverings are not required when you are alone at your workstation or a task-specific assessment has been completed and approved by H&S.
- If it is a medical mask, ensure the proper side of the disposable covering faces outward. Most disposable coverings have white on the inside and a different color on the outside.
- **Maintain 6 feet social distancing practices**.
- When wearing a face covering, it should:
  - **cover your nose and mouth**
  - **fit snugly** but comfortably against the side of the face
  - **be secured** with ties or ear loops
  - **If it is reusable it should include multiple layers** of fabric
  - **allow for breathing** without restriction
- **Carefully remove face covering.** Be careful not to touch your eyes, nose, and mouth when removing face covering and wash hands immediately after removing.
- **Contain reusable face covering after use**. Have a bag or bin to keep reusable face coverings in until they can be laundered. Disposable face coverings should be disposed after each shift or more frequently if needed.
- **Launder and dry.** Reusable face coverings should be laundered routinely based on frequency of use. Launder in hot water with detergent and dry on a hot cycle.
- **Request reimbursement.** Reusable face coverings are reimbursable for field staff assigned to projects. Disposable face covering are provided in the office or upon request.

- Face coverings are not a substitute for physical distancing, washing hands and staying home when ill.

- Wash hands or use hand sanitizer with more than 60% ethanol or 70% isopropanol immediately after removing face covering.

- Discard face coverings that: No longer cover the nose and mouth; Have stretched out or damaged ties or straps; Cannot stay on the face; Have holes or tears in the fabric.

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COVID 19 Policy
Face Covering Requirement

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HEALTH & SAFETY FACTSHEET

DO

- DO continue to practice social distancing
- DO continue to wash hands routinely
- DO continue to cover your mouth when you sneeze or cough
- DO continue to carry EPA approved disinfectant with you
- DO continue to disinfect pens, tools, clipboards, door handles, cellphones, safety glasses, etc.
- DO use the CDC website as a reference to stay informed and current with COVID-19: https://www.cdc.gov/coronavirus/2019-nCoV/index.html
- DO continue to check on state, local or municipal COVID-19 guidelines and restrictions
- DO continue to check the HANK COVID-19 resource page for updated information: https://hank.haleyaldrich.com/staffcenter/SitePages/COVID-19%20Resources.aspx
- DO contact Health & Safety with questions. Email HealthSafetyHelp@haleyaldrich.com with questions.
- **DO wear your mask to completely cover your nose and mouth.**

DO NOT

- DO NOT come to work if you are sick, have any COVID-19 related symptoms, or have been exposed to someone who is COVID-19 positive or has COVID-19 symptoms in the last 14 days, even if you are wearing a face covering
- DO NOT use the face covering as a replacement for social distancing
- DO NOT forget to clean your reusable face covering after each use or after each day
- DO NOT wear N95 respirators unless you are approved and are up to date with the H&A Respiratory Protection Program
- DO NOT share face coverings, even if cleaned, with another employee
- DO NOT use a face covering as a substitute for a respirator that is required for specific tasks
- DO NOT touch your face or reach under your mask
- **DO NOT wear your face covering on your chin or so that your nose is exposed**
- DO NOT wear an ill-fitting face covering

HALEY ALDRICH

Sub-contractor and Visitor Self-Declaration Form

The safety of our employees, customers, families, and visitors remains Haley & Aldrich's overriding priority. To prevent the spread of COVID-19 and reduce the potential risk of exposure to our employees and others, we are conducting a simple screening questionnaire. Your participation is important to help us take precautionary measures to protect you and everyone at this location.

Haley & Aldrich, Inc. will continue to monitor state and federal requirements and may make updates to our policy as warranted.

Name:	Personal Phone Number (mobile/home):
Company/Organization:	Haley & Aldrich Point of Contact:
Office/Project Site:	

If the answer is "yes" to any of the following questions and question 1a is not checked, access will be denied.

	Self-Declaration
1	Have you tested positive for COVID-19 or has a doctor confirmed you have a case of COVID-19? ☐ Yes ☐ No
1a	If the answer to question 1 is yes, have you been cleared by your doctor to return to work? ☐ I have been cleared to return to work.
2	Have you had close contact with or cared for someone diagnosed with COVID-19 within the last 14 days? ☐ Yes ☐ No
3	Have you experienced any cold or flu-like symptoms (to include fever, cough, sore throat, respiratory illness, difficulty breathing)? If yes, has it been less than 14 days since you experienced those symptoms? ☐ Yes ☐ No

Signature: _____ Date: _____

Note: If you plan to be at this location or project site for consecutive days, the Self-Declaration Form must be completed each day.

Access to location/project site (check one): ☐ Approved ☐ Denied

Revision date: 1/18/2021

COVID 19 Policy
Field Office/Trailer Use

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HEALTH & SAFETY FACTSHEET

- **H&A Field Staff are not allowed to use a shared field office or trailer if:**
  - The occupancy is over the current State allowed limit.
  - It is not possible to maintain 6' of separation at all times.
  - The site is not following strict COVID protocol for physical distancing and mask use.
  - There is poor ventilation.
  - There are no sanitation programs or practices. If H&A employees have work areas in a shared field trailer controlled by others, obtain information from controlling employer on sanitation practices.
- The H&A Site Safety Officers are responsible for cleaning all common areas within a field office or trailer space.
- To clean, use disinfectants found on the EPA list. Disinfecting refers to products that kill germs and lowers the risk of spreading infection. If you are not currently using a disinfectant on these surfaces, please purchase them.
- Labels contain instructions for safe and effective use of the product including precautions you should take when applying the product, such as wearing gloves (Personal Protective Equipment) and making sure you have good ventilation during use of the product. Gloves should be discarded after each cleaning and disinfection.
- Provide disposable disinfecting wipes for staff to use on commonly used surfaces (ex. keyboards, desks, etc.), which can be wiped down by staff at their own workstations. Throw disinfecting wipes away after one use.
- Have hand sanitizer available at your common areas for staff use. Post the WHO Hand Rubbing poster near sanitizers.
- If offices/trailers are not controlled by H&A, we recommend staff wear disposable nitrile gloves while accessing commons spaces (ex. opening doors, copy areas, shared desks) to limit potential exposures in areas controlled by others.

Routinely clean (at least once per day) and disinfect all frequently touched surfaces in the workplace such as desktops, refrigerators, microwaves, coffee makers, doorknobs, etc.

Use approved cleaners and disinfectants as directed. Ensure proper personal protective equipment is used. Throw away disposable items after each use such as gloves and disinfecting wipes.

Provide hand sanitizers, soap, and disinfectants to employees, business partners, and visitors for personal use, and encourage everyone to clean their desks, phones, cell phones, chairs, etc.

HALEY ALDRICH

COVID 19 Policy
Field Office/Trailer Use

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HEALTH & SAFETY FACTSHEET

- EPA has an approved list of cleaners and disinfectants for the coronavirus that causes COVID-19.
- Many are common cleaners and disinfectants that may already be used in our offices, project sites, and in your homes.
- Check the updated list here:

https://www.epa.gov/pesticide-registration/list-n-disinfectants-coronavirus-covid-19

To assist in managing project office/trailer cleaning and disinfection, we have reserved this space for location specific information.

Hand sanitizer, cleaners, and disinfectants used at this location and where they can be found *(Insert items being used):*

Schedule of cleaning and disinfection practices (*Insert practices for this location*):

HALEY ALDRICH

Project Shutdown/Suspension Covid-19

To be completed by Project Manager.

Please be sure to include a copy of the contract controlling the project when submitting this form via email.

If your project is shut down and/or suspended please provide the following information.

Reason for project interruption/shut down:

_____ Due to governmental action (e.g., 6 Bay Area counties' "Shelter In Place").

_____ By the client because of Covid-19.

_____ Other, Please describe: _____

Client Name: _____

Project Name and Number: _____

Name of CL and MSL: _____

Names of subcontractors or subconsultants.

Description of the client's method of notification (phone call, email from client, etc.)**.**

Description of the extent of the shutdown or suspension. For example: Is it limited to field work?

Please email this completed form back to Pat McKee (Legal) at pmckee@haleyaldrich.com.

Thank you.

COVID 19 Policy
Roles & Responsibilities

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HEALTH & SAFETY FACTSHEET

ALL STAFF MEMBERS

- Accountable for complying with all general COVID policy included in the COVID documents, and for all Office specific requirements identified in the office specific HASP.
- Accountable for submitting a self-declaration form via Gensuite prior to any entry into Haley & Aldrich work environment, office or project site.
- Accountable for cleaning and disinfecting their space at least twice per day and more routinely if necessary.
- Accountable for cleaning and disinfecting common touch points in the office prior to and after using them (e.g., door handles, railings).
- Accountable for helping clean/disinfect common surfaces in the office at least twice per day and more routinely if possible.

COVID RESPONSE LEADER

- Overall accountability for the COVID response within the office.
- Work with H&S to develop an effective Office COVID Health and Safety Plan (HASP) and continue to work with H&S to check and adjust the plan as needed.
- Responsible for monitoring local conditions to identify if local cases begin to rise, if there are changes to government orders, or issues with execution of the Office COVID HASP that would require Haley & Aldrich to consider re-closing the office.
- Work with the COVID Coordinator to identify weaknesses in the plan, the execution, and staff compliance and make corrections as needed.
- Support the COVID Coordinator in correcting staff behavior when necessary.
- Primary liaison with the General Manager and H&S on all COVID issues.
  - Report issues with the plan or the execution of the plan.
  - Report local concerns, changes in government orders, and COVID related case concerns.
  - Work with the GM and H&S to make on-going determinations to move forward in opening the office or step back.
- The COVID Response Leader does not need to be in the office on a daily basis.

To review all HASPs related to COVID-19, go to the HANK Health and Safety page. On the right-hand side, you will find links to the COVID resources.

All Office HASPs can be found by clicking on the “COVID-19” green button and then clicking on the “Click Here” link to the right of the title.

COVID-19
STAFF CENTER RESOURCES

COVID-19

OFFICE HASPS
POLICY DOCUMENTS
LEGAL INFORMATION
FACT SHEETS
POSTING COMMUNICATIONS

Office Health & Safety Plans: Click here

HALEY ALDRICH

COVID 19 Policy
Roles & Responsibilities

Safety
in everything we do

HEALTH & SAFETY FACTSHEET

COVID RESPONSE COORDINATOR

- Overall accountability for the daily execution of the COVID response within the office
- Works with the COVID Response Leader and H&S to develop the Office COVID Health and Safety Plan (HASP) and continue to work with the COVID Response Leader and H&S to check and adjust the plan as needed.
- Responsible for printing, completing and posting all signs and notices identified in the HASP.
- Responsible for checking that staff have filled out the daily self-declaration before entering the office. Staff who have not completed the declaration will not be allowed in the office.
- Responsible for performing the weekly audit to ensure the HASP is being executed properly and staff are compliant with expectations.
- Responsible for daily checks to ensure postings are still up and legible, hand sanitizer is available, and cleaning supplies are sufficiently stocked.
- Responsible for daily checks to ensure the HASP is being executed as planned.
- The COVID Coordinator does need to be in the office at least 3 days per week.

HALEY ALDRICH

APPENDIX B
JOB SAFETY ANAYLSES

Safety
in everything we do

INSERT PROJECT NAME

KEY TASK ENTER TASK NUMBER.**:** ENTER TASK NAME.

Subtask Category	Potential Hazards	Controls
Enter subtask information.	Choose category.	• Enter control(s) for each hazard.
Enter subtask information.	Choose category.	• Enter control(s) for each hazard.
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