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September 15, 2026
File No.: 41.0163350.00

Steven Wu
Project Manager
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 2
47-40 21st Street, Long Island City, NY 11101

Re: Supplemental Remedial Investigation Work Plan No. 4
161-03 29th Avenue Site
161-03 29th Avenue, Flushing, NY 11358
Block 4889, Lots 60, 61, 62, and 63
BCP Site No. C241247

Dear Mr. Wu:

On behalf of the 16103-11 29th Avenue, LLC (Applicant/Owner), Goldberg-Zoino Associates of New York P.C. d/b/a GZA GeoEnvironmental of New York (GZA) is pleased to submit this Supplemental Remedial Investigation Work Plan (SRIWP) No. 4 for the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) Site No. C241247. The property is located in 16103 29th Avenue, Flushing, NY (Site) and identified as Block 4889, Lots 60, 61, 62 and 63 in the Queens County Tax Map. A Site Location Plan is attached as **Figure 1**.

OBJECTIVES

The objective of this SRIWP No. 4 is to provide additional groundwater and soil vapor data to delineate the extent of contaminant concentrations and provide sufficient quantity of qualified data to support the proposed remedial alternative for the Site. We prepared this SRIWP scope of work to incorporate the comments provided in the NYSDEC Letter dated February 12, 2026, and June 9, 2026, and our subsequent meeting and correspondence.

PROJECT BACKGROUND

The Site is comprised of four contiguous parcels as defined in the BCP Agreement, and are described below:

Address	Block and Lot	Zoning District	Parcel Size	Current Use
161-01 29th Avenue	Block 4889, Lot 63	Low Density Residential (R3-2) and Commercial Overlays (C1-3)	0.053 acres	2-story mixed residential and commercial (Bean House) building.
161-03 29th Avenue	Block 4889, Lot 62		0.053 acres	2-story mixed residential and commercial (Bowne Chemists) building.
161-05 29th Avenue	Block 4889, Lot 61		0.052 acres	2-story mixed residential and commercial (House of Strains) building.
161-07 29th Avenue	Block 4889, Lot 60		0.051 acres	2-story mixed residential and commercial (CNL Nails and Spa) building.

The Site contains six contiguous 2-story mixed-use buildings with discrete basements and a shared rear yard located at northern portion of the property. According to the Phase I Environmental Site Assessment (ESA) Merritt Environmental Consulting Corp. (Merritt) dated November 2019, one of the commercial tenant space (161-03 29th Avenue) was occupied by a dry cleaner/laundry practice from 1934 to 2014. The drycleaner had reportedly generated spent perchloroethylene (PCE) in 2007. The Phase I ESA also noted that one 1,500-gallon underground storage tank (UST) registered under petroleum bulk storage (PBS) Site No. 2-613172 was reportedly closed-in-place and filled with sand around March 2002.

In December 2019, a due diligence investigation performed by Merritt at the Site identified chlorinated volatile organic compounds (cVOCs) and petroleum hydrocarbons in soil and groundwater. NYSDEC assigned Spill Case No. 1911712. By June 2020, the reported closed-in-place UST was uncovered and removed from the Site. Evidence of discharge, visual/olfactory signs of petroleum impact and elevated photoionization detector (PID) readings for VOCs, were observed during the 2020 tank removal. The UST area was excavated and twelve documentation endpoint soil samples collected and analyzed were reportedly below applicable standards. NYSDEC closed the Spill Case on September 30, 2020.

The December 2019 due diligence investigation, which included a sump sampling and indoor air quality investigation by Merritt, identified elevated PCE concentrations in indoor air samples which correlated with the PCE shallow groundwater impacts. On July 29, 2020, the NYSDEC in coordination with the New York State Department of Health (NYSDOH), issued a letter to the Owner that the Site was deemed a potentially inactive hazardous waste disposal site, under Environmental Conservation Law (ECL) 27-1305 (a), and required further investigation. On March 9, 2021, the Owner entered as an Applicant in the Brownfield Cleanup Program (BCP) under NYSDEC BCP Site No. C241247.

Supplemental Remedial Investigations (SRI) continued in November 2021 (SRI No. 1) by Castleton Environmental (Castleton), March 2022 (SRI No. 2) by Seacliff Environmental Geology PC (Seacliff) , and November 2024 (SRI No. 3) by GZA. The November 2021 SRI No. 1 by Castleton indicated that elevated concentrations of cVOCs were detected at slightly elevated concentrations in the sub-slab soil vapor and indoor air samples. The March 2022 SRI No. 2 by Seacliff indicated that subsurface soil did not show cVOCs impacts. One shallow groundwater sample from the rear (northern) yard monitoring well indicated elevated concentrations of PCE, trichloroethylene (TCE), and other PCE degradation products. The November 2024 SRI No. 3 by GZA indicated that subsurface soil did not show cVOCs impacts. Elevated cVOCs impacts were noted in at least one shallow groundwater sample from the northern rear yard. On February 12, 2026, in a letter to the Applicant, the NYSDEC recommended the installation of additional delineation monitoring wells to the west of the Site (i.e. along 161st Street sidewalk).

Because of the results of the November 2021 SRI No. 1 by Castleton, and as a requirement of the BCP, an Interim Remedial Measure (IRM) was implemented to address potential soil vapor intrusion into the existing building. In June 2023, a sub-slab depressurization system (SSDS) was installed at the Site (i.e., manifolded within the basements of 161-01, 161-03 and 161-05 29th Avenue) and continues to operate. On February 12, 2026, in a letter to the Applicant, the NYSDEC and NYSDOH recommended additional on-site soil vapor sampling at the (northern) rear yard and off-site soil vapor intrusion sampling within neighboring residences during the 2026-2027 heating season.

CONCEPTUAL MODEL OF SITE CONTAMINATION

The previous environmental assessments noted the former UST location as an area of concern. Subsequent delineation endpoint soil analytical results report concentrations below applicable standards. This area of concern was addressed to the satisfaction of NYSDEC and the Spill Case 1911712 was closed by NYSDEC on September 30,

2020. However, a groundwater sample collected from one shallow permanent monitoring well, B-9, showed concentrations of one petroleum VOC in slightly in excess of applicable groundwater standards which is indicative of residual petroleum contamination at this well location.

The previous environmental assessments noted that the historic use of the Site (i.e. at 161-03 29th Avenue) as a dry cleaner (Rose Garden Cleaners from 1973 to 2014) as an area of concern which may have contributed to the chlorinated VOCs contamination in the groundwater and soil vapor. The March 2022 SRI No.2 and November 2024 SRI No. 3 results showed vertical delineation as cVOCs impacts were focused in shallow wells (i.e. wells that were set at 15 feet below ground surface [bgs]), Furthermore, the November 2024 SRI No. 3 showed that elevated cVOCs impacts were mainly concentrated at the wells immediately adjacent to the Site building (MW-02A and B7). Greatly reduced cVOCs concentrations at the peripheral wells were observed, thereby providing groundwater delineation impacts to the north, east, and south of the Site. However, NYSDEC recommended additional groundwater delineation samples to the west.

The November 2021 SRI No. 1 indicated that elevated concentrations of cVOCs were detected at slightly elevated concentrations in the sub-slab soil vapor and indoor air. This prompted the installation of the SSDS as an IRM in June 2023. Although the SSDS is functioning as intended within the three basements, additional on-site soil vapor sampling at the (northern) rear yard and off-site soil vapor intrusion sampling within the neighboring residences are recommended by the NYSDEC.

SUPPLEMENTAL REMEDIAL INVESTIGATION WORK PLAN

Based on our discussion and our subsequent correspondence, we recommend that the SRIWP No. 4 be implemented in two phases as follows:

1ST Phase

- Installation of (2) permanent monitoring wells (designated as MW-05 to MW-06) to 15 feet bgs within the 161st Street sidewalk. Pre-clear the locations with a geophysical survey;
- Survey the newly installed permanent monitoring wells and perform synoptic groundwater gauging of the existing shallow wells (MW-02A, B-6, B-7, B-8, and B-9) and the two newly installed wells (MW-05 and MW-06);
- Collect and analyze groundwater samples from the newly installed wells (MW-05 and MW-06);
- Advance three (3) additional soil vapor probes in the northern portion of the Site, along the perimeter (designated SV-05 to SV-07), to 5 feet bgs to collect and analyze soil vapor samples.

The proposed locations of the monitoring wells and soil vapor probes are shown on **Figure 2**. During ground intrusive activities, continuous, real-time air monitoring for VOCs and particulate levels at the perimeter of the work area will be performed in accordance with Community Air Monitoring Plan (CAMP) and Health and Safety Plan (see **Health and Safety** discussion below). The results of the 1st Phase of SRI No. 4 will be evaluated prior to implementation of the 2nd Phase summarized below.

2ND Phase

- Solicit approval from adjacent properties to conduct indoor air sampling during the 2026-2027 heating season for soil vapor intrusion evaluation.

- If authorized access is granted, collection and analyses of up to eight (8) off-site indoor air and co-located sub-slab vapor samples from the adjacent properties lowest level. An ambient outdoor air sample will also be collected.

- Building questionnaire/product inventory forms will be filled out for each off-site property to document potential indoor air sources.

The proposed off-site indoor air sample locations are shown on **Figure 3**. A summary of proposed sample locations is included in **Table 1**.

Monitoring Well Installation and Survey

In accordance with the project Quality Assurance Project Plan (QAPP) included in **Appendix A**, the permanent monitoring wells will be comprised of two-inch diameter PVC that will be installed to a maximum depth of approximately 15 feet bgs. Prior to drilling, we will pre-clear the location with a geophysical survey. Each well will consist of a 2-inch diameter solid PVC riser and at least 10 feet of 0.02-inch slotted PVC well screen with the screened interval (5-15 feet bgs) designed to span across the water table to detect petroleum sheens or light non-aqueous phase liquids (LNAPL). A 2-foot bentonite plug will be placed above the filter pack. The remaining annular space will be filled with bentonite. The wells will be completed with a flush-mount manhole and locking cap at current sidewalk grade. An example monitoring well construction log is provided in **Appendix D**.

The permanent monitoring wells will be developed using a submersible pump equipped with dedicated high-density polyethylene (HDPE) tubing to remove fine materials generated during well installation activities. The groundwater will be pumped until it was nearly free of turbidity (i.e., <20 NTU), or 5 well volumes has been removed. The development water and soil cuttings will be containerized in 55-gallon drums and characterized for off-site disposal.

A New York State licensed surveyor will identify the locations and elevations of each of the two newly installed permanent monitoring wells. The surveyor will provide the Northing and Easting coordinates relative to the North American Datum of 1983 (NAD 83), NY Long Island Zone, and elevations in hundredth of a foot based upon the North American Vertical Datum of 1983 (NAVD 88).

Groundwater Gauging and Sampling

GZA will return to the Site one week after well development to collect synoptic groundwater measurements at existing shallow wells (MW-02A, B-6, B-7, B-8, and B-9) and the two newly installed wells (MW-05 and MW-06). The water level will be measured using an electronic oil-water interface probe to measure the groundwater depth and detect for the presence of LNAPL in the well. The data will be utilized to prepare an updated groundwater contour map.

GZA will then collect groundwater samples from the new wells (MW-05 and MW-06) as shown on **Figure 2**. Prior to sampling each monitoring well, the headspace will be measured using a PID. GZA will purge the monitoring wells in accordance with EPA low-flow sampling techniques, by purging at least three well volumes of groundwater, or until the water quality parameters become stabilized for three consecutive readings collected 3 to 5 minutes apart. Purging will be performed with the pump intake placed at approximately 3 feet above the bottom of the well screen. Field water quality and gauging measurements will be documented during sampling. An example well purge log is included in **Appendix D**.

A groundwater sample will then be collected from each monitoring well utilizing dedicated HDPE tubing and pump. Each groundwater sample will be transferred directly from the sampling equipment to laboratory provided sample bottles. The groundwater monitoring wells will be sampled for the following:

- Target Compound List (TCL) VOC plus 10 Tentatively Identified Compounds by EPA Method 8260;
- TCL SVOC plus 20 TICs, including 1,4-dioxane by EPA Method 8270;
- Total and dissolved Target Analyte List (TAL) Metals by EPA Method 6010C/6020/7471B;
- Total Cyanide by EPA method 9010/9012;
- Mercury by EPA method 7471;
- Pesticides by EPA Method 8081/ PCBs by EPA Method 8082A and Herbicides by EPA method 8151; and
- Per- and poly fluoroalkyl substances by EPA Method 1633.

Groundwater purge water collected during sampling will be drummed for off-site disposal with the well development water.

Vapor Probe Installation and Soil Vapor Sampling

Three soil vapor probes (identified as SV-05, SV-06, and SV-07) will be installed at the northern rear yard area as shown in **Figure 2**. Soil vapor samples will be collected using a stainless-steel probe, consisting of a drive point and internal perforated sampling port with a retractable tip, connected to Teflon™ sampling tubing. Soil vapor samples will be collected using batch pre-cleaned, laboratory-supplied, 6-liter sample canisters over a 2-hour duration. Flow rate for sampling will not exceed 0.2 L/min.

Samples will be collected in accordance with the Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH SVI Guidance dated October 2006 as amended May 2017). A sample log sheet will be maintained summarizing sample identification, date and time of sample collection, sampling location, identity of samplers, sampling methods and devices, sample volumes, vacuum of canisters before and after the samples are collected, and chain of custody protocols. The soil vapor samples will be analyzed for the following:

- VOCs by EPA method TO-15.

Soil vapor probes will be removed from the ground after the samples have been collected.

Off-site Indoor Air / Soil Vapor Intrusion Sampling

In coordination with NYSDEC and NYSDOH, GZA will solicit approval from adjacent property owners to conduct indoor air sampling during the 2026-2027 heating season (i.e., between November 15th to March 31st) for soil vapor intrusion evaluation.

GZA will perform a pre-sampling inspection to evaluate the physical layout and condition of the building and to evaluate conditions that may affect or interfere with the sampling.

Eight (8) off-site co-located indoor air samples(identified as Off-IA-01 to Off-IA-08) and sub-slab soil vapor samples (identified as SVI-01 to SVI-08) will be collected at the adjacent properties' lowest level (e.g. crawl space, basement, etc.) as shown on **Figure 3**. Should a property owner deny the sub-slab sample due to a vapor barrier present or other reason, only indoor air samples will be collected. An ambient outdoor air (Off-OA-01) sample will also be collected.

Samples will be collected using batch pre-cleaned, laboratory-supplied, 6-liter sample canisters over a 24-hour duration as per NYSDOH SVI guidance for residential settings. The air samples will be submitted for analysis of volatile organic compounds (VOCs) by analytical EPA Method TO-15. Flow rate for sampling will not exceed 0.2 L/min. Indoor air samples will be collected 3-5 feet above the ground to represent the breathing zone. A sample log sheet will be maintained summarizing sample identification, date and time of sample collection, sampling location, identity of samplers, sampling methods and devices, sample volumes, vacuum of canisters before and after the samples are collected, and chain of custody protocols. The sample log sheet is included in **Appendix D**.

Quality Assurance/Quality Control Procedures

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 to document that samples are representative of actual conditions at the Site. 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 samples (field and trip blanks, duplicates, etc.) will be collected by GZA and analyzed at an ELAP-certified laboratory. QA/QC samples will be collected at the frequency outlined in the **Appendix A – Quality Assurance Project Plan**.

Data Management and Validation

GZA will subcontract with a third-party quality assurance company that will develop the Data Usability Summary Report (DUSR) in accordance with *DER-10 Appendix 2B* for laboratory data that will be relied upon from:

- The NYSDEC Analytical Services Protocol (ASP) Category B Data Deliverable; or
- The EPA Contract Laboratory Program National Functional Data Validation Standard Operating Procedures for Data Evaluation and Validation.

The DUSR's primary objective is to evaluate whether or not the data from the remedial investigation, as presented, meets the site/project specific criteria for data quality and data use. The NYSDEC requires that the development of the DUSR must be conducted by an experienced environmental scientist, such as the project Quality Assurance Officer, who is fully capable of conducting a full data validation.

HEALTH AND SAFETY

The CAMP will provide for air monitoring during intrusive activities to ensure proper protections were employed to protect workers and the neighboring community. CAMP will be implemented with handheld meters. CAMP data summary tables will be delivered to the NYSDEC and NYSDOH on a daily basis and any exceedances of CAMP action levels and corrective measures taken will be reported to NYSDEC and NYSDOH immediately (within 24 hours); in addition to inclusion in daily reports. The CAMP is included in **Appendix B**.

This SRIWP includes a Health and Safety Plan (HASP) which will be implemented during the Site Supplemental RI work to protect worker safety. The Site Safety Coordinator will document compliance of the HASP in accordance with applicable health and safety laws and regulations. All field personnel involved in investigation activities will participate in training required under OSHA HAZWOPER 29 CFR 1910.120, including 40-hour hazardous waste operator training and annual 8-hour refresher training. Emergency telephone numbers will be posted at the site location before any work begins. A safety meeting will be conducted before each shift begins. Topics to be

discussed include task hazards and protective measures (physical, chemical, environmental); emergency procedures; PPE levels and other relevant safety topics including a highlighted route map to the nearest hospital/emergency room. The HASP is included in **Appendix C**.

REPORTING

Upon completion of the field activities, GZA will prepare a Final Remedial Investigation Report (RIR) to document the findings of the investigations performed to date at the Site. The RIR will be consistent with the specifications presented in the DER-10 document and will include:

- An executive summary;
- A site description and history;
- Summary information regarding previous investigations and remedial work performed at the Site;
- Descriptions of field activities performed;
- A summary of pertinent field observations, field measurements, and laboratory analytical data summarized in tabular format - analytical results will be compared to appropriate NYSDEC guidance and standards; Plan view and cross-section figures presenting laboratory analytical data and field observations of subsurface impacts.
- A qualitative human health risk assessment which assesses the sources of impact, on and off-site human and ecological receptors, and exposure pathways;
- A data usability review and DUSRs for the laboratory data collected during the Supplemental RI work;
- An integration of field observations and measurements with laboratory analytical data to evaluate the nature and extent of impacts and to develop a site conceptual model of potential contaminant migration; and
- A set of conclusions for the investigation, and recommendations.

Should you have questions, please contact Victoria Whelan at (631) 793-8821 or Victoria.whelan@gza.com.

Very truly yours,

GZA GEOENVIRONMENTAL OF NEW YORK

Reinbill P. Maniquez, CHMM
Senior Project Manager

Michael Morris
Consultant Reviewer

Victoria Whelan, P.G.
Associate Principal

ATTACHMENTS

Table 1: Sample Collection Summary

Figure 1: Site Location Plan
Figure 2: 1st Phase Proposed Sample Locations
Figure 3: 2nd Phase Proposed Sample Locations

Appendix A: Quality Assurance Project Plan
Appendix B: Health and Safety Plan
Appendix C: Community Air Monitoring Plan
Appendix D: Field Investigation and Sampling Forms

TABLE

Table 1 - Sample Collection Summary
Supplemental Remedial Investigation Work Plan No. 4

161-03 29th Avenue
Flushing, New York 11388
BCP Site Nos. C241247

GZA Sample ID	Location	Approximate well screened Interval (ft bgs)	VOCs	SVOCs	Pesticides	Herbicides	PCBs	PFAS	TAL Metals (total / dissolved)	1,4 Dioxane
Groundwater Samples										
MW-05	At eastern sidewalk of 161st Street.	5-15	X	X	X	X	X	X	X	X
MW-06	At western sidewalk of 161st Street.	5-15	X	X	X	X	X	X	X	X
DUP + QA/QC			X	X	X	X	X	X	X	X

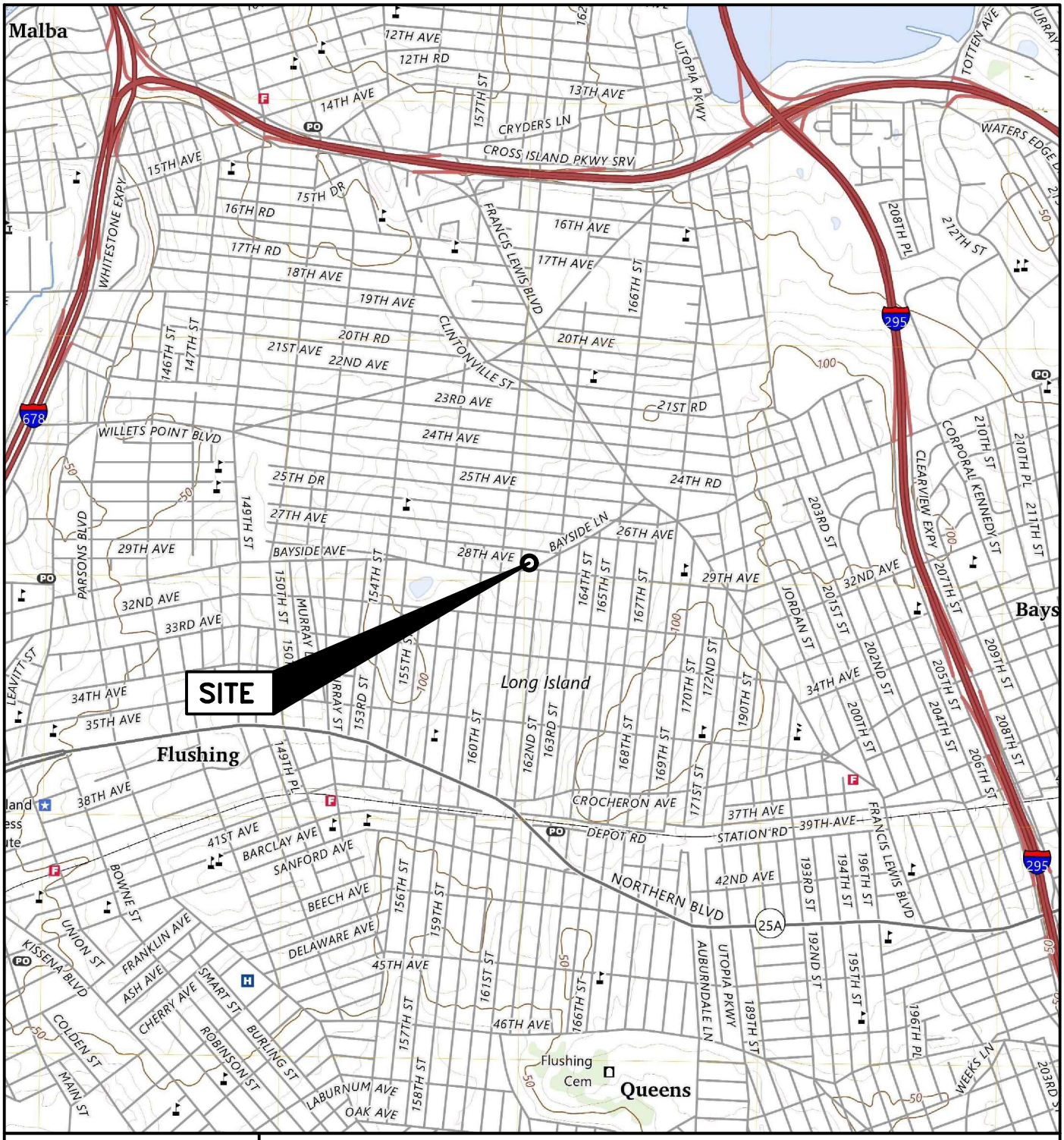
GZA Sample ID	Location	Sample Depth	VOCs - TO-15
Soil Vapor Samples		**(ft bgs)**	
SV-05	Northwest boundary of the site	5	X
SV-06	Northern boundary of the Site	5	X
SV-07	Northeeastern boundary of the Site	5	X
DUP	-	-	X

GZA Sample ID	Location (Block and Lot)	Sample Depth	VOCs - TO-15
Offsite Indoor Air / Soil Vapor Intrusion Samples*			
Off-IA-01	Block 4888 Lot 1	3 ft ags	X
SVI-01		3 ft bgs	X
Off-IA-02	Block 4888 Lot 25	3 ft ags	X
SVI-02		3 ft bgs	X
Off-IA-03	Block 4888 Lot 23	3 ft ags	X
SVI-03		3 ft bgs	X
Off-IA-04	Block 4889 Lot 27	3 ft ags	X
SVI-04		3 ft bgs	X
Off-IA-05	Block 4889 Lot 29	3 ft ags	X
SVI-05		3 ft bgs	X
Off-IA-06	Block 4889 Lot 31	3 ft ags	X
SVI-06		3 ft bgs	X
Off-IA-07	Block 4889 Lot 32	3 ft ags	X
SVI-07		3 ft bgs	X
Off-IA-08	Block 4889 Lot 34	3 ft ags	X
SVI-08		3 ft bgs	X
Off-OA-01	Outdoor Air	3 ft ags	X
DUP - Off IA	-	3 ft ags	X
DUP - SVI	-	3 ft bgs	X

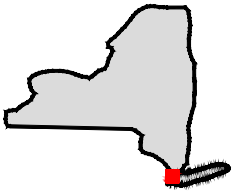
*Eight (8) off-site co-located indoor air samples(identified as Off-IA-01 to Off-IA-08) and sub-slab soil vapor samples (identified as SVI-01 to SVI-08) will be collected at the adjacent properties' lowest level (e.g. crawl space, basement, etc.). Should a property owner deny the sub-slab sample due to a vapor barrier present or other reason, only indoor air samples will be collected.

ft	feet
ags	above ground surface
bgs	below ground surface
MW	monitoring well
SV	Soil Vapor
SVI	Soil vapor intrusion
VOCs	Volatile Organic Compounds.
SVOCs	Semivolatile Organic Compunds.
PCBs	Polychlorinated Biphenylss
TCL	Target Compound Lists
TAL	Target Analyte Lists
PFAS	Per - and Polyfluoroylalkyl Substances
DUP	Duplicate
QA/QC	Quality Assurance Quality Control

FIGURES



NEW YORK



QUADRANGLE LOCATION

SOURCE:

USGS TOPOGRAPHIC MAPS: FLUSHING, NY (2023). CONTOUR INTERVAL 10FT., NAVD-1988, ORIGINAL SCALE 1:24,000 (1IN.=2,000FT.).

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161-03 29TH AVE, FLUSHING, NY 11358

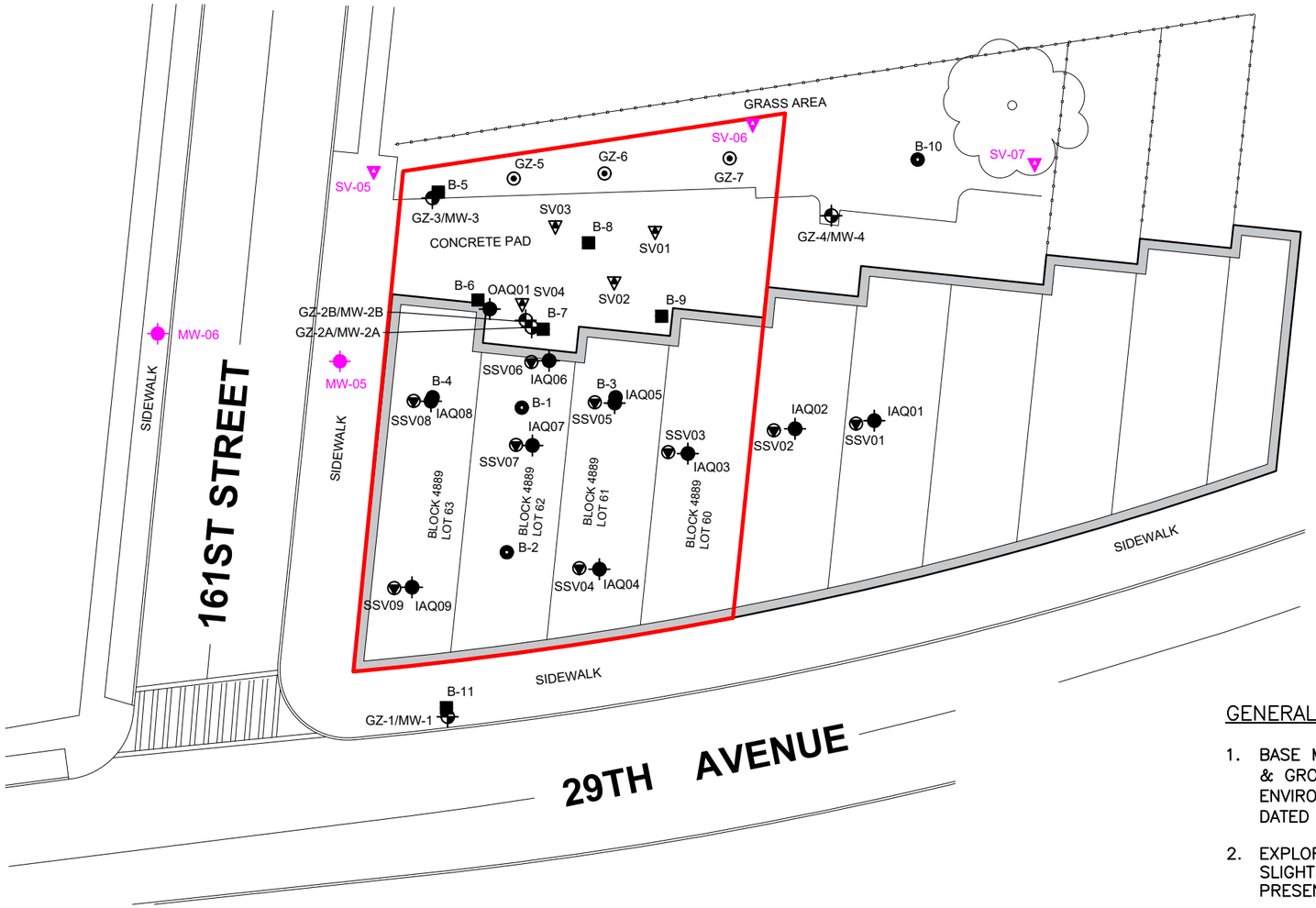
PREPARED BY:
GZA GeoEnvironmental of NY
Engineers and Scientists
www.gza.com

PREPARED FOR:
. 16103 29TH AVENUE LLC

SITE LOCATION MAP

PROJ MGR: RM	REVIEWED BY: RM	CHECKED BY: VW	FIGURE 1
DESIGNED BY: LWC	DRAWN BY: LWC	SCALE: 1"=2000'	
DATE: SEPT 2026	PROJECT NO. 41.0163350.00	REVISION NO. -	SHEET NO. 1 OF 1

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GZA–J:\Active 163300 to 163399\163350.00 – Procida 161–01 29th Ave BCP\Drawings\GZA CAD\41.0163350.00_recover.dwg [FIG 1 Site Location Map] December 17, 2024 – 3:34pm laiwa.chu



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0 15 30 60
SCALE IN FEET

GENERAL NOTES

1. BASE MAP DEVELOPED FROM DRAWING TITLED "PROPOSED SOIL & GROUNDWATER SAMPLE LOCATIONS", PREPARED BY "SEACLIFF ENVIRONMENTAL GEOLOGY PC", ORIGINAL SCALE NOT TO SCALE, DATED 7/5/23.
2. EXPLORATION LOCATIONS ARE APPROXIMATE AND MAY ADJUSTED SLIGHTLY IN THE FIELD DEPENDENT ON SITE ACCESS AND PRESENCE OF SUBSURFACE ANOMALIES.

LEGEND

- BCP SITE BOUNDARY
- IAQ01 — INDOOR AIR SAMPLE LOCATION (NOV. 2021 SRI NO. 1)
- OAQ01 — OUTDOOR AIR SAMPLE LOCATION (NOV. 2021, SRI NO. 1)
- SSV01 — SUB-SLAB VAPOR SAMPLE LOCATION (NOV. 2021, SRI NO. 1)
- SV01 — SOIL VAPOR SAMPLE LOCATION (NOV. 2021, SRI NO. 1)
- B-5 — SOIL BORING AND EXISTING 1-INCH MONITORING WELL (MAR. 2022, SRI NO. 2)
- B-1 — SOIL BORING LOCATION (MAR. 2022, SRI NO. 2)
- GZ-1/MW-1 — SOIL BORING AND 2-INCH MONITORING WELL LOCATION (NOV. 2024, SRI NO. 3)
- GZ-5 — SHALLOW SOIL BORING LOCATION (NOV. 2024, SRI NO. 3)
- MW-05 — PROPOSED 2-INCH MONITORING WELL LOCATION
- SV-05 — PROPOSED SOIL VAPOR SAMPLE LOCATION

NO.	ISSUE/DESCRIPTION	BY	DATE

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161-03 29TH AVENUE
BCP NO C241247

1st PHASE PROPOSED SAMPLE LOCATIONS
SUPPLEMENTAL REMEDIAL INVESTIGATION NO. 4

PREPARED BY:	PREPARED FOR:		
GZA GeoEnvironmental of NY Engineers and Scientists www.gza.com	PROCIDA MANAGEMENT INC. 16103-11 29TH AVENUE LLC		
PROJ MGR: BM	REVIEWED BY: RM	CHECKED BY: VW	FIGURE
DESIGNED BY: BM	DRAWN BY: PM	SCALE: 1"=30'	2
DATE: SEPT 2026	PROJECT NO. 41.0163350.00	REVISION NO. -	SHEET NO. 1 OF 1

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LEGEND

- BCP SITE BOUNDARY
- SVI-1 — PROPOSED OFFSITE SUB-SLAB SOIL VAPOR SAMPLE
- OFF-IA-01 — PROPOSED OFFSITE INDOOR AIR SAMPLE
- OFF-OA-01 — PROPOSED OFFSITE OUTDOOR AIR SAMPLE

GENERAL NOTES

1. BASE MAP DEVELOPED FROM NYC PLANNING, MAP PLUTO 25V4. JANUARY 2026 AND NYS GIS DATA, NYS BUILDING FOOTPRINTS.
2. EXPLORATION LOCATIONS ARE APPROXIMATE AND MAY ADJUSTED SLIGHTLY IN THE FIELD DEPENDENT ON SITE ACCESS AND PRESENCE OF SUBSURFACE ANOMALIES.
3. EIGHT (8) OFFSITE CO-LOCATED INDOOR AIR SAMPLES (identified as Off-IA-01 to Off-IA-08) AND SUB-SLAB SOIL VAPOR SAMPLES (identified as SVI-01 to SVI-08) WILL BE COLLECTED AT THE ADJACENT PROPERTIES' LOWEST LEVEL (e.g. crawl space, basement, etc.). SHOULD THE PROPERTY OWNER DENY THE SUB-SLAB SAMPLE DUE TO A VAPOR BARRIER PRESENT OR OTHER REASON, ONLY INDOOR AIR SAMPLES WILL BE COLLECTED .

N W E S

0 25 50 100

SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

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161-03 29TH AVENUE
BCP NO C241247

2nd PHASE PROPOSED SAMPLE LOCATIONS
SUPPLEMENTAL REMEDIAL INVESTIGATION NO. 4

PREPARED BY: GZA GeoEnvironmental of NY Engineers and Scientists www.gza.com	PREPARED FOR: PROCIDA MANAGEMENT INC. 16103-11 29TH AVENUE LLC

PROJ MGR: BM	REVIEWED BY: RM	CHECKED BY: VW	FIGURE 3
DESIGNED BY: BM	DRAWN BY: PM	SCALE: 1"=50'	
DATE: SEPT 2026	PROJECT NO. 41.0163350.00	REVISION NO. -	SHEET NO. 1 OF 1

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APPENDIX A

QUALITY ASSURANCE PROJECT PLAN



Known for excellence.
Built on trust.

QUALITY ASSURANCE PROJECT PLAN (QAPP)

161-03 29th Avenue, Flushing, NY 11358
Block 4889, Lots 60, 61, 62, and 63
BCP Site No. C241247

April 2026

PREPARED FOR:
16103-11 29th Avenue, LLC
c/o Procida Management
16103 29th Avenue │Flushing , NY 11358

PREPARED BY:
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104 West 29th Street, 10th Floor
New York, NY 10001

File No. 41.0163550.00

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1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP) presents the organization, objectives, planned activities, and specific quality assurance/quality control (QA/QC) procedures associated with the Remedial Investigation (RI) at the at 161-03 29th Avenue, Flushing, NY(Site).

This QAPP/FSP describes specific protocols for field sampling, sample handling and storage, chain-of-custody, laboratory analysis, and data handling and management. Preparation of the Plan was based on EPA Quality Assurance Project Plan guidance documents, including:

EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5, March 2001); and

Guidance for Quality Assurance Project Plans (EPA QA/G-5, December 2002).

The data generated from the analysis of samples will be used to determine the extent of contamination, identify impacted targets, and to compare the results of the remedial actions to site-specific cleanup goals. Potential parameters to be analyzed, including their respective quantitation limits (QLs), and data quality levels (DQLs), are provided in **Tables 1A through 1C**.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

A qualified person will coordinate and manage the Site sampling and analysis program, data reduction, QA/QC, data validation, analysis, and reporting. Victoria Whelan P.G. is a qualified environmental professional (QEP), as defined by the New York State Department of Environmental Conservation (NYSDEC) and will direct the sampling activities and coordinate laboratory and drilling activities. The intent of this QAPP/FSP is to be performed the RI in accordance with the technical guidance applicable to Technical Guidance for Site Investigation and Remediation (DER-10), and Sampling, Analysis and Assessment of Per- and Polyfluoroalykly Substances (PFAS) under NYSDEC's Part 375 Remedial Programs dated April 2023.

A qualified person will ensure that the QA/QC plan is implemented and will oversee data validation. GZA's Senior Technical Specialist, Dr. Chunhua Liu will provide oversight and technical support for the sampling and analytical procedures followed acting as the project QA Officer. This individual has the broad authority to approve or disapprove project plans, specific analyses, and final reports. The QEP is independent from the data generation activities. In general, the QA officer will be responsible for reviewing and advising on all QA/QC aspects of this program.

Laboratories used will be New York State Department of Health Environmental (NYSDOH) Laboratory Approval Program (ELAP) certified laboratories. The laboratories will communicate directly with the sampler regarding the analytical results and reporting and will be responsible for providing all labels, sample containers, field blank water, trip blanks, shipping coolers, and laboratory documentation. Qualifications of the QA officer are provided in **Attachment A.**

3.0 QA OBJECTIVES FOR DATA MANAGEMENT

The analytical data will be provided by the laboratory using the NYSDEC Category B deliverable format. Analytical data collected for disposal characteristics that may be requested by off-site soil or wastewater disposal facilities will be provided in the format that the facility requests.

All analytical measurements will be made so that the results are representative of the media sampled and the conditions measured. Data will be reported in consistent dry weight units for solid samples [i.e., micrograms per kilogram (µg/kg) and/or milligram per kilogram (mg/kg), micrograms per liter (µg/L) or milligrams per liter (mg/L) for aqueous samples and in micrograms per cubic meter (µg/m^3) for soil vapor and air samples. **Table 2** presents the proposed samples, sampling and analytical parameters, analytical methods, sample preservation requirements and containers.

Quantitation Limits (QLs) are laboratory-specific and reflect those values achievable by the laboratory performing the analyses. Data Quality Levels (DQLs) are those reporting limits required to meet the objectives of the program (i.e., program action levels, cleanup standards, etc.). Data Quality Objectives (DQOs) define the quality of data and documentation required to support decisions made in the various phases of the data collection activities. The DQOs are dependent on the end uses of the data to be collected and are also expressed in terms of objectives for precision, accuracy, representativeness, completeness, and comparability.

The analytical methods to be used at this Site provide the highest level of data quality and can be used for purposes of risk assessment, evaluation of remedial alternatives and verification that cleanup standards have been met. However, in order to ensure that the analytical methodologies are capable of achieving the DQOs, measurement performance criteria have been set for the analytical measurements in terms of accuracy, precision, and completeness.

The overall QA objective is to develop and implement procedures for field sampling, chain-of-custody, laboratory analysis, and reporting which will provide results that are scientifically valid, and the levels of which are sufficient to meet DQOs. Specific procedures for sampling, chain of custody, laboratory instrument calibration, laboratory analysis, reporting of data, internal quality control, and corrective action are described in other sections of this QAPP/FSP.

Tables 3, **4**, and **5** present the precision and accuracy requirements for each parameter to be analyzed. For quantitation limits for parameters associated with soil, sediment, and solid waste samples, the laboratory will be required to attempt to meet or surpass the parameter-specific limits listed in 6 NYCRR Part 375.

For quantitation limits for parameters associated with groundwater samples, the laboratory will be required to attempt to meet or surpass the parameter-specific limits for groundwater from the Division of Water Technical and Operational Guidance Series (TOGS 1.1.1) Ambient Water Quality Standards and Guidance Values. In certain instances, if the TOGS criteria are not achievable due to analytical limitations, the laboratory will report the lowest possible quantitation limit.

For quantitation limits for parameters associated with soil gas samples, the laboratory will be required to meet the parameter-specific limits from EPA's Draft Guidance for Evaluating the Vapor Intrusion to

Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance), Table 3c-SG: Question 5 Soil Gas Screening Levels for Scenario-Specific Vapor Attenuation Factors (**α=**$2H10^{-3}$), November 2002. In certain instances, if these criteria are not achievable due to analytical limitations, the laboratory will report the lowest possible quantitation limits (see **Tables 1A through 1C** for affected analytes).

The QA objectives are defined as follows:

Accuracy is the closeness of agreement between an observed value and an accepted reference value. The difference between the observed value and the reference value includes components of both systematic error (bias) and random error.

Accuracy in the field is assessed through the adherence to all field instrument calibration procedures, sample handling, preservation, and holding time requirements, and through the collection of equipment blanks prior to the collection of samples for each type of equipment being used (e.g., split spoons, groundwater sampling pumps).

The laboratory will assess the overall accuracy of their instruments and analytical methods (independent of sample or matrix effects) through the measurement of "standards," materials of accepted reference value. Accuracy will vary from analysis to analysis because of individual sample and matrix effects. In an individual analysis, accuracy will be measured in terms of blank results, the percent recovery (%R) of surrogate compounds in organic analyses, or %R of spiked compounds in matrix spikes (MSs), matrix spike duplicates (MSDs) and/or laboratory control samples (LCSs). This gives an indication of expected recovery for analytes tending to behave chemically like the spiked or surrogate compounds. **Tables 3**, **4**, and **5** summarize the laboratory accuracy requirements.

Precision is the agreement among a set of replicate measurements without consideration of the "true" or accurate value: i.e., variability between measurements of the same material for the same analyte. Precision is measured in a variety of ways including statistically, such as calculating variance or standard deviation.

Precision in the field is assessed through the collection and measurement of field duplicates (one extra sample in addition to the original field sample). Field duplicates will be collected at a frequency of one per twenty investigative samples per matrix per analytical parameter, with the exception of the Toxicity Characteristic Leaching Procedure (TCLP) parameters and parameters associated with wastewater samples. Precision will be measured through the calculation of relative percent differences (RPDs). The resulting information will be used to assess sampling and analytical variability. Field duplicate RPDs must be $\leq$ 50 for soil samples and $\leq$ 30 for aqueous samples. These criteria apply only if the sample and/or duplicate results are >5x the quantitation limit; if both results are $\leq$ 5x the quantitation limit, the criterion will be doubled. Due to the uncertainty of available representative soil gas volume, field duplicates will not be collected for this matrix.

Precision in the laboratory is assessed through the calculation of RPD for duplicate samples. For organic soil, sediment and water analyses, laboratory precision will be assessed through the analysis of MS/MSD samples and field duplicates. For the inorganic analyses, laboratory precision will be assessed through

the analysis of matrix duplicates and field duplicates. For soil gas analyses, laboratory precision will be assessed through the analysis of matrix duplicates. MS/MSD samples or matrix duplicates will be performed at a frequency of one per twenty investigative samples per matrix per parameter. **Tables 3**, **4**, and **5** summarize the laboratory precision requirements.

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. "Normal conditions" are defined as the conditions expected if the sampling plan was implemented as planned.

Field completeness is a measure of the amount of (1) valid measurements obtained from all the measurements taken in the project and (2) valid samples collected. The field completeness objective is greater than 90 percent.

Laboratory completeness is a measure of the amount of valid measurements obtained from all valid samples submitted to the laboratory. The laboratory completeness objective is greater than 95 percent.

Representativeness is a qualitative parameter that expresses the degree to which data accurately and precisely represent either a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. To ensure representativeness, the sampling locations have been selected to provide coverage over a wide area and to highlight potential trends in the data. In addition, field duplicate samples will provide an additional measure of representativeness at a given location.

Representativeness is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the Work Plans and QAPP are followed, and that proper sampling, sample handling, and sample preservation techniques are used.

Representativeness in the laboratory is ensured by using the proper analytical procedures, appropriate methods, and meeting sample holding times.

Comparability expresses the confidence with which one data set can be compared to another. Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the Work Plans and QAPP are followed and that proper sampling techniques are used. Maximization of comparability with previous data sets is expected because the sampling design and field protocols are consistent with those previously used.

Comparability is dependent on the use of recognized EPA or equivalent analytical methods and the reporting of data in standardized units. Laboratory procedures are consistent with those used for previous sampling efforts.

4.0 SAMPLING PLAN

Environmental sampling may include soil, groundwater, soil vapor and sediment sampling. Additionally, wastes generated during remediation or development will be sampled and tested for characterization for disposal. Direct push drilling (GeoProbe®), sonic drilling, and/or test pit excavations will be the preferred methods for obtaining subsurface soil samples. However, other drilling methods including mud rotary and drive and wash may also be used if warranted by site conditions. Hand auger and/or

hand-held sampling equipment will be the preferred method for collecting surficial and/or shallow soil samples. Groundwater samples will be collected using bailers or peristaltic, bladder or submersible pumps. Soil vapor samples will be collected in SUMMA® canisters. Performing grab or composite sampling using appropriate hand-held sampling equipment will be the preferred method for waste characterization sampling.

4.1. Utility Clearance

New York State law requires that New York 811 be notified at least three working days prior to subsurface work is conducted to initiate the utility locating activities. Companies with subsurface utilities present will locate and mark out subsurface utility lines. However, New York 811 contractors will only locate utilities on public property and rights-of-way.

GZA will subcontract a subsurface utility locator to perform a geophysical survey of the warehouse's interior prior to commencement of the Remedial Investigation. Subsurface anomalies, including utilities, will be clearly marked with spray paint. A GZA representative will be on-site during the subsurface investigation to record the locations of subsurface anomalies with the subcontractor.

4.2. Test Pit Soil Sampling

Test pitting and/or excavating may be conducted during the RI, if necessary. Test pits will allow for visual characterization of subsurface soil conditions and the collection of grab soil samples. Prior to soil sample collection, headspace screening will be conducted to evaluate whether analysis of soil samples is warranted, and if so, which soils should be collected.

Prior to completing a test pit or excavation, underground utilities should be identified as discussed in **Section 4.1**. Should active, underground utilities be located in the vicinity of the intended excavation, hand or vacuum excavation methods should be employed, as appropriate, to confirm the location and depth prior to initiating the excavation.

The size and type of excavator used to complete the test pits will be selected based on the anticipated depth and overall size of the excavation required to meet the project objectives. At no time will field personnel enter a test pit/excavation unless it has been deemed safe to enter by an Excavation Competent person based on training and experience required by 29CFR 1926.652.

Grab soil/solid samples will be collected from the material or interval in question by retrieving a volume for analysis using a clean stainless steel, aluminum, or mild steel/ disposable scoop, trowel, spoon, or bucket auger and placing the soil in a cleaned stainless-steel pan for homogenization before inserting into the sample container. Samples collected for analysis for volatile organic compounds and total organic halides will not be homogenized. Samples for volatile organics analysis and total organic halides will be placed directly into the sample container.

Composite samples will be collected in the same manner described above, except that the discrete sample volumes will be placed in a clean stainless-steel pan and mixed to form the composite. Composite sampling will be performed for the following objectives:

- Waste characterization;
- Determination of the suitability of the soil for on-site re-use; and
- Evaluation of health and safety requirements for workers that will disturb the soil during subsequent construction work.

4.3. Direct Push Drilling Soil Sampling

This drilling method is typically used to collect shallow overburden soils and create boreholes for temporary monitoring well installations, or soil vapor sampling points. Sampling will be performed using four or five-foot-long acetate sleeves that will be advanced continuously to the desired depth below the surface. Soil samples from each sleeve will be screened using a photoionization detector (PID) to detect possible organic vapors. Organic vapor screening will be performed by slicing open the acetate sleeve, making a small slice in the soil column with a clean knife or sampling tool, inserting the PID probe and pushing the slice closed, and monitoring the soil for approximately 5 to 10 seconds. This procedure will be repeated at intervals along the soil column at the field geologist's discretion.

The samples will be examined for staining, discoloration, odors, and debris indicative of contamination (ash, coal fragments, wood chips, cinders, petroleum staining, etc.). Samples for laboratory analysis will be collected from the six-inch interval most likely to be contaminated, based on PID readings, discoloration, staining, and the field geologist's judgment (field conditions may require a section longer than six inches to make sufficient sample; however, this decision will be field based).

The samples will be collected by cutting the soil in two places with a decontaminated steel, stainless steel, or aluminum trowel, spoon, or knife and homogenized in a decontaminated stainless-steel pan before being placed in the sample bottles. Samples collected for analysis for VOCs and total organic halides will be placed directly into the sample containers without homogenization (as per EPA sampling method 5035A). Samplers will wear phthalate-free gloves such as nitrile (no latex will be used) and will avoid contact of the gloves with the sample. Clean metal/disposable instruments will be used to transfer samples. If there is insufficient soil volume in the spoon, then this will be made up by attempting a second direct push sleeve at the same depth, or by using the next immediate sample interval above or below this depth, if appropriate. If there is no recovery, then the sample depth will be skipped, and drilling will progress to the next depth interval.

Soil samples will be collected in laboratory provided containers and transported to a NYSDOH ELAP certified laboratory, under proper chain of custody procedures for analysis. Once the sample containers are filled, they will be immediately placed in the cooler with ice (in Ziploc plastic bags to prevent leaking) or synthetic ice packs to maintain the samples at below 4°C.

4.4. Sonic Drill Rig Soil Sampling

The sonic drilling system employs simultaneous high frequency vibration and low speed rotational motion along with down pressure to advance the cutting shoes of the drill string. This technique provides a continuous soil core and generates minimal cuttings. Due to the continuous sampling of the system, accurate depictions of the stratigraphy and lithology of the overburden are obtained (minimal sloughing). Additionally, few cuttings are mobilized to the surface. Most of the formation material enters the core barrel, except small amounts, which are pushed into the borehole wall.

Drilling operations take place from the drill platform, which is about 4 feet above ground. Steel drill casing and core barrel are connected to the head from the work platform/support truck and are then hoisted to vertical in the derrick. Tool joints are connected and broken by a hydraulic vise/wrench that is in the base of the derrick. The sonic head is able to pivot 90 degrees to facilitate connection of the drilling rods.

The sonic drilling system uses an override core barrel system and can create a 4- or 6-inch diameter borehole. This is followed by the override casing drilled to the same depth as the core barrel cutting shoe. The core barrel is then removed, and cores are extruded into plastic sleeves. The outer casing prevents cross contamination and formation mixing and allows for a very controlled placement of wells.

GZA proposes to use a track-mounted sonic drill rig collecting soil continuously from either five-foot long or 10-foot-long cores. Samples will be extruded from the core barrel into polyethylene sleeves. Once the plastic sleeve is cut open, soil will be screened using a PID to detect possible organic vapors. Organic vapor screening will be performed by making a small slice in the soil column with a clean knife or sampling tool, inserting the PID probe and pushing the slice closed, and monitoring the soil for approximately 5 to 10 seconds. This procedure will be repeated at intervals along the soil column at the field geologist's discretion.

The samples will be examined for staining, discoloration, odors, and debris indicative of contamination (ash, coal fragments, wood chips, cinders, petroleum staining, etc.) Samples for laboratory analysis will be collected from the six-inch interval most likely to be contaminated, based on PID readings, discoloration, staining, and the field geologist's judgment (field conditions may require a section longer than six inches to make sufficient sample; however, this decision will be field based).

The samples will be collected by cutting the soil in two places with a decontaminated steel, stainless steel, or aluminum trowel, spoon, or knife and homogenized in a decontaminated stainless-steel pan before being placed in the sample bottles. Samples collected for analysis for VOCs and total organic halides will be placed directly into the sample containers without homogenization (as per EPA sampling method 5035A). Samplers will wear phthalate-free gloves such as nitrile (no latex will be used) and will avoid contact of the gloves with the sample. Clean metal/disposable instruments will be used to transfer samples. If there is insufficient soil volume in the spoon, then this will be made up by attempting a second direct push sleeve at the same depth, or by using the next immediate sample interval above or

below this depth, if appropriate. If there is no recovery, then the sample depth will be skipped, and drilling will progress to the next depth interval.

Soil samples will be collected in laboratory provided containers and transported to a NYSDOH ELAP certified laboratory, under proper chain of custody procedures for analysis. Once the sample containers are filled, they will be immediately placed in the cooler with ice (in Ziploc plastic bags to prevent leaking) or synthetic ice packs to maintain the samples at below 4°C.

4.5. Temporary Well Point Installation and Sampling

If proposed for site characterization, temporary well points will be immediately installed in drilled soil direct-push soil borings by placing a one-inch diameter PVC screen and riser pipe directly into the borehole. No additional materials will be placed around the annual space. The screen will be set to straddle the water table. Temporary wells will not be purged prior to sample collection. Depth to water will be measured in each well point to provide data to approximate groundwater flow direction.

Groundwater samples will be collected from the temporary well point using a dedicated microbailer. The samples will be collected in sample bottles (pre-preserved, if appropriate), placed in iced coolers, and removed from light immediately after collection. In addition, all sample bottles must be filled to the top so that no aeration of the samples occurs during transport. All bottles will be filled to avoid cascading and aeration of the samples, the goal being to minimize any precipitation of colloidal matter. Samples for dissolved metals will be collected in unpreserved containers and will be filtered and preserved at the laboratory within 24 hours of sampling. Samples will be transported to a NYSDOH ELAP certified laboratory under proper chain of custody procedures for analysis.

Screen and riser pipes will be removed from the borehole and the borehole will be backfilled.

4.6. Permanent Well Installation and Sampling

Groundwater sampling of permanent monitoring wells is described according to the following distinct phases of this work: well installation/construction, well development, well purging, and well sampling.

4.6.1. *Well Installation/Construction*

To collect representative groundwater samples, soil borings drilled with the direct push or sonic drilling method will be converted into permanent two-inch diameter monitoring wells. Groundwater monitoring wells will be constructed of threaded two-inch diameter PVC well casing and 20-slot well screen (to investigate the potential of floating product). The 10-foot screen will be set seven feet below the measured water table. Clean silica sand, Morie No. 1 or equivalent, will be placed in the annular space around the well to a minimum of one foot above the top of the well screen, two feet being optimal. Solid PVC riser, attached to the well screen, will extend to grade or above if the well is a stick-up. For a

two-inch diameter well, the annular space for the filter pack should be 4 inches thick meaning a minimum six-inch diameter soil boring. In general, direct push borings will be enlarged by running hollow stem augers after soil sampling is complete and the permanent wells will be installed within the augered borehole. A two-foot-thick bentonite seal will then be placed above the sand pack and moistened with potable water for a minimum of 15 minutes before backfilling the remaining space with a cement-bentonite grout. If warranted by depth, filling will be completed using a tremie pipe placed below the surface of the grout. A stick-up or flush-mount protective casing with a locking well cap will then be installed, and a measuring point marked on each PVC well riser. Well construction diagrams will be prepared for each well.

4.6.2. Well Development

Following installation, the groundwater monitoring wells will be developed using a submersible pump (or equivalent) until the water is reasonably free of turbidity and field readings (pH, conductivity, temperature, and dissolved oxygen) sufficiently stabilize. Fifty nephelometric turbidity units (NTUs) or less will be the turbidity goal but not an absolute value. The wells will be developed aggressively to remove fines from the formation and sand pack. The wells will be allowed to equilibrate for seven days prior to sampling. The volume of water removed, the well development time, and field instrument readings will be recorded in the logbook.

4.6.3. Well Purging

The objective is to purge monitoring wells until turbidity stabilizes to a level as low as possible and this parameter will be given the greatest weight in determining when groundwater sampling may begin. With this objective in mind, a low-flow pump will be used to avoid entrainment of particulates within the well or from the formation. Groundwater from each well will be purged until parameters have stabilized. A turbidity level of fifty NTUs or less is the well purging goal, but not an absolute value before sampling. Other field parameters including temperature, conductivity, pH, and dissolved oxygen (DO) will also be monitored. As practical, all field measurements will be taken from the flow cell and will be recorded during and after purging, and before sampling. Field parameters should generally be within ±10 percent for three consecutive readings, one minute apart, prior to sampling.

Upon opening each monitoring well and point, the concentration of VOCs in the headspace will be measured using a PID and water level measurements will be recorded using an electronic interface probe. The depth to product (if present), depth to water, and the total depth will be measured from the top of the marked PVC casings. Water level and free product measurements will first be made and the volume of water in the well determined. The volume of water in the well will be calculated so that the number of well volumes purged and an estimate of the time required to purge the well can be made. Before sampling, the wells will be purged utilizing a low-flow submersible stainless steel pump using high-density polyethylene (HDPE) tubing connected to a flow cell. Very low purging rates are proposed, on the order of 100 ml/minute to 500 ml/minute, to minimize suspension of particulate matter in the well.

Purging will be done with the pump intake placed at the midpoint of the well screen or the midpoint of the water column (to be determined based on the depth and length of the screen interval) to ensure that all stagnant water in the well is removed, while not stirring up sediment that may have accumulated on the bottom of the well. Equipment will be lowered into the well very carefully to prevent suspension of bottom sediment and subsequent entrainment onto sampling equipment. Surging will be avoided. Tubing will be replaced between each well. Pumps must be carefully cleaned between wells according to the procedures specified in **Section 4.15,** below. It is anticipated that no more than three well volumes will be purged in order for turbidity to reach a minimum and the other parameters to stabilize. Ideally, pumping rates will be at a rate so that no drawdown of the groundwater level occurs (i.e., pumping rate is less than recharge rate). During purging, the sampler will actively monitor and track the volume of water purged and the field parameter readings. Data will be recorded in the field logbook. For example, the sampler will record the running total volume purged from each well and note the readings for the corresponding field parameters.

4.6.4. Well Sampling

Once groundwater conditions have stabilized and groundwater levels have recovered, samples will be collected from the flow cell outlet (connected to the low-flow peristaltic pump) vis United States Environmental Protection Agency (USEPA) low-flow sampling methods. All non-disposable/non-dedicated (re-usable) sampling equipment will be cleaned according to the procedures specified in **Section 4.15**.

Sampling will be performed with the pump intake at the same location used for purging. Pumping rates for withdrawing the samples will be similar to those followed for well purging.

The samples will be collected in sample bottles (pre-preserved, if appropriate), placed in iced coolers, and removed from light immediately after collection. In addition, all sample bottles must be filled to the top so that no aeration of the samples occurs during transport. All bottles will be filled to avoid cascading and aeration of the samples, the goal being to minimize any precipitation of colloidal matter. Samples will be transported to a NYSDOH ELAP certified laboratory under proper chain of custody procedures for analysis. Samples for dissolved metals will be collected in unpreserved containers and will be filtered and preserved at the laboratory within 24 hours of sampling.

4.7. Borehole Abandonment

Soils extracted during the advancement of the borings will be used to backfill the borings, provided that the borings are not to be used for installation of permanent monitoring wells. However, soils that exhibit "gross" contamination, as evidenced by staining or free-phase product, or any visual, olfactory, or PID readings greater than 50 ppm above background, will be managed in accordance with **Section 9**. In this event, bentonite chips or pellets to within 0.5 feet below ground surface. The ground surface will be restored to a similar condition as the surrounding grade (e.g., topsoil, asphalt, or concrete).

4.8. Monitoring Well Abandonment

There may be occasions when monitoring wells will require abandonment. For temporary monitoring wells, the approach will be to pull the PVC well materials from the borehole and backfill the remaining open portion of the borehole with cement/bentonite grout to approximately 0.5 feet below the ground surface. The ground surface will be restored to a similar condition as the surrounding grade (e.g., topsoil, asphalt, or concrete). For permanent overburden and bedrock monitoring wells, depending on the site-specific subsurface geologic conditions and nature of contamination, the abandonment approach will be in accordance with NYSDEC Policy CP-43 – Groundwater Monitoring Well Decommissioning Policy.

4.9. Soil Reuse Sampling and Worker Health & Safety Sampling

Soil reuse sampling may be performed to determine whether the soil can be reused elsewhere on the Site, or to determine whether contaminant levels in the soil would warrant OSHA 40-hour HAZWOPER training for workers disturbing the soil during post-remediation construction activities. This sampling would consist of compositing discrete soil samples from borings advanced by direct push (see **Section 4.3**), or during test pits following the procedures outlined in **Section 4.2**.

4.10. Waste Characterization Sampling

Waste classification sampling may be conducted to characterize soil, liquids, and/or groundwater for the purpose of proper off-site waste disposal. Specific methods for sampling liquid and solid wastes are briefly discussed below.

4.10.1. Solid Waste

Solid sampling methods include utilizing dedicated stainless steel or HDPE scoops/shovels, triers, and thiefs. Scoops and shovels are the preferred method for sampling solids from piles or containers. Stainless steel triers are similar to a scoop and are used for the collection of a core sample of a solid material.

4.10.2. Liquid Waste

Liquid sampling methods include utilizing dedicated dippers, glass tube samplers, pump, and tubing, kemmerer bottles, and Bacon Bomb samplers. Dippers are used to collect samples from the surface of the liquid and are appropriate for wastes that are homogeneous. Glass tube samplers consist of glass tubes of varying length and diameter used to collect a full-depth liquid sample from a drum or similar container. Pump and tubing (e.g., bladder pump or peristaltic pump) are used to collect liquid samples from a depth (up to approximately 20 feet below grade), and are typically relied upon for sampling subsurface structures, such as underground storage tanks. To minimize the loss of volatile organic components in the liquid, the lowest achievable flow rate is utilized for collecting the sample by this

method. Kemmerer bottles and Bacon Bomb samplers are discrete-depth samplers. These samplers are lowered into the liquid and opened to collect a sample at a desired depth.

4.10.3. Grab versus Composite Sampling

Waste characterization of a liquid or a solid can involve grab or composite sampling depending upon the homogeneity and the volume of the waste. Grab sampling consists of collecting a discrete sample or samples of a material and submitting each sample for separate analysis. Grab sampling is appropriate for characterizing small quantities of waste as well as waste streams of varying content (e.g., drums of different contents). Composite sampling consists of taking discrete grab samples of a material and combining them into a smaller number of samples for analysis. Composite sampling generally is appropriate for large volumes of a homogenous waste material, such as a pile of soil or construction debris. The specific number of composite and grab samples will depend upon the size and nature of the waste pile (i.e., cubic yards) as well as the analysis required for characterization of the waste.

4.11. Sub-Slab Soil Gas Sampling

A direct-push drill rig will be utilized to drive rods with a decontaminated stainlesssteel probe to the desired sample depth, which will be approximately 6-inches below the existing slab. The soil gas probe will then be purged at a flow rate not greater than 0.2 liters/minute to evacuate one to three volumes using a photoionization detector (PID) with an integrated vacuum pump (MiniRAE 3000 or appropriate alternate). Peak and stabilized PID readings will be recorded prior to sample collection. Following the stabilization period, each probe will be connected to an evacuated laboratory-supplied 6-liter SUMMA® canister. SUMMA® canisters are passivated stainless steel vessels that have been cleaned and certified contaminant-free by the contract laborer. After connecting the SUMMA® canister to the soil gas probe, a regulator valve on the canister will be opened and the vacuum will slowly draw the sample into the canister over a period of 20 minutes. The samples will not be drawn at greater than 0.2 liters per minute. Quantitation limits for all analytes range between 1.6 ppbV and 4.0 ppbV, depending on the compound. After collecting the soil gas sample, the valve will be closed and disconnected from the soil gas probe. The soil-gas samples will be transported to a NYSDOH ELAP certified laboratory for TO-15 analysis.

Prior to sample collection, helium will be used as a tracer gas to evaluate the potential for infiltration of outdoor air into the sample. Subsequent rounds of soil gas sampling would include the use of tracer gas only if the initial round of sampling indicates that outdoor air has the potential to influence soil gas sample results.

When soil vapor samples are collected, the following conditions that may influence the interpretation of results will be documented:

- Identification of any nearby commercial or industrial buildings that likely uses volatile organic compounds;

- A sketch of the Site, showing streets, neighboring commercial or industrial facilities (with estimated distances to the Site, and soil-gas sampling locations);
- Weather conditions (e.g., precipitation, outdoor temperature, barometric pressure, wind speed and direction); and
- Any pertinent observations, such as odors or readings from field instrumentation.

4.12. Ambient Air Sampling

Ambient air samples will be collected with an evacuated laboratory-supplied 6-liter SUMMA® canister. SUMMA® canisters are passivated stainless steel vessels that have been cleaned and certified contaminant-free by the contract laborer. The sample will be set at an elevation of approximately 4 to 5 feet above grade, to represent breathing zone air quality conditions. The samples will not be drawn at greater than 0.2 liters per minute. After collecting the ambient air sample, the valve will be closed, and the canister will be labeled with the necessary information. The soil-gas samples will be transported to a NYSDOH ELAP certified laboratory for TO-15 analysis.

When ambient air samples are collected, the following conditions that may influence the interpretation of results will be documented:

- Identification of any nearby commercial or industrial buildings that likely uses volatile organic compounds;
- A sketch of the Site, showing streets, neighboring commercial or industrial facilities (with estimated distances to the Site, and soil-gas sampling locations);
- Weather conditions (e.g., precipitation, outdoor temperature, barometric pressure, wind speed and direction); and
- Any pertinent observations, such as odors or readings from field instrumentation.

4.13. QC Sample Collection

QC samples will include equipment blanks, trip blanks, field duplicates and MS/MSDs.

Equipment blanks will consist of distilled water and will be used to check for potential contamination of the equipment that may cause sample contamination. Equipment blanks will be collected by routing the distilled water through the sampling equipment prior to sample collection. Equipment blanks will be submitted to the laboratory at a frequency of one per day per matrix per type of equipment being used per parameter. Equipment blanks will not be collected with samples for analysis for TCLP parameters, parameters associated with wastewater samples, samples collected for disposal purposes, soil gas samples, chip samples, wipe samples and samples collected for grain size analyses.

Trip blanks will consist of distilled water (supplied by the laboratory) and will be used to assess the potential for volatile organic compound contamination of groundwater samples due to contaminant migration during sample shipment and storage. Trip blanks will be transported to the site unopened, stored with the investigative samples, and kept closed until analyzed by the laboratory. Trip blanks will be submitted to the laboratory at a frequency of one per cooler that contains groundwater samples for analysis for VOCs.

Field duplicates are an additional aliquot of the same sample submitted for the same parameters as the original sample. Field duplicates will be used to assess the sampling and analytical reproducibility. Field duplicates will be collected by alternately filling sample bottles from the source being sampled. Field duplicates will be submitted at a frequency of one per 20 samples for all matrices and all parameters with the exception of TCLP parameters, parameters associated with wastewater samples, samples collected for waste characterization purposes, chip samples, wipe samples and samples collected for grain size analyses. Soil gas field duplicates will be obtained by using a tubing a T-splitter.

MSs and MSDs are two additional aliquots of the same sample submitted for the same parameters as the original sample. However, the additional aliquots are spiked with the compounds of concern. Matrix spikes provide information about the effect of the sample matrix on the measurement methodology. MS/MSDs will be submitted at a frequency of one per 20 investigative samples per matrix for organic parameters for soil, sediment, and groundwater. MSs will be submitted at a frequency of one per 20 investigative samples per matrix for inorganic parameters.

4.14. Sample Preservation and Containerization

The analytical laboratory will supply the sample containers for the chemical samples. These containers will be cleaned by the manufacturer to meet or exceed all analyte specifications established in the latest U.S. EPA's *Specifications and Guidance for Contaminant-Free Sample Containers*. Certificates of analysis are provided with each bottle lot and maintained on file to document conformance to EPA specifications. The containers will be pre-preserved, where appropriate (see **Table 2**).

Table 6 presents a summary of QC sample preservation and container requirements.

4.15. Equipment Decontamination

4.15.1. Reuseable Sampling Equipment

Stainless steel and aluminum sampling equipment shall be cleaned between each use in the following manner:

- Wash/scrub with a biodegradable degreaser ("Simple Green") if there is oily residue on equipment surface

- Tap water rinse
- Wash and scrub with Alconox and water mixture
- Tap water rinse
- Distilled/deionized water rinse
- Air dry

Cleaned equipment shall be wrapped in aluminum foil if not used immediately after air-drying.

Groundwater sampling pumps will be cleaned by washing and scrubbing with an Alconox /water mixture, rinsing with tap water, and irrigating with distilled/deionized water.

4.15.2. Disposable Sampling Equipment

Disposable sampling equipment includes disposable gloves, bailers, string, tubing associated with groundwater sampling/purging pumps, or polyethylene sampling spatulas. Disposable sampling equipment will be used only once, and following its use, will be properly drummed or bagged for off-site disposal (see Section 4.6, below).

4.15.3. Heavy Equipment

Certain heavy equipment such as drilling augers may be used to obtain samples. Such equipment will be subject to high-pressure hot water or steam cleaning between uses. A member of the sampling team will visually inspect the equipment to check that visible contamination has been removed by similar procedure listed above prior to sampling and between drilling locations. The drilling casing and down-hole equipment will be cleaned prior to arrival on Site and between soil test borings. Drilling equipment decontamination will be performed on-site in temporary, bermed decontamination pads.

4.16. Investigation Derived Waste

Field investigation derived waste (IDW) generated during drilling will be collected in properly labeled USDOT approved storage containers (55-gallon drums) and grouped by environmental matrix (soil, water, PPE/plastic, construction debris).

Drums will be tracked and given unique identification codes based on the following:

- A prefix indicating the site where the drum was generated and the drum's contents: i.e., S – Soil, W – Water, and P – PPE/Plastic.
- Following the prefix and a hyphen will be the drum's chronological number of generation. For example, drum S-1 will be the first drum filled with soil for the project; while drum W-8 will be the eighth drum generated and contains water.

- As drums are generated, their identification code, date of generation, contents, source (i.e., drill cuttings from location x, purge water from well y), and date sampled will be entered on a tracking table.
- For example, the full nomenclature of S-2/SB-2 110724 would be the second drum produced during the program with its contents from Soil Boring No. 2 generated on November 7, 2024.

The drums will be centrally stored on-Site. Subsequently, the waste soils and/or water will be characterized with laboratory analyses for proper disposal. Waste transportation and disposal of all contaminated wastes will be managed by GZA and the subcontractor. GZA anticipates that drummed IDW will be disposed of off the Site to a permitted disposal facility. GZA will retain copies of each waste disposal manifest for documentation.

5.0 DOCUMENTATION AND CHAIN-OF-CUSTODY

5.1. Sample Collection Documentation

5.1.1. Field Notes

Field team members will keep a field logbook to document all field activities. Field logbooks will provide the means of recording the chronology of data collection activities performed during the remediation. As such, entries will be described in as much detail as possible so that a particular situation could be reconstructed without reliance on memory.

The logbook will be a bound notebook with water-resistant pages. Logbook entries will be dated, legible, and contain accurate and inclusive documentation of the activity. The title page of each logbook should contain the following:

- Person to whom the logbook is assigned
- The logbook number
- Project name and number
- Site name and location
- Project start date
- End date

Entries into the logbook will contain a variety of information. At the beginning of each entry, the date, start time, weather, and names of sampling team members present will be entered. Each page of the logbook will be signed and dated by the person making the entry. All entries will be made in permanent ink, signed, and dated and no erasures or obliterations will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark that is signed and dated by the sampler. The correction shall be written adjacent to the error.

Field activities will be fully documented. Information included in the logbook should include, but may not be limited to, the following:

- Chronology of activities, including entry and exit times
- Names of all people involved in sampling activities
- Level of personal protection used
- Any changes made to planned protocol
- Names of visitors to the site during sampling and reason for their visit
- Sample location and identification
- Changes in weather conditions
- Dates (month/day/year) and times (military) of sample collection
- Measurement equipment identification (model/manufacturer) and calibration information
- Sample collection methods and equipment
- Sample depths
- Whether grab or composite sample collected
- How sample composited, if applicable
- Sample description (color, odor, texture, etc.)
- Sample identification code
- Tests or analyses to be performed
- Sample preservation and storage conditions
- Equipment decontamination procedures
- QC sample collection
- Unusual observations
- Record of photographs
- Sketches or diagrams
- Signature of person recording the information

Field logbooks will be reviewed on a daily basis by the Field Team Leader. Logbooks will be supported by standardized forms.

5.1.2. Chain-of-Custody Records

On a regular basis (daily or on such a basis that all holding times will be met), samples will be transferred to the custody of the respective laboratories, via third-party commercial carriers or via laboratory courier service.

Chain-of-custody records are initiated by the samplers in the field. The field portion of the custody documentation should include: (1) the project name; (2) signatures of samplers; (3) the sample number, date and time of collection, and whether the sample is grab or composite; (4) signatures of individuals involved in sampling; and (5) if applicable, air bill or other shipping number. Sample receipt and log-in procedures at the laboratory are described in **Section 5.2.2** of this Plan.

5.1.3. Sample Labeling

Immediately upon collection, each sample will be labeled with a pre-printed adhesive label, which includes the date and time of collection, sampler's initials, tests to be performed, preservative (if applicable), and a unique identifier.

A. The following identification scheme will be used:

Soil borings will be assigned sequential numbers. For soil samples collected from soil borings, sample numbers will be assigned as follows:

SB-#(sampling interval)

Example:
Sample SB-4(4-6') = soil sample collected from soil boring #4 at a depth of 5-6' below grade.

Groundwater wells will be assigned sequential numbers. Groundwater samples will be identified by the well that the sample was collected from.

Examples:
MW-01 = groundwater sample collected from permanent well point #1

Sub-slab soil vapor/soil vapor/ambient air will be assigned numbers coordinating with the adjacent soil boring or a sequential number due to sample names being identical to a previous Site sampling event. Vapor samples will be identified by the soil gas point that the sample was collected from.

Examples:
SV-01 = Soil vapor sample collected from the soil gas point
OA-01 = Outdoor ambient air sample

Duplicate samples will be labeled as blind duplicates by giving them sample numbers indistinguishable from a normal sample.

Blanks should be spelled out and identify the associated matrix, e.g., Equipment Blank, Soil

MS/MSDs will be noted in the Comments column of the COC.

B. The analysis required will be indicated for each sample.

Example: SVOC

C. Date taken will be the date the sample was collected, using the format: MM-DD-YY.

Example: 11-07-24

D. Time will be the time the sample was collected, using military time.

Example: 14:30

E. The sampler's name will be printed in the "Sampled By" section.

F. Other information relevant to the sample.

Example: Equipment Blank

An example sample label is presented below:

Job No:	XXXXXXXXX
Client:	Name
Sample No:	SB-01(5-5.5')
Matrix:	Soil
Date Taken:	11/07/24
Time Taken:	14:30
Sampler:	M. Frey
Analysis:	SVOC

Job No. _____
Client: _____
Sample Number _____
Date _____ Sample Time _____
Sample Matrix _____
Grab or Composite (explain) _____
Preservatives _____
Analyses _____
Sampler Signature _____

This sample label contains the authoritative information for the sample. Inconsistencies with other documents will be settled in favor of the vial or container label unless otherwise corrected in writing from the field personnel collecting samples or the QEP.

5.2. Sample Custody

Custody is one of several factors that are necessary for the admissibility of environmental data as evidence in a court of law. Custody procedures help to satisfy the two major requirements for admissibility: relevance and authenticity. Sample custody is addressed in three parts: field sample collection, laboratory analysis, and final evidence files.

A sample or evidence file is considered to be under a person's custody if

- the item is in the actual possession of a person
- the item is in the view of the person after being in actual possession of the person
- the item was in the actual physical possession of the person but is locked up to prevent tampering
- the item is in a designated and identified secure area

5.2.1. Field Custody Procedures

Samples will be collected following the sampling procedures documented in **Section 4.0** of this Plan. Documentation of sample collection is described in **Section 5.1** of this Plan. Sample chain-of-custody and packaging procedures are summarized below. These procedures are intended to ensure that the samples will arrive at the laboratory with the chain-of-custody intact.

- The field sampler is personally responsible for the care and custody of the samples until they are transferred or dispatched properly. Field procedures have been designed such that as few people as possible will handle the samples.

- All bottles will be identified by the use of sample labels with sample numbers, sampling locations, date/time of collection, and type of analysis.

- Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample label because the pen would not function in wet weather.

- Samples will be accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents the transfer of custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage location.

- All shipments will be accompanied by the chain-of-custody record identifying the contents. The original record will accompany the shipment, and copies will be retained by the sampler and placed in the project files.

- Samples will be properly packaged for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed custody record enclosed in and secured to the inside top of each sample box or cooler. If third party commercial carriers are used for transfer to the laboratory, shipping containers will be secured with strapping tape and custody seals prior to shipment. The custody seals will be attached to the front right and back left of the cooler and covered with clear plastic tape after being signed by field personnel. The cooler will be strapped shut with strapping tape in at least two locations.

- If the samples are sent by third party commercial carrier, the air bill will be used. Air bills will be retained as part of the permanent documentation. Commercial carriers are not required to sign off on the custody forms since the custody forms will be sealed inside the sample cooler and the custody seals will remain intact.

- Samples remain in the custody of the sampler until transfer of custody is completed. This consists of delivery of samples to the laboratory courier or sample custodian, and signature of the laboratory courier or sample custodian on chain-of-custody document as receiving the samples and signature of sampler as relinquishing samples.

5.2.2. Laboratory Custody Procedures

Samples will be received and logged in by a designated sample custodian or his/her designee. Upon sample receipt, the sample custodian will

- Examine the shipping containers to verify that the custody tape is intact,
- Examine all sample containers for damage,
- Determine if the temperature required for the requested testing program has been maintained during shipment and document the temperature on the chain-of-custody records,
- Compare samples received against those listed on the chain-of-custody,
- Verify that sample holding times have not been exceeded,
- Examine all shipping records for accuracy and completeness,
- Determine sample pH (if applicable) and record on chain-of-custody forms,
- Sign and date the chain-of-custody immediately (if shipment is accepted) and attach the air bill,
- Note any problems associated with the coolers and/or samples on the cooler receipt form and notify the Laboratory Project Manager, who will be responsible for contacting the QEP,
- Attach laboratory sample container labels with unique laboratory identification and test, and
- Place the samples in the proper laboratory storage.

Following receipt, samples will be logged in according to the following procedure:

- The samples will be entered into the laboratory tracking system. At a minimum, the following information will be entered: project name or identification, unique sample numbers (both client and internal laboratory), type of sample, required tests, date and time of laboratory receipt of samples, and field ID provided by field personnel.
- The Laboratory Project Manager will be notified of sample arrival.
- The completed chain-of-custody, air bills, and any additional documentation will be placed in the final evidence file.

6.0 CALIBRATION PROCEDURES

6.1. Field Instruments

Field instruments will be calibrated according to the manufacturer's specifications. Calibration procedures performed will be documented in the field logbook and will include the date/time of calibration, name of person performing the calibration, reference standard used, temperature at which the readings were taken, and the readings.

6.2. Laboratory Instruments

Calibration procedures for a specific laboratory instrument will consist of initial calibrations, initial calibration verifications, and/or continuing calibration verification. Detailed descriptions of the calibration procedures for a specific laboratory instrument are included in the laboratory's standard operating procedures (SOPs), which describe the calibration procedures, their frequency, acceptance criteria, and the conditions that will require recalibration. These procedures are as required in the respective analytical methodologies (summarized in **Table 2** of this Plan). The initial calibration associated with all analyses must contain a low-level calibration standard which is less than or equal to the quantitation limit.

7.0 SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

No field analyses are anticipated for this program. If site conditions were to warrant field analysis, the responsible contractor will prepare an addendum establishing the field analytical procedures. Analyses of all samples will be performed by NYSDOH ELAP certified laboratories. **Table 2** summarizes the analytical methods to be used during the remediation.

8.0 DATA REDUCTION, VALIDATION, AND REPORTING

Appropriate QC measures will be used to ensure the generation of reliable data from sampling and analysis activities. Proper collection and organization of accurate information followed by clear and concise reporting of the data is a primary goal in this project. Complete data packages suitable for data validation will be provided by the analytical laboratory.

For all analyses, the laboratory will report results that are below the laboratory's reporting limit; these results will be qualified as estimated (J) by the laboratory. The laboratory may be required to report tentatively identified compounds (TICs) for the VOC and SVOC analyses; this will be requested by the

sampler on an as-needed basis. A Data Usability Summary Report (DUSR) will be prepared and will be included in the Remedial Investigation Report (RIR). A DUSR preparer for the Remedial Investigation has not been employed.

8.1. Data Evaluation/Validation

8.1.1. Field Data Evaluation

Measurements and sample collection information will be transcribed directly into the field logbook or onto standardized forms. If errors are made, results will be legibly crossed out, initialed, and dated by the person recording the data, and corrected in a space adjacent to the original (erroneous) entry. Daily reviews of the field records by the Field Team Leader will ensure that:

- Logbooks and standardized forms have been filled out completely and that the information recorded accurately reflects the activities that were performed.
- Records are legible and in accordance with good record keeping procedures, i.e., entries are signed and dated, data are not obliterated, changes are initialed, dated, and explained.
- Sample collection, handling, preservation, and storage procedures were conducted in accordance with the protocols described in the Plan, and that any deviations were documented and approved by the appropriate personnel.

8.1.2. Data Usability

A Data Usability Summary Report (DUSR) will be prepared in accordance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

The data usability evaluation will include reviewing the quality assurance/quality control (QA/QC) information including: (1) chain-of-custody; (2) the summary QA/QC information provided by the laboratory; and (3) the project narrative.

For each data package the following questions will be evaluated:

- Is the data package complete as defined under the requirements for the NYSDEC ASP Category B, USEPA CLP deliverables or other standards/guidance?
- Have all holding times and preservation requirements been met?
- Do the quality control (QC) data fall within the laboratory and project established limits and specifications?

8.2. Identification and Treatment of Outliers

Any data point which deviates markedly from others in its set of measurements will be investigated; however, the suspected outlier will be recorded and retained in the data set. One or both of the following tests will be used to identify outliers.

Dixon's test for extreme observations is an easily computed procedure for determining whether a single very large or very small value is consistent with the remaining data. The one-tailed t-test for difference may also be used in this case. It should be noted that these tests are designed for testing a single value. If more than one outlier is suspected in the same data set, other statistical sources may be consulted and the most appropriate test of hypothesis will be used and documented, if warranted.

Since an outlier may result from unique circumstances at the time of sample analysis or data collection, those persons involved in the analysis and data reduction will be consulted. This may provide an experimental reason for the outlier. Further statistical analysis may be performed with and without the outlier to determine its effect on the conclusions. In many cases, two data sets may be reported, one including, and one excluding the outlier.

In summary, every effort will be made to include the outlying values in the reported data. If the value is rejected, it will be identified as an outlier, reported with its data set and its omission noted.

9.0 INTERNAL QUALITY CONTROL

The subcontracting laboratories' Quality Assurance Project Plans will identify the supplemental internal analytical quality control procedures to be used. At a minimum, this will include:

- Matrix spike and/or matrix spike duplicate samples
- Matrix duplicate analyses
- Laboratory control samples
- Instrument calibrations
- Instrument tunes for SW-846 8260B and 8270C and EPA Method TO-15 analyses
- Method and/or instrument blanks
- Surrogate spikes for organic analyses
- Internal standard spikes for SW-846 8260B and 8270C and EPA Method TO-15 analyses
- Quantitation limit determination and confirmation by analysis of low-level calibration standard

As outline on **Table 5** and summarized in **Section 4.13**, field quality control samples will include:

- Equipment blanks
- Field duplicate samples
- Trip blanks
- MS/MSDs

10.0 CORRECTIVE ACTION

The entire sampling program will be under the direction of the QEP. The emphasis in this program is on preventing problems by identifying potential errors, discrepancies, and gaps in the data-collection-laboratory-analysis-interpretation process. Any problems identified will be promptly resolved. Likewise, follow-up corrective action is always an option in the event that preventative corrective actions are not totally effective.

The acceptance limits for the sampling and analyses to be conducted in this program will be those stated in the method or defined by other means in the Plan. Corrective actions are likely to be immediate in nature and most often will be implemented by the contracted laboratory analyst or the Program Manager. The corrective action will usually involve recalculation, reanalysis, or resampling.

10.1. Immediate Corrective Action

Corrective action in the field may be needed when the sample network is changed (i.e., more/less samples, sampling locations other than those specified in the Plan), or when sampling procedures and/or field analytical procedures require modification, etc. due to unexpected conditions. The field team may identify the need for corrective action. The Field Team Leader will approve the corrective action and notify the Program Manager. The Program Manager will approve the corrective measure. The Field Team Leader will ensure that the corrective measure is implemented by the field team.

Corrective actions will be implemented and documented in the field logbook. Documentation will include:

- A description of the circumstances that initiated the corrective action,
- The action taken in response,
- The final resolution, and
- Any necessary approvals

No staff member will initiate corrective action without prior communication of findings through the proper channels.

Corrective action in the laboratory may occur prior to, during, and after initial analyses. A number of conditions such as broken sample containers, omissions or discrepancies with chain-of-custody documentation, low/high pH readings, and potentially high concentration samples may be identified during sample log-in or just prior to analysis. Following consultation with laboratory analysts and Laboratory Section Leaders, it may be necessary for the Laboratory QA Manager to approve the implementation of corrective action. The laboratory SOPs specify some conditions during or after analysis that may automatically trigger corrective action or optional procedures. These conditions may include dilution of samples, additional sample extract cleanup, automatic reinjection/reanalysis when certain QC criteria are not met, loss of sample through breakage or spillage, etc.

The analyst may identify the need for corrective action. The Laboratory Section Leader, in consultation with the staff, will approve the required corrective action to be implemented by the laboratory staff. The Laboratory QA Manager will ensure implementation and documentation of the corrective action. If the nonconformance causes project objectives not to be achieved, the QEP will be notified. The QEP will notify the Program Manager, who in turn will contact all levels of project management for concurrence with the proposed corrective action.

These corrective actions are performed prior to release of the data from the laboratory. The corrective action will be documented in both the laboratory's corrective action files, and the narrative data report sent from the laboratory to the Program Manager. If the corrective action does not rectify the situation, the laboratory will contact the Program Manager, who will determine the action to be taken and inform the appropriate personnel.

If potential problems are not solved as an immediate corrective action, the contractor will apply formalized long-term corrective action, if necessary.

TABLES

Table 1 A
Soil Criteria Table

161-03 29th Avenue, Flushing, NY
Quality Assurance Project Plan

Contaminant	Protection of Public Health					Protection of Ecological Resources[n]	Protection of Groundwater
	Unrestricted Use	Residential	Restricted-Residential	Commercial	Industrial		
All soil cleanup objectives (SCOs) are in parts per million (ppm); approximately equivalent to mg/kg.							
Metals							
Arsenic	13 [m]	16 [f]	17 [f]	18 [f]	19 [f]	13 [f]	16 [f]
Barium	410 [m]	410 [f]	410	410	10,000 [d]	433	820
Beryllium	4.4	8.8	43	670	750	10	47
Cadmium	2.5 [m]	2.5 [f]	2.5	3.7	4.4	4	7.5
Chromium, hexavalent [h]	1 [l]	1	1	11	11	20 [e]	19
Chromium, trivalent [h]	30 [m]	36	180	1,500	6,800	41	NS
Copper	50	270	270	270	10,000 [d]	50	1,720
Total Cyanide [h]	2.3	2.6	13	28	240	NS	40
Lead	63 [m]	400	400	1,000	3,900	63 [f]	450
Manganese	1600 [m]	2,000 [f]	2,000 [f]	10,000 [d]	10,000 [d]	1600 [f]	2,000 [f]
Total Mercury	0.18 [m]	0.3 [j]	0.3 [j]	1.1 [j]	1.1 [j]	0.18 [f]	0.73
Nickel	30	87	320	320	5,900	30	130
Selenium	3.9 [m]	22	110	1,700	2,000	3.9 [f]	4 [f]
Silver	2	22	110	1,700	2,000	2	8.3
Zinc	109 [m]	1300	6600	10,000 [d]	10,000 [d]	109 [f]	2,480
PCBs/Pesticides							
2,4,5-TP Acid (Silvex)	3.8	58	100 [a]	500 [b]	1,000 [c]	NS	3.8
4,4'-DDE	0.0033 [l]	0.78	3.4	22	22	0.0033 [e]	9.3
4,4'-DDT	0.0033 [l]	0.78	3.8	27	27	0.0033 [e]	135
4,4'-DDD	0.0033 [l]	1.2	5	33	33	0.0033 [e]	14
Aldrin	0.005 [m]	0.009	0.044	0.33	0.33	0.14	0.19
alpha-BHC	0.02	0.042	0.18	1.2	1.2	0.04 [g]	0.02
beta-BHC	0.021	0.042	0.18	1.8	2.9	0.6	0.09
Chlordane (alpha)	0.014	0.17	0.65	8.2	11	1.3	4.5
delta-BHC	0.04	100 [a]	100 [a]	500 [b]	1,000 [c]	0.04 [g]	0.1
Dibenzofuran	7	14	59	350	1,000 [c]	NS	210
Dieldrin	0.005 [m]	0.017	0.075	0.48	0.48	0.006	0.1
Endosulfan I	4.3	8.4 [i]	35 [i]	360 [i]	580 [i]	NS	65
Endosulfan II	4.3	8.4 [i]	35 [i]	360 [i]	580 [i]	NS	44
Endosulfan sulfate	4.3	8.4 [i]	35 [i]	360 [i]	580 [i]	NS	47
Endrin	0.014	1.2	5.3	55	87	0.014	0.06
Heptachlor	0.013	0.12	0.53	5.1	5.1	0.14	0.38
Lindane	0.025	0.05	0.21	0.21	3.4	6	0.05
Polychlorinated biphenyls	0.1	1	1	1	25	1	3.2
Semivolatiles							
Acenaphthene	20	100 [a]	100 [a]	500 [b]	1,000 [c]	20	98
Acenapthylene	100 [k]	100 [a]	100 [a]	501 [b]	1,000 [c]	NS	365
Anthracene	100 [k]	100 [a]	100 [a]	502 [b]	1,000 [c]	NS	1,000 [c]
Benz(a)anthracene	1 [m]	1 [f]	1.4 [f]	37	37	NS	1 [f]
Benzo(a)pyrene	1 [m]	1 [f]	1 [f]	3.7 [f]	3.7	2.6	22
Benzo(b)fluoranthene	1 [m]	1 [f]	1.4 [f]	37	37	NS	2.1
Benzo(g,h,i)perylene	0.64	1.2 [a]	4.9 [a]	47 [b]	78 [c]	NS	1,000 [c]
Benzo(k)fluoranthene	0.8 [m]	1.2	4.9	47	78	NS	2
Chrysene	1 [m]	1.2 [f]	4.9	47	78	NS	1 [f]
Dibenz(a,h)anthracene	0.33 [l]	0.33 [e]	0.33 [e]	3.7	3.7	NS	1,000 [c]
Fluoranthene	85 [k]	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	1,000 [c]
Fluorene	30	100 [a]	100 [a]	500 [b]	1,000 [c]	30	386
Indeno(1,2,3-cd)pyrene	0.5 [m]	0.5 [f]	1.4 [f]	37	37	NS	6.6
m-Cresol	0.33 [l]	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	0.33 [e]
Naphthalene	12	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	12
o-Cresol	0.33 [l]	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	0.33 [e]
p-Cresol	0.33 [l]	34	100 [a]	500 [b]	1,000 [c]	NS	0.33 [e]
Pentachlorophenol	0.8 [l]	0.8	1.3	6.9	7	0.8 [e]	0.8 [e]
Phenanthrene	1.1	1.2 [a]	4.9 [a]	47 [b]	78 [c]	NS	1,000 [c]
Phenol	0.33 [l]	100 [a]	100 [a]	500 [b]	1,000 [c]	30	0.33 [e]
Pyrene	64	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	1,000 [c]

Table 1 A
Soil Criteria Table

161-03 29th Avenue, Flushing, NY
Quality Assurance Project Plan

Contaminant	Protection of Public Health					Protection of Ecological Resources[n]	Protection of Groundwater
	Unrestricted Use	Residential	Restricted-Residential	Commercial	Industrial		
All soil cleanup objectives (SCOs) are in parts per million (ppm); approximately equivalent to mg/kg.							
Volatiles							
1,1,1-Trichloroethane	0.68	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	0.68
1,1-Dichloroethane	0.27	19	47	240	241	NS	0.27
1,1-Dichloroethene	0.24	0.41	0.98	5.1	5.1	NS	0.33
1,2-Dichlorobenzene	1.1	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	1.1
1,2-Dichloroethane	0.02 [m]	2.4	5.8	30	30	10	0.02 [f]
cis-1,2-Dichloroethene	0.19	8.7	41	500 [b]	590	NS	0.19
trans-1,2-Dichloroethene	0.19	75 [a]	100 [a]	500 [b]	1,000 [c]	NS	0.19
1,3-Dichlorobenzene	2.6	11	38	280	280	NS	2.6
1,4-Dichlorobenzene	1.8	10	24	130	130	20	1.8
1,4-Dioxane	0.1 [l]	1.4	5.7	36	36	0.1 [e]	0.1 [e]
Acetone	0.03	100[a]	100[b]	500 [b]	1,000 [c]	2.2	0.03
Benzene	0.06	1.2	3.7	20	20	70	0.06
Butylbenzene	12	100[a]	100[a]	500 [b]	1,000 [c]	NS	12
Carbon tetrachloride	0.76	1.9	7.1	41	41	NS	0.76
Chlorobenzene	4.5	73	100[a]	500 [b]	1,000 [c]	40	4.5
Chloroform	0.37	4.8	24	180	180	12	0.37
Ethylbenzene	1	32	76	390	390	NS	1
Hexachlorobenzene	0.33 [l]	0.33[e]	0.33	1.8	2.9	NS	3.2
Methyl ethyl ketone	0.1	100 [a]	100 [a]	500 [b]	1,000 [c]	100 [a]	0.1
Methyl tert-butyl ether	0.1	40	100 [a]	500 [b]	890	NS	0.1
Methylene chloride	0.05	17	81	500 [b]	1,000 [c]	12	0.05
n-Propylbenzene	5	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	5
sec-Butylbenzene	25	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	25
tert-Butylbenzene	5.9	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	5.9
Tetrachloroethene	1.3	15	18	81	81	2	1.3
Toluene	0.7	100 [a]	100 [a]	500 [b]	1,000 [c]	36	0.7
Trichloroethene	0.47	1.7	6.4	54	54	2	0.47
1,2,4-Trimethylbenzene	3.6	47	52	190	380	NS	3.6
1,3,5- Trimethylbenzene	8.4	47	52	190	380	NS	8.4
Vinyl chloride	0.03	0.99	0.48	7.1	7.1	NS	0.03
Xylene (mixed)	0.26	100 [a]	100 [a]	500 [b]	1,000 [c]	0.26	1.2
Per-and Polyfluoroalkyl Substances (PFAs)[o]							
PFOA	0.00066	0.0066	0.033	0.5	0.6	NS	0.0011
PFOS	0.00088	0.0088	0.044	0.44	0.44	NS	0.0037

Notes:
[a] The SCOs for residential, restricted-residential and ecological resources use were capped at a maximum value of 100 ppm.
[b] The SCOs for commercial use were capped at a maximum value of 500 ppm.
[c] The SCOs for industrial use and the protection of groundwater were capped at a maximum value of 1000 ppm.
[d] The SCOs for metals were capped at a maximum value of 10,000 ppm.
[e] For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the SCO value.
[f] For constituents where the calculated SCO was lower than the rural soil background concentration as determined by the Department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 2 SCO value for this use of the site.
[g] This SCO is derived from data on mixed isomers of BHC.

[h] The SCO for this specific compound (or family of compounds) is considered to be met if the analysis for the total species of this contaminant is below the specific SCO.
[i] This SCO is for the sum of endosulfan I, endosulfan II, and endosulfan sulfate.
[j] Protection of public health SCOs for total mercury are based on either Rural Soil Background concentration for total mercury (0.3ppm) or most toxic mercury form that
[k] The SCOs for unrestricted use were capped at a maximum value of 100 ppm.
[l] For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the Track 1 SCO value.
[m] For constituents where the calculated SCO was lower than the rural soil background concentration, as determined by the Department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 1 SCO value for this use of the site.
[n] Protection of ecological resources SCOs were not developed for contaminants identified in Table 375-6.8(b) with "NS". Where such contaminants appear in Table 375-6.8(a), the applicant may be required by the Department to calculate a protection of ecological resources SCO according to the TSD.
[o] Protection of groundwater SCOs for Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA) are considered interim SCOs. The leaching and transport of these chemicals through the subsurface are not understood well at this time and are currently the focus of extensive scientific research. Any new scientific information will be considered in determining cleanup goals for remediation sites. These SCOs apply only to the remedial programs in 6NYCRR Part 375 and are not to be applied to other DEC regulatory programs unless directed by those programs.

Table 1B
Groundwater Criteria Table
161-03 29th Avenue, Flushing, NY
Quality Assurance Project Plan

Contaminant	Aqueous Water Quality Standards[1], ug/L
Metals	
Antimony	3
Arsenic	---
Arsenic	25
Barium	1,000
Beryllium	3
Cadmium	5
Chromium, hexavalent	---
Chromium, trivalent	50
Copper	200
Cyanide	---
Iron	300
Lead	25
Magnesium	35,000
Manganese	300
Mercury	0.7
Nickel	100
Selenium	10
Silver	50
Sodium	20,000
Thallium	0.5
Zinc	2000
PCBs/Pesticides	
alpha-BHC	0.01
2,4,5-TP Acid (Silvex)	---
4,4'-DDD	0.3
4,4'-DDE	0.2
4,4'-DDT	0.2
Aldrin	---
beta-BHC	0.04
Chlordane (alpha)	---
Dibenzofuran	---
Dieldrin	0.004
Endosulfan I	0.12
Endosulfan II	0.12
Endosulfan sulfate	0.12
Endrin	---
Endrin aldehyde	5
Endrin ketone	5
gamma-BHC (Lindane)	0.05

Table 1B
Groundwater Criteria Table
161-03 29th Avenue, Flushing, NY
Quality Assurance Project Plan

Contaminant	Aqueous Water Quality Standards[1], ug/L
PCBs/Pesticides, Con't.	
gamma-Chlordane	0.12
Heptachlor	0.04
Heptachlor epoxide	0.03
Lindane	---
Methoxychlor	35
Polychlorinated biphenyls	---
Toxaphene	0.06
Semivolatiles	
1,1'-Biphenyl	5
2,2'-oxybis(1-Chloropropane)	5
2,4,5-Trichlorophenol	1
2,4-Dichlorophenol	1
2,4-Dimethylphenol	50
2,4-Dinitrophenol	10
2,4-Dinitrotoluene	5
2,6-Dinitrotoluene	5
2-Chloronaphthalene	10
2-Chlorophenol	1
2-Methylnaphthalene	502
2-Methylphenol	1
2-Nitroaniline	5
2-Nitrophenol	1
3,3'-Dichlorobenzidine	5
3-Nitroaniline	5
4-Chloro-3-methylphenol	1
4-Chloroaniline	5
4-Methylphenol	1
4-Nitroaniline	5
4-Nitrophenol	1
Acenaphthene	20
Acenapthylene	202
Anthracene	50
Atrazine	7.5
Benz(a)anthracene	0.002
Benzo(a)pyrene	---
Benzo(b)fluoranthene	0.002
Benzo(g,h,i)perylene	52
Benzo(k)fluoranthene	0.002
bis(2-Chloroethoxy)methane	5

Table 1B
Groundwater Criteria Table
161-03 29th Avenue, Flushing, NY
Quality Assurance Project Plan

Contaminant	Aqueous Water Quality Standards[1], ug/L
Semivolatiles, Con't.	
Bis(2-Chloroethyl)ether	1
bis(2-Ethylhexyl)phthalate	5
Butylbenzylphthalate	50
Chrysene	0.002
Dibenz(a,h)anthracene	502
Dibenzofuran	52
Diethylphthalate	50
Dimethylphthalate	50
Di-n-butylphthalate	50
Di-n-octylphthalate	50
Fluoranthene	50
Fluorene	50
Hexachlorobenzene	0.04
Hexachlorobutadiene	0.5
Hexachlorocyclopentadiene	5
Hexachloroethane	5
Indeno(1,2,3-cd)pyrene	0.002
Isophorone	50
m-Cresol	---
Naphthalene	10
Nitrobenzene	0.4
N-Nitrosodiphenylamine	50
o-Cresol	---
p-Cresol	---
Pentachlorophenol	1
Phenanthrene	50
Phenol	1
Pyrene	50
Volatiles	
1,1,1-Trichloroethane	5
1,1,2,2-Tetrachloroethane	5
1,1,2-Trichloro-1,2,2-trifluoroethane	5
1,1,2-Trichloroethane	1
1,1-Dichloroethane	5
1,1-Dichloroethene	5
1,1-Dichloroethylene	---
1,2,4-Trichlorobenzene	---

Table 1B
Groundwater Criteria Table
161-03 29th Avenue, Flushing, NY
Quality Assurance Project Plan

Contaminant	Aqueous Water Quality Standards[1], ug/L
Volatiles, Con't.	
1,2,4-Trimethylbenzene	5
1,2-Dibromo-3-chloropropane	0.04
1,2-Dibromoethane	0.0006
1,2-Dichlorobenzene	3
1,2-Dichloroethane	0.6
1,2-Dichloropropane	1
1,3,5- Trimethylbenzene	---
1,3-Butadiene	---
1,3-Dichlorobenzene	3
1,3-Dichlorobenzene	---
1,4-Dichlorobenzene	3
1,4-Dichlorobenzene	---
1,4-Dioxane	0.35[2]
2-Butanone	50
2-Hexanone	50
4-Methyl-2-pentanone	502
Acetone	50
Benzene	1
Bromodichloromethane	50
Bromoform	50
Bromomethane	5
Butylbenzene	---
Carbon Disulfide	60
Carbon tetrachloride	5
Chlorobenzene	5
Chloroethane	5
Chloroform	7
Chloromethane	5
Cis- 1,3-Dichloropropene	0.4
cis-1,2-Dichloroethene	5
cis-1,2-Dichloroethylene	---
Cyclohexane	---
Dibromochloromethane	50
Dichlorodifluoromethane	5
Ethyl Acetate	---
Ethylbenzene	5
Freon 113	---
Hexachlorobenzene	---

Table 1B
Groundwater Criteria Table
161-03 29th Avenue, Flushing, NY
Quality Assurance Project Plan

Contaminant	Aqueous Water Quality Standards[1], ug/L
Volatiles, Con't.	
Hexachlorobutadiene	---
Hexane	---
Isopropylbenzene	5
m,p-Xylene	---
m-Dichlorobenzene	---
Methyl Acetate	NS
Methyl ethyl ketone	---
Methyl Isobutyl Ketone	---
Methyl tert-butyl ether	10
Methylcyclohexane	---
Methylene chloride	5
n-Propylbenzene	---
o-Dichlorobenzene	---
o-Xylene	---
p-Dichlorobenzene	---
sec-Butylbenzene	---
Styrene	5
tert-Butylbenzene	---
Tertiary Butyl Alcohol	---
Tetrachloroethene	5
Toluene	5
trans-1,2-Dichloroethene	5
trans-l,3-Dichloropropene	0.4
Trichloroethene	5
Trichlorofluoromethane	5
Vinyl Acetate	---
Vinyl Chloride	2
Xylene (mixed)	5
Per- and Polyfluoroalkyl Substances (PFAS)	
PFOA	0.0067[3]
PFOS	0.0027[3]

Notes:

[1] - Division of Water Technical and Operational Guidance Values (TOGS) Ambient Water Quality Standards and Guidance Values (AWQS), ug/L

[2] - Guidance value for PFOA, PFOS, and 1,4-dioxane is from the NYSDEC final AWQGVs, dated March 2023.

ug/L - micro gram per liter

Table 1C
Soil Vapor Criteria Table
161-03 29th Avenue, Flushing, NY
Quality Assurance Project Plan

Volatile Organics in Air	CAS No.	NYSDOH Soil Vapor Intrusion Guidance Criteria				Toxicity	Decision Matrix
		1	2	3	4		
1,1,1-Trichloroethane	71556	2.5	20.6	-	-	L	**B**
1,1,2,2-Tetrachloroethane	79345	0.4	-	-	-	M	TD
1,1,2-Trichloroethane	79005	0.4	<1.5	-	-	H	TD
1,1-Dichloroethane	75343	0.4	<0.7	-	-	L	TD
1,1-Dichloroethene	75354	0.4	<1.4	-	-	M	B
1,2,4-Trichlorobenzene	120821	0.5	<6.8	-	-	NA	TD
1,2,4-Trimethylbenzene	95636	9.8	9.5	-	-	NA	D
1,2-Dibromoethane	106934	0.4	<1.5	-	-	H	TD
1,2-Dichlorobenzene	95501	0.5	<1.2	-	-	M	TD
1,2-Dichloroethane	107062	0.4	<0.9	-	-	H	TD
1,2-Dichloropropane	78875	0.4	<1.6	-	-	M	TD
1,3,5-Trimethybenzene	108678	3.9	3.7	-	-	M	D
1,3-Butadiene	106990	-	<3.0	-	-	H	TD
1,3-Dichlorobenzene	541731	0.5	<2.4	-	-	M	TD
1,4-Dichlorobenzene	106467	1.2	5.5	344	-	M	TD
1,4-Dioxane	123911	-	-	-	-	M	TD
2,2,4-Trimethylpentane	540841	5	-	-	-	M	D
2-Butanone	78933	16	12	-	-	M	TD
2-Hexanone	591786	-	-	-	-	NA	TD
3-Chloropropene	107051	-	-	-	-	M	TD
4-Ethyltoluene	622968	-	3.6	-	-	NA	TD
4-Methyl-2-pentanone	108101	1.9	6	-	-	M	TD
Acetone	67641	115	98.9	45.8	-	L	TD
Benzene	71432	13	9.4	10	-	H	D
Benzyl chloride	100447	-	<6.8	-	-	H	TD
Bromodichloromethane	75274	-	-	-	-	M	TD
Bromoform	75252	-	-	-	-	M	TD
Bromomethane	74839	0.5	<1.7	-	-	M	TD
Carbon disulfide	75150	-	4.2	-	-	M	TD
Carbon tetrachloride	56235	1.3	<1.3	1.1	-	H	A
Chlorobenzene	108907	0.4	<0.9	-	-	M	TD
Chloroethane	75003	0.4	<1.1	-	-	L	TD
Chloroform	67663	1.2	1.1	6.34	-	H	TD
Chloromethane	74873	4.2	3.7	-	-	M	TD
cis-1,2-Dichloroethene	156592	0.4	<1.9	-	-	M	B
cis-1,3-Dichloropropene	10061015	0.4	<2.3	-	-	NA	TD
Cyclohexane	110827	6.3	-	-	-	L	D

Table 1C
Soil Vapor Criteria Table
161-03 29th Avenue, Flushing, NY
Quality Assurance Project Plan

Volatile Organics in Air	CAS No.	NYSDOH Soil Vapor Intrusion Guidance Criteria				Toxicity	Decision Matrix
		1	2	3	4		
Dibromochloromethane	124481	-	-	-	-	NA	TD
Dichlorodifluoromethane	75718	10	16.5	-	-	NA	TD
Ethanol	64175	1300	210	-	-	L	TD
Ethyl Acetate	141786	-	5.4	-	-	M	TD
Ethylbenzene	100414	6.4	5.7	7.62	-	M	D
Freon-113	76131	2.5	3.5	-	-	L	TD
Freon-114	76142	0.4	<6.8	-	-	NA	TD
Heptane	142825	18	-	-	-	M	E
Hexachlorobutadiene	87683	0.5	<6.8	-	-	M	TD
Isopropanol	67630	-	-	-	-	M	TD
Methyl tert butyl ether	1634044	14	11.5	36	-	M	TD
Methylene chloride	75092	16	10	7.5	60	NA	TD
n-Hexane	110543	14	10.2	-	-	M	E
o-Xylene	95476	7.1	7.9	7.24	-	M	D
p/m-Xylene	179601231	11	22.2	22.2	-	M	E
Styrene	100-42-5	1.4	1.9	5.13	-	M	TD
Tertiary butyl Alcohol	75-65-0	-	-	-	-	NA	TD
Tetrachloroethene (PCE)	127184	2.5	15.9	6.01	30	H	B
Tetrahydrofuran	109999	0.8	-	-	-	M	TD
Toluene	108883	57	43	39.8	-	L	F
trans-1,2-Dichloroethene	156605	-	-	-	-	NA	TD
trans-1,3-Dichloropropene	10061026	NC	<1.3	-	-	NA	TD
Trichloroethene	79016	0.5	4.2	1.36	2	H	A
Trichlorofluoromethane	75694	12	18.1	-	-	L	TD
Vinyl bromide	593602	-	-	-	-	H	TD
Vinyl chloride	75014	0.4	<1.9	-	-	H	A

Notes
Decision Criteria used:
Martix A: Sub-Slab >5, Indoor Air >5
Martix B: Sub-Slab >100, Indoor Air >30
Toxicities from DAR-1 Appendix C/SCG/ACG
(H) HIGH Toxicity Contaminant.
(M) MODERATE Toxicity Contaminant.
(L) LOW Toxicity Contaminant.

ND - Non-detect
NA - Not applicable
NFA - No further action
TD - To be determined based on the NYSDOH VI Decision
Reasonable - Take reasonable/practical actions to identify source/reduce exposure

NYSDOH Soil Vapor Intrusion Guidance Criteria
1 - Table C-1 2003 Upper Fence Study of Volatile Organic Chemicals in air of Fuel Oil Heated Homes for Indoor Air
2 - Table C-2 2001 USEPA BASE 90th Percentile for Indoor Air
3 -Table C-5 2005 Health Effects Institute 95th Percentile for Indoor Air
4 -NYSDOH Air Guidance Value
NYSDOH Specific Compounds for Matrix Evaluation

Table 2
Typical Analytical Parameters, Methods, Preservation, Holding Time and Container Requirements
161-03 29th Avenue, Flushing, NY 11358
Block 4889, Lots 60, 61, 62, and 63
BCP Site No. C241247

Sample Matrix	Analytical Parameter	Numer of Samples[1]	EPA Analytical Method	Sample Preservation	Holding Time[2]	Sample Container[3]
Soil	VOCs + TICs (TCL)	31	SW-846 Method 8260C/5035	Cool to 4^0 C no headspace	14 days to analysis	(3) Encore
Soil	PCBs	31	SW-846 Method 8082A	Cool to 4^0 C	365 days to analysis	(1) 250 mL amber glass jar
Soil	Pesticides (TCL)	31	SW-846 Method 8081A	Cool to 4^0 C	14 days to extraction	(1) 250 mL amber glass jar
Soil	SVOCs + TICs (TCL)	31	SW-846 Method 8270D	Cool to 4° C	14 days to extraction	(1) 250 mL amber glass jar
Soil	1,4-Dioxane	31	SW-846 Method 8270D	Cool to 4° C	7 days to extraction	(2) 250 mL amber glass jars
Soil	Metals	31	SW-846 Method 6010DSeries	Cool to 4^0 C	180 days to analysis	(1) 60 mL glass jar
Soil	Mercury	31	SW-846 Method 7470 A	Cool to 4^0 C	28 days to analysis	(1) 60 mL glass jar
Soil	Hexavalent chromium		EPA 3060A/7196A	Cool to 4^0 C	14 days to analysis	(1) 250 mL amber glass jar
Soil	Cyanide	31	SW-846 Method 9010C/9012B	Cool to 4^0 C	14 days to analysis	(1) 250 mL amber glass jar
Soil	Herbicides		SW-846 Method 8151A	Cool to 4^0 C	14 days to extraction	(1) 250 mL amber glass jar
Soil	PFAS	31	EPA Method 1633	Cool to 4^0 C	14 Days	(1) 250 mL plastic container
Groundwater	VOCs (TCL)	5	SW-846 Method 8260C	HCl; Cool to 4^0 C; no headspace	14 days to analysis	(3) Vial
Groundwater	VOCs with TICs, including 1,4-Dioxane (TCL)	5	SW-846 Method 8260C	HCl; Cool to 4^0 C; no headspace	14 days to analysis	(3) Vial
Groundwater	1,4-Dioxane	5	SW-846 Method 8270D	Cool to 4^0 C	7 days to analysis	(2) 250 mL amber glass jar
Groundwater	SVOCs (TCL)	5	SW-846 Method 8270D	Cool to 4^0 C	7 days to extraction	(2) 250 mL amber glass jar
Groundwater	SVOCs with TICs (TCL)	5	SW-846 Method 8270D	Cool to 4^0 C	7 days to extraction	(2) 250 mL amber glass jar
Groundwater	Metals- total (TAL)	5	SW-846 Method 6020B/7470A Series	HNO_3; Cool to 4° C	28 days to analysis for Hg; 180 days to analysis for other	(1) 500 mL plastic container
Groundwater	Metals-dissolved (TAL)	5	SW-846 Method 6020B/7470A Series	HNO3; Cool to 4° C	28 days to analysis for Hg; 180 days to analysis for other metals	(1) 500 mL plastic container
Groundwater	Pesticides (TCL)	5	SW-846 Method 8081B	Cool to 4^0 C	7 days to extraction	(2) 120 mL amber glass jar
Groundwater	Herbicides (TCL)	5	SW-846 Method 8151A	Cool to 4^0 C	7 days to extraction	(2) 1000 mL amber glass jar
Groundwater	PCBs	5	SW-846 Method 8082A	Cool to 4^0 C	365 days to analysis	(1) 250 mL amber glass jar
Groundwater	Cyanide	5	SW-846 Method 9012A	Cool to 4^0 C	14 days to analysis	(1) 250 mL amber glass jar
Groundwater	Hexavalent chromium	5	EPA 3060A/7196A	Cool to 4^0 C	14 days to analysis	(1) 250 mL amber glass jar
Groundwater	Mercury	5	SW-846 Method 7470 A	HNO3; Cool to 4° C	28 days to analysis	(1) 250 mL plastic container
Groundwater	PFAS	5	EPA Method 1633	Cool to 4^0 C	14 Days	(1) 250 mL plastic container
Soil Vapor	VOCs	15	EPA Method TO-15	None	14 days to analysis	(1) Evacuated 6-Liter SUMMA® canister

Notes:
[1] Actual number of samples may vary depending on field conditions, sample material availability, and field observations. See RIWP for estimates.

[2] Holding times listed are method holding time calculated from time of collection and not NYSDEC ASP holding times.

[3] MS/MSDs require duplicate volume for all parameters for solid matrices; MS/MSDs require triplicate volume for organic parameters for aqueous matrices and duplicate volume for inorganic parameters for aqueous matrices

Table 3
Typical Laboratory Data Quality Objectives
Soil Samples
161-03 29th Avenue, Flushing, NY 11358
Block 4889, Lots 60, 61, 62, and 63
BCP Site No. C241247

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
VOCs (TCL)	SW-846 Methods 8260B/5035	Soil	Surrogates % Rec. 1,2-Dichloroethane-d4 70-130 4-Bromofluorobenzene 70-130 Dibromofluoromethane 70-130 Toluene-d8 70-130 2-Chloroethoxyethane 70-130 Matrix Spikes 30-151% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 30 per matrix type	Field Duplicates RPD <30 MS/MSDs (RPD) RPD <30	Field Duplicates: One per 20 per soils MS/MSDs: One per 30 per matrix type
VOCs with Tentatively Identified Compounds (TICs)	SW-846 Method 8260C	Soil	Surrogates % Rec. 1,2-Dichloroethane-d4 70-130 4-Bromofluorobenzene 70-130 Dibromofluoromethane 70-130 Toluene-d8 70-130 Matrix Spikes 36-162 % recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20	Field Duplicates RPD <30 MS/MSDs RPD RPD<30	Field Duplicates: One per 20 MS/MSDs: One per 20
PCBs	SW-846 Method 8082A	Soil	Surrogates % Rec. 2,4,5,6-Tetrachloro-m-xylene 30-150 Decachlorobiphenyl 30-150 Matrix Spikes 40-140% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <50 MS/MSDs (RPD) RPD<50	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type
SVOCs	SW-846 Method 8270D	Soil	Surrogates % Rec. Phenol-d6 10-120 2-Fluorophenol 25-120 2,4,6-Tribromophenol 10-136 Nitrobenzene-d5 23-120 2-Fluorobiphenyl 30-120 4-Terphenyl-d14 18-120 Matrix Spikes 14-144% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 50 per matrix type	Field Duplicates RPD <50 MS/MSDs (RPD)	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type
SVOCs with TICs	SW-846 Method 8270D	Soil	Surrogates % Rec. Phenol-d5 10-120 2-Fluorophenol 21-120 2,4,6-Tribromophenol 10-120 Nitrobenzene-d5 23-120 2-Fluorobiphenyl 15-120 4-Terphenyl-d14 41-149 Matrix Spikes 14-144%	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20	Field Duplicates RPD <50 MS/MSDs RPD RPD<50	Field Duplicates: One per 20 MS/MSDs: One per 20
1,4-Dioxane	SW-846 Method 8270D	Soil	Surrogates % Rec. 1,4-Dioxane-d8 15-110 Matrix Spikes 40-140% recovery	Surrogates: All samples, standards, QC samples	Field Duplicates RPD <30 MS/MSDs (RPD) RPD<30	Field Duplicates: One per 20 per soils MS/MSDs: One per 20
Pesticides (TCL)	SW-846 Method 8081A	Soil	Surrogates % Rec. Decachlorobiphenyl 30-150 Tetrachloro-m-xylene 30-150 Matrix Spikes 30-150% Recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <50 MS/MSDs (RPD) RPD<50	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type
Total Petroleum Hydrocarbons	SW-846 Method 8015B	Soil	Surrogates % Rec. o-Terphenyl 27-153 Tetracosane-d50 28-148 5α-androstane 27-148 TPH-DRO 10-149	Surrogates: All samples, standards, QC samples One per 20 per matrix type	Field Duplicates RPD <50 TPH-DRO 44	Field Duplicates: One per 20 per soils One per 20 per matrix type
Herbicides	SW-846 Method 8151A	Soil	Surrogates % Rec. 2,4-DCAA 30-150 Matrix Spikes 30-150% Recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <50 MS/MSDs (RPD) RPD<50	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type
Metals (TAL)	SW-846 Method 6010D	Soil	Surrogates % Rec. Matrix Spikes 75-125% recovery	Surrogates: Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <20 MS/MSDs (RPD) RPD <20	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type

Table 3
Typical Laboratory Data Quality Objectives
Soil Samples
161-03 29th Avenue, Flushing, NY 11358
Block 4889, Lots 60, 61, 62, and 63
BCP Site No. C241247

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
PFAs	LCMSMS-Isotope Dilution	Soil	Surrogates % Rec. Perfluoro[13C4]Butanoic Acid (MPFBA) 61-135 Perfluoro[13C4]Butanoic Acid (MPFBA) 58-132 Perfluoro[13C5]Pentanoic Acid (M5PFPEA) 62-163 Perfluoro[13C5]Pentanoic Acid (M5PFPEA) 58-150 Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS) 70-131 Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS) 74-139 Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA) 57-129 Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA) 66-128 Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA) 60-129 Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA) 71-129 Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS) 71-134 Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS) 78-139 Perfluoro[13C8]Octanoic Acid (M8PFOA) 62-129 Perfluoro[13C8]Octanoic Acid (M8PFOA) 75-130 1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS) 14-147 1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS) 20-154 Perfluoro[13C9]Nonanoic Acid (M9PFNA) 59-139 Perfluoro[13C9]Nonanoic Acid (M9PFNA) 72-140 Perfluoro[13C8]Octanesulfonic Acid (M8PFOS) 79-136 Perfluoro[13C8]Octanesulfonic Acid (M8PFOS) 69-131 Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA) 75-130 Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA) 62-124 1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS) 19-175 1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS) 10-162 N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA) 24-116 N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA) 31-134 Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA) 61-155 Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA) 55-137 Perfluoro[13C8]Octanesulfonamide (M8FOSA) 10-112 Perfluoro[13C8]Octanesulfonamide (M8FOSA) 10-117 N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA) 34-137 N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA) 27-126 Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA) 48-131 Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA) 54-150 Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA) 22-136 Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA) 24-159 Matrix Spikes 46-182% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <30 MS/MSDs (RPD) RPD <30	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type
Mercury	SW-846 Method 7471B	Soil	Surrogates % Rec. Matrix Spikes 80-125% recovery	Surrogates: Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <20 MS/MSDs (RPD) RPD <20	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type
Cyanide	SW-846 Method 9012A	Soil	Surrogates % Rec. Matrix Spikes 75-125% Recovery	Surrogates: Matrix Spikes: One per 35 per matrix type	Field Duplicates RPD <35 MS/MSDs (RPD) RPD <35	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type

Recovery criteria for laboratory control samples must be at least as stringent as MS/MSD criteria.
Laboratory control limits are periodically updated. The latest control limits will be utilized at the time of sample analysis.

Table 4
Typical Laboratory Data Quality Objectives
Groundwater Samples
161-03 29th Avenue, Flushing, NY 11358
Block 4889, Lots 60, 61, 62, and 63
BCP Site No. C241247

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
VOCs (TCL)	SW-846 Method 8260C	Groundwater	Surrogates % Rec. 1,2-Dichloroethane-d4 70-130 4-Bromofluorobenzene 70-130 Dibromofluoromethane 70-130 Toluene-d8 70-130 Matrix Spikes 36-162 % recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20	Field Duplicates RPD <20 MS/MSDs RPD RPD <20	Field Duplicates: One per 20 MS/MSDs: One per 20
VOCs with Tentatively Identified Compounds (TICs)	SW-846 Method 8260C	Groundwater	Surrogates % Rec. 1,2-Dichloroethane-d4 70-130 4-Bromofluorobenzene 70-130 Dibromofluoromethane 70-130 Toluene-d8 70-130 Matrix Spikes 36-162 % recovery	Surrogates: All samples, standards, QC Matrix Spikes: One per 20	Field Duplicates RPD <20 MS/MSDs RPD RPD <20	Field Duplicates: One per 20 MS/MSDs: One per 20
SVOCs TCL	SW-846 Method 8270D	Groundwater	Surrogates % Rec. Phenol-d5 10-120 2-Fluorophenol 21-120 2,4,6-Tribromophenol 10-120 Nitrobenzene-d5 23-120 2-Fluorobiphenyl 15-120 4-Terphenyl-d14 41-149 Matrix Spikes 14-144%	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20	Field Duplicates RPD <50 MS/MSDs RPD RPD <50	Field Duplicates: One per 20 MS/MSDs: One per 20
SVOCs with TICs	SW-846 Method 8270D	Groundwater	Surrogates % Rec. Phenol-d5 10-120 2-Fluorophenol 21-120 2,4,6-Tribromophenol 10-120 Nitrobenzene-d5 23-120 2-Fluorobiphenyl 15-120 4-Terphenyl-d14 41-149 Matrix Spikes 14-144%	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20	Field Duplicates: RPD <50 MS/MSDs RPD RPD <50	Field Duplicates: One per 20 MS/MSDs: One per 20
1,4-Dioxane	SW-846 Method 8270D	Groundwater	Surrogates % Rec. 1,4-Dioxane-d8 15-110 Matrix Spikes 40-140% recovery	Surrogates: All samples, standards, QC samples	Field Duplicates RPD <30 Matrix Duplicates RPD<30	Field Duplicates: One per 20 per soils MS/MSDs: One per 20
Metals (Total and Dissolved)	SW-846 Methods 6020B	Groundwater	Matrix Spikes 75-125% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20	Field Duplicates RPD <20 Matrix Duplicates RPD <20	Field Duplicates: One per 20 MS/MSDs: One per 20
Mercury (Total and Dissolved)	SW-846 Methods 7470A	Groundwater	Matrix Spikes 75-125% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20	Field Duplicates RPD <35 (dissolved) RPD<20 (Total) Matrix Duplicates RPD <35 (dissolved) RPD<20 (Total)	Field Duplicates: One per 20 MS/MSDs: One per 20
PCBs	SW-846 Method 8082A	Groundwater	Surrogates % Rec. 2,4,5,6-Tetrachloro-m-xylene 30-150 Decachlorobiphenyl 30-150 Matrix Spikes 40-140% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <50 MS/MSDs (RPD) RPD<50	Field Duplicates: One per 20 MS/MSDs: One per 20 per matrix type
Herbicides	SW-846 Method 8151A	Groundwater	Surrogates % Rec. 2,4-DCAA 30-150 Matrix Spikes 30-150% Recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20 per matrix type	Field Duplicates: RPD <50 MS/MSDs (RPD) RPD<50	Field Duplicates: One per 20 MS/MSDs: One per 20 per matrix type

Table 4
Typical Laboratory Data Quality Objectives
Groundwater Samples
161-03 29th Avenue, Flushing, NY 11358
Block 4889, Lots 60, 61, 62, and 63
BCP Site No. C241247

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
Pesticides (TCL)	SW-846 Method 8081B	Groundwater	Surrogates % Rec. Decachlorobiphenyl 15-142 2,4,5,6-Tetrachloro-m-xylene 36-126 Matrix Spikes 30-150% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20	Field Duplicates RPD <30 MS/MSDs RPD RPD <30	Field Duplicates: One per 20 MS/MSDs: One per 20
PFAs	EPA Method 1633	Grounwater	Surrogates Perfluoro[13C4]Butanoic Acid (MPFBA) Perfluoro[13C4]Butanoic Acid (MPFBA) Perfluoro[13C5]Pentanoic Acid (M5PFPEA) Perfluoro[13C5]Pentanoic Acid (M5PFPEA) Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS) Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS) Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA) Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA) Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA) Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA) Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS) Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS) Perfluoro[13C8]Octanoic Acid (M8PFOA) Perfluoro[13C8]Octanoic Acid (M8PFOA) 1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2- 1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2- Perfluoro[13C9]Nonanoic Acid (M9PFNA) Perfluoro[13C9]Nonanoic Acid (M9PFNA) Perfluoro[13C8]Octanesulfonic Acid (M8PFOS) Perfluoro[13C8]Octanesulfonic Acid (M8PFOS) Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA) Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA) 1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2- 1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2- N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA) Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA) Perfluoro[13C8]Octanesulfonamide (M8FOSA) Perfluoro[13C8]Octanesulfonamide (M8FOSA) N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA) Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA) Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA) Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA) Matrix Spikes 46-182% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <30 MS/MSDs (RPD) RPD <30	Field Duplicates: One per 20 MS/MSDs: One per 20 per matrix
Cyanide	EPA Method 9012B	Groundwater	 Matrix Spikes 75-125% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 35	Field Duplicates RPD <35 Matrix Duplicates RPD <35	Field Duplicates: One per 20 Matrix Duplicates: One per 20

Recovery criteria for laboratory control samples must be at least as stringent as MS/MSD criteria.

Laboratory control limits are periodically updated. The latest control limits will be utilized at the time of sample analysis.

Table 5
Typical Laboratory Data Quality Objectives
Soil Gas Samples
161-03 29th Avenue, Flushing, NY 11358
Block 4889, Lots 60, 61, 62, and 63
BCP Site No. C241247

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
VOCs	EPA Method TO-15	Soil Gas	Surrogates % Rec. 4-Bromofluorobenzene 78-124	Surrogates: All samples, standards, QC samples	Matrix Duplicates RPD < 30	Matrix Duplicates One per 20

Table 6
QC Sample Preservation and Container Requirements
161-03 29th Avenue, Flushing, NY 11358
Block 4889, Lots 60, 61, 62, and 63
BCP Site No. C241247

Sample Matrix	Analytical Parameter	No. of Samples	EPA Analytical Method	Sample Preservation	Holding Time[1]	Sample Container
Soil	VOCs (TCL)	2	SW-846 Method 8260C/5035	Cool to 4^0 C; no headspace	14 days to analysis	(3) Encore
Soil	PCBs	2	SW-846 Method 8082A	Cool to 4^0 C	365 days to analysis	(1) 250 mL amber glass jar
Soil	SVOCs (TCL)	2	SW-846 Method 8270D	Cool to 4° C	14 days to extraction	(1) 250 mL amber glass jar
Soil	1,4-Dioxane	2	SW-846 Method 8270D	Cool to 4° C	7 days to extraction	(2) 250 mL amber glass jars
Soil	Metals (TAL)	2	SW-846 Method 6010DSeries	Cool to 4^0 C	180 days to analysis	(1) 60 mL glass jar
Soil	Mercury	2	SW-846 Method 7471B	Cool to 4^0 C	28 days to analysis	(1) 60 mL glass jar
Soil	Hexavalent chromium	2	EPA 3060A/7196A	Cool to 4^0 C	14 days to analysis	(1) 250 mL amber glass jar
Soil	Cyanide	2	SW-846 Method 9010C/9012B	Cool to 4^0 C	14 days to analysis	(1) 250 mL amber glass jar
Soil	Herbicides	2	SW-846 Method 8151A	Cool to 4^0 C	14 days to extraction	(1) 250 mL amber glass jar
Soil	Pesticides	2	SW-846 Method 8141A[6]	Cool to 4^0 C	14 days to extraction	(1) 300 mL amber glass jar
Soil	PFAS	2	EPA Method 1633	Cool to 4^0 C	14 Days	(1) 250 mL plastic container

Table 6
QC Sample Preservation and Container Requirements
161-03 29th Avenue, Flushing, NY 11358
Block 4889, Lots 60, 61, 62, and 63
BCP Site No. C241247

Groundwater	VOCs (TCL)	1	SW-846 Method 8260C	HCl; Cool to 4^0 C; no headspace	14 days to analysis	(3) Vial
Groundwater	1,4-Dioxane	1	SW-846 Method 8270D	Cool to 4^0 C	7 days to analysis	(2) 250 mL amber glass jar
Groundwater	SVOCs (TCL)	1	SW-846 Method 8270D	Cool to 4^0 C	7 days to extraction	(2) 250 mL amber glass jar
Groundwater	Metals- total (TAL)	1	SW-846 Method 6020B/7470A Series	HNO_3; Cool to 4° C	28 days to analysis for Hg; 180 days to analysis for other metals	(1) 500 mL plastic container
Groundwater	Metals-dissolved (TAL)	1	SW-846 Method 6020B/7470A Series	HNO3; Cool to 4° C	28 days to analysis for Hg; 180 days to analysis for other metals	(1) 500 mL plastic container
Groundwater	Pesticides (TCL)	1	SW-846 Method 8081B	Cool to 4^0 C	7 days to extraction	(2) 120 mL amber glass jar
Groundwater	Herbicides (TCL)	1	SW-846 Method 8151A	Cool to 4^0 C	7 days to extraction	(2) 1000 mL amber glass jar
Groundwater	PCBs	1	SW-846 Method 8082A	Cool to 4^0 C	365 days to analysis	(1) 250 mL amber glass jar
Groundwater	Hexavalent Chromium	1	EPA 3060A/7196A	Cool to 4^0 C	14 days to analysis	(1) 250 mL amber glass jar
Groundwater	Cyanide	1	SW-846 Method 9012A	Cool to 4^0 C	14 days to analysis	(1) 250 mL amber glass jar
Groundwater	Mercury	1	SW-846 Method 7470 A	HNO3; Cool to 4° C	28 days to analysis	(1) 250 mL plastic container
Groundwater	PFAS	1	EPA Method 1633	Cool to 4^0 C	14 Days	(1) 250 mL plastic container
Soil Vapr	VOCs	1	EPA Method TO-15	None	14 days to analysis	(1) Evacuated 6-Liter SUMMA® canister

Notes:
1 Holding times listed are method holding time calculated from time of collection and not NYSDEC ASP holding times.

ATTACHMENTS



Chunhua Liu, PhD

Senior Technical Specialist

Summary of Experience

Dr. Liu is a senior chemist with more than 10 years of experience in analytical chemistry, data validation and management, and quality control and quality assurance for remedial investigations and remedial actions. Her experience includes laboratory chemical analysis, EPA Region I and Region II data validation and data usability evaluation, data usability evaluation for Massachusetts Contingency Plan (MCP), sampling and analysis plan development in accordance with the NYSDEC Analytical Service Protocol and Massachusetts Compendium of Quality Assurance and Quality Control Requirements (QA/QC) and Performance Standards for Selected Analytical Methods, and quality control and quality assurance for Superfund and MCP projects.

Dr. Liu majored in environmental chemistry and during her doctoral study at Harvard School of Public Health, she researched analytical methods for sediment and evaluated metal fate and transport in sediment. Dr. Liu worked at Parsons for over seven years and at Gradient for one year before joining GZA. At Parsons, Dr. Liu led the quality control and assurance and data management efforts from developing Quality Assurance Project Plan (QAPP) to assuring implementation of QA/QC requirements and from field sampling preparation and arrangement to chemical data management. Dr. Liu was responsible for the QA/QC and data validation and data usability evaluation for a 10,000-acre BRAC and Superfund NPL site in New York and assisted in the successful transfer of over 8,000 acres of land. Dr. Liu performed data usability evaluation for various Massachusetts Contingency Plan sites at Gradient and GZA.

Education

B.E., 1992, Environmental Engineering, Tsinghua University, Beijing, China
M.E., 1995, Environmental Engineering, Tsinghua University, Beijing, China
M.S., 1998, Environmental Health, Harvard School of Public Health
D.S., 2000, Environmental Chemistry, Harvard School of Public Health

Areas of Specialization

- Human Health Risk Assessment
- Ecological Risk Assessment
- Data Usability Evaluation
- Project Quality Control and Assurance
- Fate and Transport Modeling

Relevant Project Experience

Senior Technical Specialist. Leads GZA human health risk assessment efforts for federal and state level superfund and MCP projects. Dr. Liu is also responsible for data usability evaluation for various projects.

Technical Director. Directed preparation and submittal of the Site-Wide Sampling and Analysis Plan (SAP) and the Site-Wide Quality Assurance Project Plan (QAPP) for a 10,000-acre Superfund site in New York in accordance with the Department of Defense (DOD), NYSDEC ASP, EPA Region II and EPA guidance. Directed project field sampling and data management. Supervised data validation in accordance with EPA Region II SOPs and NYSDEC ASP based on the NYSDEC ASP Category B deliverables. Identified laboratories qualified for project chemical analyses and interfaced with various analytical laboratories to address analytical deficiencies. Submitted data summary report to EPA Region II on a quarterly basis.

Lead Chemist and Risk Assessor. Led data usability evaluation and supported the successful closure of a 125-acre Hingham Annex Guaranteed Fixed Price Remediation Project. Dr. Liu also led the risk assessment effort and the effort of evaluating pesticide fate and transport at the site and successfully demonstrated that the pesticide conditions at the site were related to the past normal use of pesticides and therefore were not associated with the release at the Site.

Technical Director. Directed preparation and submittal of the SAP and the QAPP for various Formerly Used Defense (FUD) Sites. Supervised field sampling and data

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validation in accordance with guidance from various EPA regions. Reviewed data validation and data usability report.

Technical Director. Directed data validation for various Superfund sites in EPA Region I and Region II in accordance with the EPA regional and state SOPs and the EPA Functional Guidelines. Led data validation for numerous MCP sites for various analytical analyses including metal, VOC, SVOC, pesticide, PCB, EPH, VPH, and TPH analyses.

Project Chemist. Evaluated different analytical methods for hexavalent chromium analysis. Compared analytical methods developed by NJDEP and EPA and identified the appropriate method for a CERCLA site in New Jersey.

Project Chemist. Evaluated quantitatively potential impacts to metal data usability by interference caused by common metals in environmental samples for a CERCLA site in New York.

Project Chemist. Performed data validation for indoor air samples for various CERCLA and MCP Sites to assist evaluation of potential vapor intrusion pathway.

Project Chemist. Performed Level IV data validation for a Superfund site in New York for various analytical analyses including metal, VOC, SVOC, pesticide, and PCB analyses. Reviewed TIC identification and quantitation and assessed chromatograms and mass spectrums for VOCs and SVOCs.

Project Chemist. Provided technical support, prepared QAPPs, established proper data quality objectives (DQOs) for various projects, maintained project quality control, trained junior scientists, coordinated project field sampling and laboratory analyses, addressed non-conformance issues associated with the data produced by the laboratory, conducted statistical analysis, and prepared data validation reports on numerous RCRA/CERCLA and MCP projects.

ENVIRONMENTAL ASSESSMENT AND REMEDIATION PROJECTS

(Former Malden MGP) Senior Scientist - Lead Risk Assessor, Chemist, Site Assessment, Malden, Massachusetts. Leading ongoing risk assessment work at large, complex former MGP that encompasses more than 16 acres of land and more than 10 different properties. Work has included vapor intrusion pathway evaluation, imminent hazard evaluation, substantial hazard evaluation, data usability evaluation, and risk characterizations for evaluation of effectiveness of sub-slab depressurization systems and remediation, direction of Site remediation and investigations, and verification of the need for AULs. GZA was able to demonstrate that indoor air impacts in a residential area were not related to MGP residuals, allowing for closure of that portion of the Site. Risk characterizations also demonstrated that Site conditions did not pose substantial hazards, confirming the effectiveness of the Temporary Solution.

(Commercial Point LNG Facility) Senior Scientist - Lead Risk Assessor, Site Assessment and Closure, Dorchester Massachusetts. Directed risk characterization to support MCP closure of former MGP facility that was currently being used as a Liquefied Natural Gas (LNG) storage and distribution facility. Performed risk characterization to support supplemental Phase II – IV MCP investigations and Permanent Solution status while allowing for beneficial reuse of the facility for LNG operations and a solar power generating facility. Also performed focused risk characterizations in support of an AUL filing and potential reuse options for portions of the Site.

(Former Haverhill Holder Site) Senior Scientist - Lead Risk Assessor, Site Closure, Haverhill Massachusetts. Directed risk characterization to support MCP closure of former MGP gas holder facility where wastes had been disposed. Conducted risk characterization to facilitate development of cost-effective cleanup plan involving focused soil excavation and use restrictions that allowed for achievement of a Permanent Solution. Performed a Method 3 risk characterization to support the complex supplemental Phase II investigation. This complex site encompassed properties owned by seven different parties, including residential land and portions of a river/tributary system.

(Gloucester Former MGP) Senior Scientist - Lead Risk Assessor, Human Health Risk Assessment, North Shore, Massachusetts. Performed Method 3 Risk Characterization for multiple parcels to support the Supplemental Phase II Comprehensive Site Assessment initiated by other consultants under the Massachusetts Contingency Plan. This Site included MGP impacts to

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approximately 45 acres of Gloucester Harbor sediment. GZA evaluated potential human health risks via exposure to soil, groundwater, sediment, surface water, homegrown produce, and consumption of fish. In addition, Risk Characterization was used in the early stages of the project to assist identification of data gaps and Site investigation.

(Salem Power Plant) Project Manager, Cost Recovery Negotiations, Salem, Massachusetts. Working through counsel, provided advice to a prior owner with respect to remedial obligations under the Massachusetts Contingency Plan (MCP) associated with impacts to soil at this power generating facility. Work included review of hot spot evaluation, risk characterization, and remediation performed at the Site. Given the Site use, we concluded that most of the claimed costs that had been incurred by the current owner were not necessary under the MCP and thus should not be subject to recovery from our client.

(Sawyer Passway) Senior Scientist - Lead Risk Assessor, Chemist, MGP Site Closure, Fitchburg, Massachusetts. Performed a Substantial Hazard Evaluation and a Method 3 Risk Characterization to support fast-track Massachusetts Contingency Plan (MCP) Phase II/III study of large, complex former MGP facility on the banks of a major New England river. The work had to be completed within two months to meet a key regulatory deadline. Work included a risk evaluation to support a streamlined supplemental field exploration program, a risk evaluation to direct the focused soil excavation, and a substantial hazard evaluation for the cost-effective temporary solution within the required regulatory deadlines. GZA's continuing work on this project has included technical support for an insurance cost-recovery claim, periodic evaluations of the temporary solution, completion of soil stabilization/solidification pilot studies, implementation of focused remedial programs during site building demolition work and development of remedial, plans directed at achieving a Permanent Solution (PS). Based on updated evaluations, a cost-effective approach to a PS was developed in 2014 and a Method 3 Risk Characterization was performed to support a PSS in 2015.

(Former Army Depot Activity Site), Technical Director, Syracuse, New York. Directed preparation and submittal of the Site-Wide Sampling and Analysis Plan (SAP) and the Site-Wide QAPP for a 10,000-acre Superfund site in New York in accordance with the Department of Defense (DOD), NYSDEC ASP, USEPA Region II and USEPA guidance. Directed project field sampling and data management. Supervised data validation in accordance with USEPA Region II SOPs and NYSDEC ASP based on the NYSDEC ASP Category B deliverables. Identified laboratories qualified for project chemical analyses and interfaced with various analytical laboratories to address analytical deficiencies. Submitted data summary report to USEPA Region II on a quarterly basis.

(Waverley Oaks Road), Senior Scientist - Lead Risk Assessor, Human Health Risk Assessment, Waltham, Massachusetts. This property has been impacted by improper storage of large quantities of waste oil that was to be used to heat on-site green houses, or to be processed and resold. This Site is regulated under the Massachusetts Contingency Plan; Massachusetts Department of Environmental Protection reviewed and approved all work plans and reports for the site investigation and risk assessment; it was downgraded from a Tier 1A to a Tier 1B Site following completion of the Phase II investigations.

Waste oil releases have impacted nearly 10-acres of an on-Site pond, stream and wetland, including 3 acres that have visible oil presented within surficial wetland soil and sediment. GZA conducted a Method 3 Risk Characterization to support the permanent solution of the Site. For the Vapor Intrusion pathway, GZA identified constituents not related to Site release and verified the conclusion based on the evaluation of Site-specific attenuation factors.

Publications and Presentations

Liu, C., J. Jay, T. Ford. Evaluation of Environmental Effects on Metal Transport from Capped Contaminated Sediment under Conditions of Submarine Groundwater Discharge. Env. Sci. Tech. 2001 35: 4549-4555.

Liu, C., J. Jay, R. Ika, S. James, and T. Ford. Capping efficiency for metal-contaminated marine sediment under conditions of groundwater inflow. Env. Sci. Tech. 2001 35: 2334-2340.

Blanchet, R., Liu, C., Bowers, T. Summary of Available Freshwater and Marine Sediment Quality Guidelines and Their Use in North America. Abstract accepted at SEATEC Conference, November, 2001

Blanchet, R., Liu, C., Bowers, T. Estimation of Average Exposure Point Concentrations for Pesticides Assuming Accumulation and Degradation in the Environment. Abstract accepted at SEATEC Conference, November, 2001

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Seeley, M.R., Schettler, S., Liu, C., Blanchet, R.J., Bowers, T.S. Assessing Cancer Risks Due to Use of Insecticides to Control the Mosquito-borne West Nile Virus: Use of the Margin of Exposure Approach. Abstract accepted at Society of Toxicology, 41st Annual Meeting, March 17-21, 2002.

Chunhua Liu, Jennifer Jay, Ravi Ika, Shine James, Timothy Ford. Capping Efficiency for Metal-Contaminated Marine Sediment under Conditions of Submarine Groundwater Discharge. Poster presentation at Conference on Dredged Material Management: Options and Environmental Considerations. December 3-6, 2000

Chunhua Liu, Jennifer Jay, Timothy Ford. Evaluation of Environmental Effects on Metal Transport from Capped Contaminated Sediment Under Conditions of Submarine Groundwater Discharge. Poster presentation at Conference on Dredged Material Management: Options and Environmental Considerations. December 3-6, 2000

Chunhua Liu, Jennifer Jay, Timothy Ford. Core analysis: Is it a good indicator of metal release and capping efficiency? Poster presentation at Conference on Dredged Material Management: Options and Environmental Considerations. December 3-6, 2000

Chunhua Liu. 2000. Capping Efficiency for Metal Contaminated Marine Sediment under Conditions of Submarine Groundwater Discharge. Doctoral Thesis. Harvard School of Public Health

Chunhua Liu, Ravi Ika, Tim Ford. 1998. Metal flux in near shore capping sites under conditions of submarine groundwater discharge. In: Fourth Marine & Estuarine Shallow Water Science & Management Conference. March 15-19, 1998

Wei Lin, Guowei Fu, Chunhua Liu. 1996. Study on allocating permissible pollutants discharge based on axioms system. Chin. J. Environ. Sci. 1996 17(3):35-37

Wei Lin, Chunhua Liu, Guowei Fu. 1995. Environmental conflict analysis and its application in environmental planning and management: siting of public facilities. Chin. J. Environ. Sci. 1995 16(6): 36-39

Chunhua Liu, Yongfeng Nie, Wei Lin. 1995. Application prospects of landfill gas utilization technique in China. Pollution Control Technology 1995 8(3): 143-145

Chunhua Liu. 1995. Evaluation of gas production from sanitary landfill. Master's thesis. Tsinghua University, Beijing, P.R.China

Wei Lin, Chunhua Liu. 1994. Rudimentary study on countermeasure to comprehensively control air pollution caused by motor vehicles in China. Pollution Control Technology 1994 7(4): 1-3

Xiurong Zhang, Chunhua Liu, Yanru Yang, Qingzhong Bai. 1993. Environmental impact report of wastewater treatment plant project in Xuanhua City, China.

Chunhua Liu, Yongfeng Nie. 1993. Water balance evaluation in Hongmei hazardous waste landfill. In: Environmental Impact Assessment of Hongmei Hazardous Waste Landfill: 25-33

Chunhua Liu. 1992. Modeling landfill leachate production and migration. Bachelor Thesis. Tsinghua University, Beijing, P.R.China

Chunhua Liu. 1991. A discussion with the author of "clean water extraction from ocean water". Technology of Water Purification 1991(1): 39-41

Affiliations/Memberships

- Member, LSP Association
- Member, Society for Risk Analysis
- Certified EIT in Massachusetts

APPENDIX B

HEALTH AND SAFETY PLAN

GZA SITE-SPECIFIC HEALTH, SAFETY & ACCIDENT PREVENTION STANDARD-PLAN

1. CLIENT/SITE/PROJECT INFORMATION		
Client: 16103-11 29th Avenue LLC c/o Procida Management Inc.		
Site Address: 161-01 to 161-11 29th Avenue, Flushing, NY 11388		
Site Description (be sure to list pertinent site features, chemicals used at the facility, and other potential hazard sources: The approximately 0.302-acre Site is comprised of six continuous tax parcels identified in the Queens County Tax Map. The Site is located on the northeast corner of the intersection of 29th Avenue and 16th Street in the Flushing neighborhood of Queens, NY.		
Work Environment (active manufacturing, office, vacant site, undeveloped property, etc.): Multiple two story buildings and a parking lot.		
Job/Project #: 41.0163350.00	Estimated Start Date: 10/21/24	Estimated Finish Date: 10/24/24
Site is Covered by the Following Regulations:	OSHA HAZWOPER Standard ☒	Mine Safety and Health Administration ☐
	OSHA Construction Regulations ☐	OSHA General Industry Regulations ☐

2. EMERGENCY INFORMATION		
Hospital Name: Flushing Hospital Medical Center		Hospital Phone: 718-670-5000
Hospital Address: 4500 Parsons Blvd, Flushing, New York 11355		Directions and Street Map Attached: ☒ Yes
Local Fire #: 911	Local Ambulance #: 911	Local Police #: 911
WorkCare Incident Intervention Services:	**For non-emergencies, if an employee becomes hurt or sick call 888-449-7787**	
Other Emergency Contact(s): Reinbill Maniquez	Phone #'s: (347) 443-1059	

Google Maps Flushing Hospital Medical Center: Emergency Room, 4500 Parsons Blvd, Flushing, NY 11355 to 161-01 29th Ave, Flushing, NY 11358 Drive 1.8 miles, 9 min



Imagery ©2024 Airbus, Maxar Technologies, Map data ©2024 Google 1000 ft

Flushing Hospital Medical Center: Emergency Room
4500 Parsons Blvd, Flushing, NY 11355

Take Delaware Ave to Parsons Blvd

44 sec (404 ft)

1. Head northwest toward Delaware Ave

10 ft

2. Sharp left toward Delaware Ave

138 ft

3. Turn right onto Delaware Ave

256 ft

4. Turn left onto Parsons Blvd

19 sec (230 ft)

Continue on Cherry Ave. Take 155th St to 29th Ave

7 min (1.4 mi)

5. Turn right onto Cherry Ave

0.4 mi

6. Turn left at the 3rd cross street onto Murray St

0.3 mi

7. Turn right onto 41st Ave

0.1 mi

8. 41st Ave turns left and becomes 155th St

0.6 mi

9. Turn right onto 29th Ave

Destination will be on the left

1 min (0.3 mi)

161-01 29th Ave
Flushing, NY 11358

Site-Specific Emergency Preparedness/Response Procedures/Concerns:

Drilling: Pay attention to drilling operations, surroundings, and overhead and underground utilities.

Daily Contractor Tailgate Meeting, including review of emergency procedures, current location, and access to hospital. Make emergency phone numbers available to all on site personnel. Ensure that cell phone is charged daily and have vehicle phone chargers on hand.

Drilling: Pay attention to subcontractor operations, surroundings, and overhead and underground utilities and hazards. Maintain safe distances from all operating equipment. Test kill switches prior to initiating work.

Anticipated emergencies on site include physical injuries, potential for heart attacks, and heat/cold related injuries. Personnel on site will have current first aid and CPR training and will be able to respond to minor injuries and potential heart attacks while emergency response personnel are contacted for assistance.

Personal Injury: For minor injuries, such as cuts, burns, exhaustion, heat cramps, insect stings, etc., the affected employee will be removed to an safe area for administration of appropriate first aid. If the injury warrants additional medical attention, the affected employee will be properly decontaminated, as necessary and appropriate to the situation, and transported to the nearest hospital or emergency medical facility.

For more serious injuries the Field Safety Officer (FSO) or designee will summon emergency assistance to the project site. No attempt will be made by GZA personnel to move the victim, unless in imminent danger, without the aid and/or instructions of qualified emergency response personnel.

All personnel will pay attention to drilling operations, surroundings, and overhead and underground utilities. Kill switches will be tested prior to initiating work. Low tick; the use of permethrin is highly recommended and frequent body checks for the presence of ticks.

Before start of each day's work a Site briefing will be conducted by the Field Safety Officer to ensure that all Site personnel are aware of the identity of the emergency coordinator on Site and that everyone is aware of the following:

- Location and proper use of fire extinguishers
- Evacuation procedures and gathering points
- Location of emergency names and numbers
- Address of nearest hospital

Incidents and near misses will be documented in the Accident/Incident investigation report. In addition, "good catch" scenarios will be documented. GZA employees will report incidents, good catches, unsafe acts and conditions, and remarkably safe behaviors (SLAM Dunks) using the GZA People-Based Safety iPhone app.



- All EHS Events must be reported immediately to the Project Manager and to the GZA People-Based Safety mobile app.
- In the event of a chemical release greater than 5 gallons, site personnel will evacuate the affected area and relocate to an upwind location. The GZA Field Safety Officer and client site representative shall be contacted immediately.
- Site work shall not be conducted during severe weather, including high winds and lightning. In the event of severe weather, stop work, lower any equipment (drill rigs), and evacuate the affected area.

3. SCOPE OF WORK	
General project description, and phase(s) or work to which this H&S Plan applies[1].	Soil boring and monitoring well installation.
Specific Tasks Performed by GZA:	Soil classification, groundwater and soil sampling.
Concurrent Tasks to be Performed by GZA-hired Subcontractors (List Subcontractors by Name):	Drilling and installation of soil borings and monitoring wells.
Concurrent Tasks to be Performed by Others:	

Any OSHA PERMIT-REQUIRED CONFINED SPACE entry? ☐ YES ☒ NO IF YES, ADD CONFINED SPACE ENTRY PERMIT FOR THAT PORTION OF THE WORK	Any INDOOR fieldwork? ☐ YES ☒ NO IF YES, EXPLAIN:

4. SUB-SURFACE WORK, UNDERGROUND UTILITY LOCATION			
Will subsurface explorations be conducted for this work (drilling, excavation, test pits)?	☒ Yes	☐ No	
Have GZA project-related files been searched for existing private utility drawings?	☐ Yes	☐ No	☐ N/A
Has GZA requested utility drawings from our Client, property owner, and others?	☒ Yes	☐ No	☐ N/A
Have existing drawings been reviewed for possible conflicts with planned work?	☒ Yes	☐ No	☐ N/A
Will GZA personnel be required to use a hand-auger as part of this work?	☐ Yes	☒ No	☐ N/A

[1] Copy from or reference proposal or applicable design plan as appropriate.

GZA SITE-SPECIFIC HEALTH, SAFETY & ACCIDENT PREVENTION STANDARD-PLAN

Site property ownership where underground explorations will be conducted on:	Public Access Property ☒ Yes ☐ No Private Property ☐ Yes ☐ No
Have Necessary Underground Utility Notifications for Subsurface Work Been Made?	☒ Yes ☐ Yet to be conducted
Specify Clearance Date & Time, Dig Safe Clearance I.D. #, And Other Relevant Information: 811 ticket number 242892341	

IMPORTANT! For subsurface work, prior to the initiation of ground penetrating activities, GZA personnel to assess whether the underground utility clearance (UUC) process has been completed in an manner that appears acceptable, based on participation/ confirmation by other responsible parties (utility companies, subcontractor, client, owner, etc.), for the following:

Electric:	☐ Yes	☐ No	☐ NA	☐ Other_____
Fuel (gas, petroleum, steam):	☐ Yes	☐ No	☐ NA	☐ Other_____
Communication:	☐ Yes	☐ No	☐ NA	☐ Other_____
Water:	☐ Yes	☐ No	☐ NA	☐ Other_____
Sewer:	☐ Yes	☐ No	☐ NA	☐ Other_____
Other:_____	☐ Yes	☐ No	☐ NA	☐ Other_____

Comments: GZA to verify no utilities are present in the work zone, contractor to determine exact location of drilling.

5. HAZARD ASSESSMENT (CHECK ALL THAT APPLY AND ADDRESS EACH HAZARD IN SECTION 6)

A. GENERAL FIELDWORK HAZARDS

☐ Confined Space Entry (Add Confined Space Entry Permit)	☒ Overhead Hazards (i.e. falling objects, overhead power lines)
☐ Abandoned or vacant building/Enclosed Spaces	☒ Portable Hand Tools or Power Tools
☒ Significant Slip/Trip/Fall Hazards	☒ Significant Lifting or Ergonomic Hazards
☐ Unsanitary/Infectious Hazards	☐ Electrical Hazards (i.e. Equipment 120 Volts or Greater, Work Inside Electrical Panels, or Maintenance of Electrical Equipment)
☐ Poisonous Plants	☐ Other Stored energy Hazards (i.e. Equipment with High Pressure or Stored Chemicals)
☒ Biting/Stinging Insects	☐ Fire and/or Explosion Hazard
☐ Feral Animal Hazards	☒ Elevated Noise Levels
☐ Water/Wetlands Hazards	☒ Subsurface Work (Drilling/Excavations/Test Pits)
☐ Remote Locations/Navigation/Orientation hazards	☐ Explosives or Unexploded Ordinance/MEC
☒ Heavy Traffic or Work Alongside a Roadway	☐ Long Distance or Overnight Travel
☒ Weather-Related Hazards	☐ Personal Security or High Crime Area Hazards
☒ Motor vehicle operation Hazards	☐ Working Alone
☒ Heavy Equipment Hazards	☐ Ionizing Radiation or Non-Ionizing Radiation
☐ Structural Hazards (i.e. unsafe floors/stairways/roof)	☒ Chemical/Exposure Hazards (See Part B for Details)
☐ Demolition/Renovation	☐ Other:
☒ Presence of Pedestrians or the General Public	

B. CHEMICAL/EXPOSURE HAZARDS (CONTAMINANTS ARE CONTAINED IN SOIL, WATER, GROUNDWATER)

☐ No chemical hazards anticipated	☐ Methane
☐ Hydrogen Sulfide (H2S)	☐ Chemicals Subject to OSHA Hazard Communication (attach Safety Data Sheet for each chemical GZA brings to the site)
☐ Cyanides, Hydrogen Cyanide (HCN)	☐ Containerized Waste, Chemicals in Piping & Process Equipment
☐ Carbon Monoxide	☒ Emissions from Gasoline-, Diesel-, Propane-fired Engine, Heater, Similar Equipment
☐ Herbicides, Pesticide, Fungicide, Animal Poisons	☐ General Work Site Airborne Dust Hazards
☐ Metals, Metal Compounds:	☒ Volatile Organic Compounds (VOCs), BTEX
☐ Corrosives, Acids, Caustics, Strong Irritants	☒ Chlorinated Organic Compounds
☐ Polychlorinated Biphenyls (PCBs)	☐ Fuel Oil, Gasoline, Petroleum Products, Waste Oil
☐ Polycyclic Aromatic Hydrocarbons (PAHs)	☐ Asbestos
☐ Compressed Gases	☐ Oxygen Deficiency, Asphyxiation Hazards
☐ Flammable/Combustible Liquids	☐ Other:
☐ Radiation Hazards (i.e. radioactive sealed/open source, x-rays, ultra violet, infrared, radio-frequency, etc.)	

6. SITE-SPECIFIC OVERVIEW OF H&S HAZARDS/MITIGATIONS (NOTE: Based on Hazard Assessment, Section 5)	
Describe the major hazards expected to be present at the jobsite, and describe the safety measures to be implemented for worker protection (refer to items checked in Section 5 above). Use brief abstract statements or more detailed narrative as may be appropriate.	
ON-SITE HAZARDS:	**HAZARD MITIGATIONS:**
Task Hazard Analyses	(list task hazard analysis applicable to the project and attach to this HASP)
Owning Zero	Ensure all GZA personnel on-site have downloaded the People-Based Safety app to their mobile phones and are familiar with using it to report safety events. Prior to work each day, review Owning Zero rules with all on-site during the morning safety meeting.
Underground Utilities	Confirm that underground utility clearance procedures have been completed in accordance with GZA Policy # 04-0301 Responsibility for Utility Clearance of Exploration Locations for clearing utility locations prior to breaking ground.
Motor vehicle operation Hazards	Ensure vehicle is operating properly prior to leaving office. Review directions and check air pressure in vehicle tires prior to departure. Plan to take periodic breaks while driving long distances. Do not use cell phone (handheld or hands-free) while vehicle motor is running. While driving, be observant of other drivers and potential for severe weather conditions. Maintain appropriate speeds for the road conditions.
Slip/Trip/Fall	Inspect work area prior to starting work. Mark out or remove any potential hazards. Inspect area for uneven or sloped terrain, or around test pits. Wear sturdy shoes with ankle support and good tread. In winter weather, wear boot grips for more traction when walking. Look for potential natural depressions/holes/animal burrows, downed trees/limbs and other obstructions in the area of work and travel. Maintain one free hand to break falls. Watch for equipment on ground and slippery surfaces. Keep work area clean, no running, be mindful of changing weather conditions that may change footing conditions. Maintain safe distance from open borings. Be aware of surroundings. Ensure that borings are well marked (if left uncovered) or are appropriately filled to reduce trip/fall hazards. Do not leave borings or test pits open at the end of the work shift. Cover with metal plate if hole cannot be backfilled and label. GZA personnel will be performing work in cellar. GZA should assess stairs and integrity of cellar prior to start of work. Contact PM should work areas conditions pose a hazard.
Struck by, caught by, run over by equipment	Do not stand near or where equipment operators cannot see you. Always be in line of sight. Do not make sudden moves and always let the operator know of your intentions. Wear high-visibility safety vest, hard hat, eye protection, steel toe boots and use common sense and good housekeeping practices to avoid injury. Stay within sight of rig/excavator operator but at least 10 feet away from rig and excavator swing area. Maintain clear lines of communication (verbal and/or visual) with the operator. Stand clear of exhaust from operating equipment and stay out of the swing radius of heavy equipment. Be aware of overhead equipment and potential for falling objects (i.e. Tree branches). Avoid any “pinch points” where one could become trapped between the equipment and other objects. Maintain awareness of general rig movement/operation and communication with drill crew. Do not conduct soil classification/sampling directly adjacent to the drill rig. Hearing protection shall be worn when working near operating equipment. Equipment should be situated so that at full extension of bucket arm, the equipment is at least 10 feet away from overhead lines.
Heavy Equipment Hazards	Coordinate all required observation activities with contractor and perform them at a safe distance from operating equipment. Wear appropriate PPE: hard hat, steel toe boots, gloves, hearing protection, safety glasses, and high-visibility vest. Stay within sight of operator but at least 10 feet away, and even further if the swing radius of the equipment dictates. Never pass under a suspended load. Stay at least 10 feet

	away from any heavy equipment that is operating, and do not approach unless the equipment is shut down. Equipment should stay at least 10 feet away from overhead lines, if applicable, and a spotter may be necessary to assist avoiding the overhead line. No loose clothing, jewelry, or unsecured long hair is permitted near the rig, and avoid any "pinch points" where one could become trapped between the equipment and other objects. Maintain clear lines of communication (verbal and/or visual) with the operator. Perform daily tailgate safety meetings at the start of the day to discuss hazards. Make sure equipment have fire extinguisher available that has current annual certification (10 pound ABC extinguisher, at minimum). GZA personnel are not authorized to be on equipment or to operate the equipment; however, be sure GZA personnel on site are familiar with the location of emergency kill switches and understand how to operate the switch in the event of an emergency.
Significant Lifting or Ergonomic Hazards	Use proper lifting techniques (lifting with the legs, carrying the load at a reasonable height to allow for proper posture during the carry, and avoiding twisting while carrying loads) should be followed at all times. Caution should be used when lifting equipment. Be aware of hand position during all stages of the lift, transport and placement of equipment. Review equipment to be moved prior to lifting to prevent moving parts from crushing fingers or otherwise pinching skin. Do not stack items prior to carrying, but rather transport one item at a time to prevent shifting during carrying. Get help when items are heavy or awkward to lift. Use lifitng and transport devices whenever possible. Follow GZA Safe Lifting SOP.
Elevated Noise Levels	In accordance with 29 CFR 1910.95(b)(1) When employees are subjected to sound exceeding those listed in Table G-16, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within the levels of Table G-16, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table. TABLE G-16 - PERMISSIBLE NOISE EXPOSURES (1) Duration per day, hours | Sound level dBA slow response 8.....| 90 6.....| 92 4.....| 95 3.....| 97 2.....| 100 1 1/2 .....| 102 1.....| 105 1/2 .....| 110 1/4 or less.....| 115 Hearing protection in the form of disposable ear plugs will be worn during field work with sound levels anticpated above those listed in Table G-16. Use sound meter app on phone to assess required PPE. Be aware that hearing protection can diminish warning sounds - do not stand with back to operating equipment and be alert for changing conditions
Heavy Traffic or Work Alongside a Roadway	All personnel must wear high visibility vests and provide safety cones as needed to block off the work area. Be cognizant of the position of vehicles and equipment when unloading in proximity to parking lot. The proposed work area should be coned off to access from vehicles as needed. Maintain site control, do not allow access to unauthorized persons. Maintain safe distance from travel area and work outside the main traffic flow area whenever possible. Wear high visibility/reflective vest (Class III) at all times you are on and adjacent to roadway.
Observation of Drilling Observation and Excavation Safety	Do not wear loose fitting clothing. Prior to mobilization to the project site, all underground utilities will be located and properly marked. All personnel working in proximity to heavy equipment will be

	familiarized with the location and operation of emergency kill switches prior to equipment start-up. No loose clothing, jewelry or unsecured long hair is permitted near the rig. Keep hands and feet AWAY from all moving parts while drilling is in progress. Persons shall not pass under or over a moving stem or auger. Watch for moving vehicles and equipment. Stay out of equipment radius while drilling is in progress. Maintain visibility and eye contact with operators when walking around trucks. Wear reflective vest to enhance visibility. Stay clear of drill rig (minimum 10 feet) while operating, and do not approach unless equipment has been stopped and eye contact/coordination is made with equipment operator for personnel to approach rig to make observations or collect samples. GZA personnel shall not climb onto rig or approach rig while operating or while drill rods are being attached or removed. GZA staff should verify that the onsite equipment has been routinely inspected. GZA staff should also maintain a safe working distance from the equipment while it is maneuvering around the Site. GZA staff are not authorized to operate the drill rig; however, should be familiar with the location and operation of the emergency shutoff in the event the main operator is unable to operate this control in the event of an emergency. Keep drilling equipment at least 25 feet from all overhead power lines; use spotters to assist operator in to positioning equipment when overhead power lines or other obstructions are near. Personnel are not allowed on a mast while the auger is in operation. When a drill rig is moved from one location to another, drill steel, tools and other equipment shall be secured and the mast placed in a safe position. All borings will be adequately covered and/or barricaded if left unattended for any period of time to prevent injury. Working around heavy equipment / excavators. Awareness for pinch points, rotating equipment, and winch-operated equipment. Maintain safe working distance and never walk underneath overhead projection of the equipment. Always maintain eye contact and communication with the operator. Follow GZA safe drilling and field work procedures Keep 10 feet minimum clear distance from drill rig during operation. Be aware of rotating, falling, and mechanical hazards around drill rig. Stay aware of surroundings and wear hard hats, high visibility vests, and steel toe boots. Stay alert for potential overhead hazards (utilities lines, tree limbs) and other overhead objects that may pose hazards or may dislodge and fall during drilling operations or while drill rig is obtaining access to the next boring location.
Hand and Portable Power Tools	Lift and transport hand tools using proper lifting techniques and keep a clean and orderly workspace. Be familiar with tool's operating instructions and specific hazards before beginning work; wear leather gloves when appropriate. Use grounded or double insulated power hand tools. Use GFCI plugs. Check extension cords and power cords keep all cords organized to avoid tripping hazards. Check cords for sign of fraying, or damage. Do not use portable tools that shows signs of damage. Observe proper electrical safety practices. Wear proper PPE. Store and carry tools correctly. Use the correct tool for the job. Know first aid response procedures to address potential injuries. 1. Wear safety glasses and other appropriate PPE. 2. Keep vents clear to maintain adequate ventilation. 3. Use sharp drill bits, blades or other cutting surfaces. 4. Use GFCI plugs and keep all cords clear of the cutting area during use. 5. Inpsect for frays or damage before each use. 6. Disconnect power supply before changing or adjusting the equipment.
Soil & GW Sampling Hazards	Wear hard hat, nitrile gloves, and safety glasses at a minimum when handling sample containers. Wash hands and face before eating or applying cosmetics (i.e. sunscreen or chapstick). Do not eat within the work zone. Keep samples upright during transport. Sample containers may have broken during transport. Don leather work gloves in addition to nitrile gloves to remove any broken or cracked containers. Pack containers in an upright orientation and use packaging (such as bubble wrap) between each glass container to prevent breakage.

Presence of Pedestrians or the General Public	Establish warning signs and cones to delineate work area and warn pedestrians of work ahead. Maintain site control, do not allow access to unauthorized persons. Wear high visibility vest or clothing at all times when working in the roadway or near a sidewalk. Always be aware of pedestrians walking near the exclusion zone. If a pedestrian approaches the job site, work will cease until the pedestrian leaves the area.
Significant Lifting or Ergonomic Hazards	Use proper lifting techniques (lifting with the legs, carrying the load at a reasonable height to allow for proper posture during the carry, and avoiding twisting while carrying loads) should be followed at all times. Caution should be used when lifting equipment. Be aware of hand position during all stages of the lift, transport and placement of equipment. Review equipment to be moved prior to lifting to prevent moving parts from crushing fingers or otherwise pinching skin. Do not stack items prior to carrying, but rather transport one item at a time to prevent shifting during carrying. Get help when items are heavy or awkward to lift. Use lifitng and transport devices whenever possible. Follow GZA Safe Lifting SOP.

7. AIR MONITORING ACTION LEVELS – Make sure air monitoring instruments are in working order, calibrated before use, and 'bump-checked' periodically throughout the day and/or over multiple days of use

Is air monitoring to be performed for this project? Yes ☐ No ☒

ACTION LEVELS FOR OXYGEN DEFICIENCY AND EXPLOSIVE ATMOSPHERIC HAZARDS (Action levels apply to occupied work space in general work area)

☐ Applicable, See Below. ☒ Not Applicable

Parameter	Response Actions for Elevated Airborne Hazards
Oxygen	At 19.5% or below – Exit area, provide adequate ventilation, or proceed to Level B, or discontinue activities Verify presence of adequate oxygen (approx. 12% or more) before taking readings with LEL meter. Note: If oxygen levels are below 12%, LEL meter readings are not valid.
LEL	Less than 10% LEL – Continue working, continue to monitor LEL levels Greater than or Equal to 10% LEL – Discontinue work operations and immediately withdraw from area. Resume work activities ONLY after LEL readings have been reduced to less than 10% through passive dissipation, or through active vapor control measures.

ACTION LEVELS FOR INHALATION OF TOXIC/HAZARDOUS SUBSTANCES (Action levels are for sustained breathing zone concentrations)

☒ Applicable, See Below. ☐ Not Applicable

Air Quality Parameters (Check all that apply)	Remain in Level D or Modified D	Response Actions for Elevated Airborne Hazards
☒ VOCs	0 to 5 ppm	If readings exceed 5 ppm in the breathing zone, personnel should step out from the work zone until vapors subside. Retest, and if levels remain high, stop work and contact PM and consult EHS Team.
☐ Carbon Monoxide	0 to 35 ppm	At greater than 35 ppm, exit area, provide adequate ventilation, proceed to Level B, or discontinue activities.
☐ Hydrogen Sulfide	0 to 10 ppm	At greater than 10 ppm, exit area, provide adequate ventilation, proceed to Level B, or discontinue activities
☐ Dust	0 to mg/m^3	
☐	0 to	

SPECIAL INSTRUCTIONS/COMMENTS REGARDING AIR MONITORING (IF APPLICABLE)

8. HEALTH AND SAFETY EQUIPMENT AND CONTROLS

AIR MONITORING INSTRUMENTS

- ☒ PID Type: Lamp Energy: 10.6 eV
- ☐ FID Type:
- ☐ Carbon Monoxide Meter
- ☐ Hydrogen Sulfide Meter
- ☐ O_2/LEL Meter
- ☐ Particulate (Dust) Meter
- ☒ Calibration Gas Type Isobutelyne
- ☐ Others:

OTHER H&S EQUIPMENT & GEAR

- ☐ Fire Extinguisher
- ☐ Caution Tape
- ☒ Traffic Cones or Stanchions
- ☐ Warning Signs or Placards
- ☐ Decon Buckets, Brushes, etc.
- ☐ Portable Ground Fault Interrupter (GFI)
- ☐ Lockout/Tagout Equipment
- ☐ Ventilation Equipment
- ☒ Others: First Aid Kit, Soap & Water, Soap and Water

PERSONAL PROTECTIVE EQUIPMENT

- ☐ Respirator – Type
- ☐ Respirator - Cartridge Type:
- ☒ Hardhat
- ☒ Outer Gloves Type: Nitrile
- ☐ Inner Gloves Type:
- ☒ Steel-toed boots/shoes
- ☐ Coveralls – Type
- ☐ Outer Boots – Type
- ☒ Eye Protection with side shields
- ☐ Face Shield
- ☒ Traffic Vest
- ☐ Personal Flotation Device (PFD)
- ☐ Fire Retardant Clothing
- ☐ EH (Electrical Hazard) Rated Boots, Gloves, etc.
- ☒ Noise/Hearing Protection
- ☐ Others:

Discuss/Clarify, as Appropriate:

9. H&S TRAINING/QUALIFICATIONS FOR FIELD PERSONNEL

- ☒ Project-Specific H&S Orientation (Required for All Projects/Staff)
- ☐ OSHA 40-Hour HAZWOPER/8 Hour Refreshers
- ☐ Hazard Communication (for project-specific chemical products)
- ☐ First Aid/CPR (required for HAZWOPER for at least one individual on site)
- ☐ Current Medical Clearance Letter (required for HAZWOPER)
- ☒ OSHA 10-hour Construction Safety Training
- ☐ Fall Protection Training
- ☒ Trenching & Excavation
- ☐ Lockout/Tagout Training
- ☐ Electrical Safety Training
- ☐ Bloodborne Pathogen Training
- ☒ Safe Drilling SOP
- ☐
- ☐
- ☐
- ☐

Discuss/Clarify, as needed:

10. PERSONNEL AND EQUIPMENT DECONTAMINATION (SECTION ONLY REQUIRED FOR HAZWOPER SITES)

Describe personnel decontamination procedures for the project site, including "dry decon" (simple removal of PPE)	Dry Decon. Change PPE before leaving site. Wash hands and other exposed skin before taking breaks and leaving the site.

11. PROJECT PERSONNEL - ROLES AND RESPONSIBILITIES

GZA ON-SITE PERSONNEL:

Name(s)	Project Title/Assigned Role	Telephone Numbers
Mark Frey	Site Supervisor	Work: 631-847-1605 Cell: 347-213-8324
Mark Frey	Field Safety Officer	Work: 631-847-1605 Cell: 347-213-8324
Mark Frey	First Aid Personnel	Work: 631-847-1605 Cell: 347-213-8324
Mark Frey	GZA Project Team Members	Work: 631-847-1605 Cell: 347-213-8324

Site Supervisors and Project Managers (SS/PM): Responsibility for compliance with GZA Health and Safety programs, policies, procedures and applicable laws and regulations is shared by all GZA management and supervisory personnel. This includes the need for effective oversight and supervision of project staff necessary to control the Health and Safety aspects of GZA on-site activities.

Field Safety Officer (FSO): The FSO is responsible for implementation of the Site Specific Health and Safety Plan.

First Aid Personnel: At least one individual designated by GZA who has current training and certification in basic first aid and cardiopulmonary resuscitation (CPR) must be present during on-site activities involving multiple GZA personnel at HAZWOPER sites.

GZA Project Team: Follow instructions relayed by the HASP and GZA manager on-site.

OTHER PROJECT PERSONNEL:

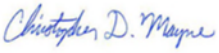
Name	Project Title/Assigned Role	Telephone Numbers
Victoria Whelan	Principal-in-Charge	Work: 212-594-8140 Cell: 631-847-1606
Reinbill Maniquez	Project Manager	Work: 212-594-8140 Cell: (347) 443-1059
Reinbill Maniquez	Office Safety Coordinator	Work: 212-594-8140 Cell: (347) 443-1059
Richard Ecord	GZA EHS Director	Work: 781-278-3809 Cell: 404-234-2834

Principal-in-Charge: Responsible of overall project oversight, including responsibility for Health and Safety.

Project Manager: Responsible for day-to-day project management, including Health and Safety.

Health and Safety Coordinator: General Health and Safety guidance and assistance.

GZA EHS Director: H &S technical and regulatory guidance, assistance regarding GZA H&S policies and procedures.

12. PLAN ACKNOWLEDGEMENT AND APPROVALS		
GZA Project Site Worker Plan Acknowledgement		
I have read, understood, and agree to abide by the information set forth in this Safety and Accident Prevention Plan. I will follow guidance in this plan and in the GZA Health and Safety Program Manual. I understand the training and medical monitoring requirements covered by the work outlined in this plan and have met those requirements.		
GZA Employee Name	GZA Employee Signature	Date
Subcontractor Site Worker Plan Acknowledgement		
GZA has prepared this plan solely for the purpose of protecting the health and safety of GZA employees. Subcontractors, visitors, and others at the site must refer to their organization's health and safety program or site-specific HASP for their protection. Subcontractor employees may use this plan for general informational purposes only. Subcontractor firms are obligated to comply with safety regulations applicable to their work, and understand this plan covers GZA activities only.		
Subcontractor Employee Name	Subcontractor Employee Signatures	Date
GZA HASP Approval Signatures		
The following individuals indicate their acknowledgement and/or approval of the contents of this Site Specific H&S Plan based on their understanding of project work activities, associated hazards and the appropriateness of health and safety measures to be implemented. A signed copy of this document must be present at the project site at all times work is being performed.		
GZA Author/Reviewer Role	Signature	Date
HASP Preparer/Mark Frey		**10-17-2024**
Chris Mayne **EHS Reviewer**		**10-17-2024**
Principal in Charge/Victoria Whelan		**10-25-2024**

APPENDIX C

COMMUNITY AIR MONITORING PLAN



Known for excellence.
Built on trust.

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

GZA GeoEnvironmental of New York
104 West 29th Street
10th Floor
New York, NY 10001
T: 212.594.8140
F: 212.279.8180
www.gza.com

Appendix C
New York State Department of Health
Generic Community Air Monitoring Plan
Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require

particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. A periodic monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well bailing/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the

source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (NYSDEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m_3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m_3 above the upwind level and provided that no visible dust is migrating from the work area.
2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.
3. All readings must be recorded and be available for State (NYSDEC and NYSDOH) and County Health personnel to review.

Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures

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

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

Special Requirements for Indoor Work with Co-Located Residences or Facilities

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under “Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures” except that in this instance “nearby/occupied structures” would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.

APPENDIX D

FIELD INVESTIGATION AND SAMPLING FORMS

AIR MONITORING FIELD LOG

PROJECT NAME:	
DATE:	
LOCATION:	
FILE NO.	
GZA Personnel:	
Weather:	
Wind:	

Time	Dust (mg/m3)	PID (ppm)

SOIL VAPOR SAMPLE FIELD LOG

PROJECT NAME: _____ DATE : _____

LOCATION: _____ FILE NO.: _____

GZA Engineer: _____ Contractor/Lab: _____

Weather: _____ Analytical Method: _____ Depth to Water: _____

Operator: _____ Ground Elevation: _____

Barometric Pressure: _____ PID Calibration: _____ Water Elevation: _____

Sample ID	Canister No.	Regulator No.	Sample Depth (ft)	Vacuum Pressure (in.Hg)		Purge Time			Sample Date	Sample Time		PID Reading (ppm)	Container Type	Surface Cover	Driving Effort	Remark
				Start	End	Purge Start	Purge Stop	Elapsed Time		Start	End					

ABBREVIATIONS:

ft. - feet

in.Hg- Inches of mercury
l./min. - liters per minute
cu. Ft. - cubic feet
ppm - parts per million
NA - not applicable

CONTAINER TYPE	SURFACE COVER	PROBE DRIVING EFFORT	SOIL MOISTURE CONTENT
TB -Tedlar Bag	SO - Soil	E - Easy	D- Dry
SC- Suma Canister	GIL - Grass/Loam	M - Moderate	M- Moderate
ST- Sorbant Tube	Asph - Asphalt	D - Difficult	W - Wet
	Cncrt - Concrete	R - Rellisal	S - Saturated

REMARKS:

WELL PURGE DATA SHEET

WELL ID: _____

CLIENT: _____ PROJECT NO: _____
SITE: _____ DATE: _____
WEATHER: _____ SAMPLER(S): _____

COLUMN OF WATER IN WELL:
T = Depth to Bottom (ft) - Static Water Level (ft)
= _____ - _____
Water Column (T) = _____ (ft)

GALLONS OF WATER PER WELL VOLUME:
Well Volume = Water Column (T) (ft) x Multiplier
_____ x _____
Well Volume (V) = _____ (Gallons)

well diameter	multiplier
1	0.041
1.5	0.092
2	0.163
4	0.653
6	1.469

TOTAL VOLUME PURGED:
Design = _____ (gallons)
Actual = _____ (gallons)[1]

PURGE RATE: Variable (mL / min)
PURGE METHOD: Peristaltic Pump, Low Flow Sampling
SCREENED INTERVAL: approximately to ft bgs

WATER QUALITY:

Time	Elapsed Time (Mins)	Purged Volume (gal)	Depth to Water (ft)	Temp (°C)	pH (SU)	ORP (ORPmV)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Percent Dissolved Oxygen	Notes
											Start

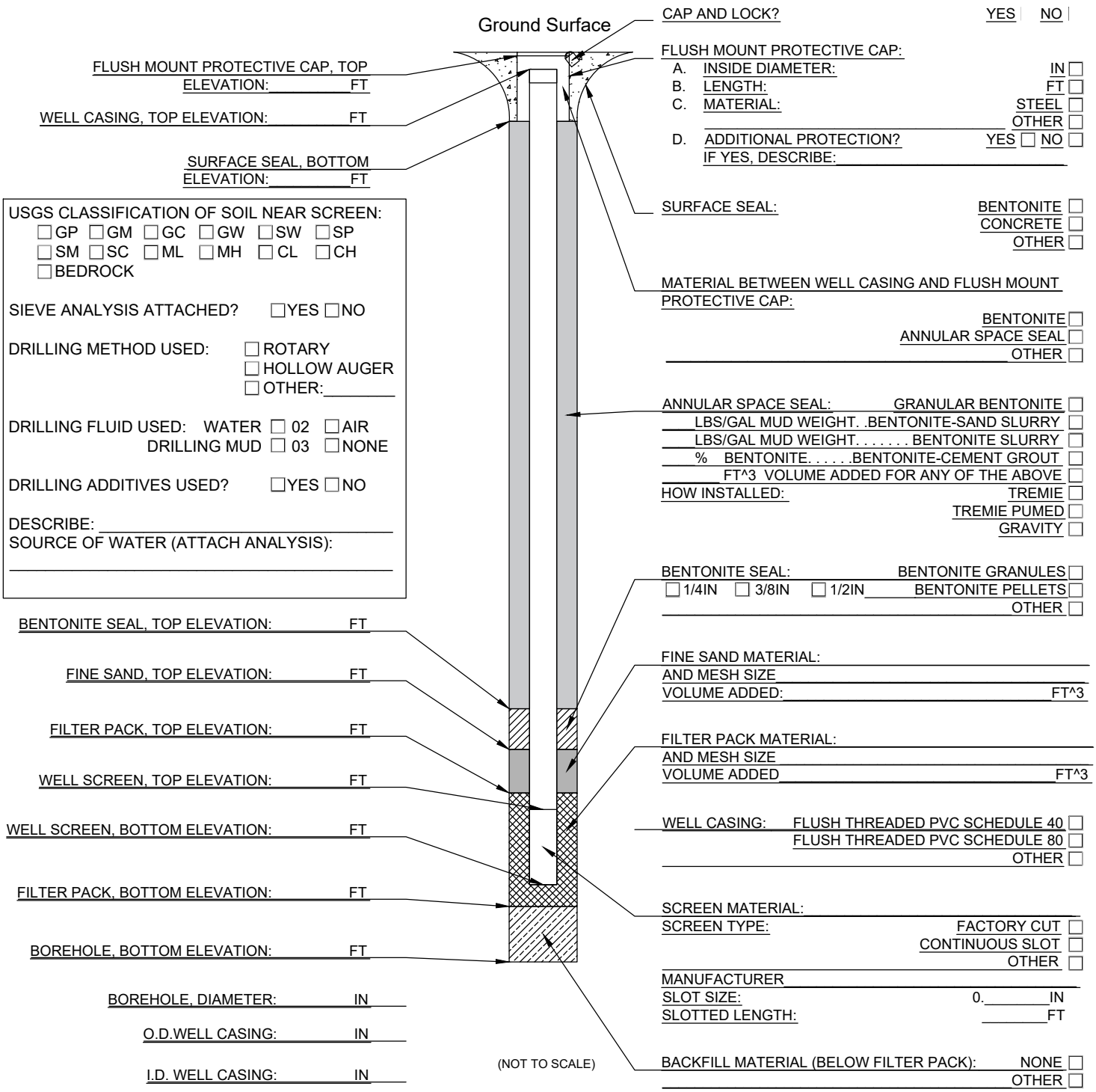
UNITS:
gal. - gallons
ft. - feet
SU - standard units
ORP - Oxygen Reduction Potential
mV - millivolts
DO - Dissolved Oxygen
mS/cm - millisiemens per centimeter
NTU -nephelometric turbidity units
mg/l -milligrams per liter
°C - degrees Celsius
bgs - below ground surface
NA - not applicable

NOTES AND OBSERVATIONS:

1. Purged volume was estimated.

GZA GEOENVIRONMENTAL OF NEW YORK **Well No.**

Project:	Location:	Page 1 of 1		
Project No.	Contractor:	Water Levels		
Surface Elevation:	Driller:	Date	Time	Depth
Top of PVC Casing Elevation:	GZA Rep:			
Datum:	Date of Completion:			



USGS CLASSIFICATION OF SOIL NEAR SCREEN:
☐ GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP
☐ SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH
☐ BEDROCK

SIEVE ANALYSIS ATTACHED? ☐ YES ☐ NO

DRILLING METHOD USED: ☐ ROTARY ☐ HOLLOW AUGER ☐ OTHER:

DRILLING FLUID USED: WATER ☐ 02 ☐ AIR
DRILLING MUD ☐ 03 ☐ NONE

DRILLING ADDITIVES USED? ☐ YES ☐ NO

DESCRIBE:
SOURCE OF WATER (ATTACH ANALYSIS):

CAP AND LOCK? YES NO

FLUSH MOUNT PROTECTIVE CAP:
A. INSIDE DIAMETER: IN ☐
B. LENGTH: FT ☐
C. MATERIAL: STEEL ☐ OTHER ☐
D. ADDITIONAL PROTECTION? YES ☐ NO ☐
IF YES, DESCRIBE:

SURFACE SEAL: BENTONITE ☐ CONCRETE ☐ OTHER ☐

MATERIAL BETWEEN WELL CASING AND FLUSH MOUNT PROTECTIVE CAP: BENTONITE ☐ ANNULAR SPACE SEAL ☐ OTHER ☐

ANNULAR SPACE SEAL: GRANULAR BENTONITE ☐
LBS/GAL MUD WEIGHT. .BENTONITE-SAND SLURRY ☐
LBS/GAL MUD WEIGHT. . . . . BENTONITE SLURRY ☐
% BENTONITE. . . . . .BENTONITE-CEMENT GROUT ☐
FT^3 VOLUME ADDED FOR ANY OF THE ABOVE ☐
HOW INSTALLED: TREMIE ☐ TREMIE PUMED ☐ GRAVITY ☐

BENTONITE SEAL: BENTONITE GRANULES ☐
☐ 1/4IN ☐ 3/8IN ☐ 1/2IN BENTONITE PELLETS ☐
OTHER ☐

FINE SAND MATERIAL:
AND MESH SIZE
VOLUME ADDED: FT^3

FILTER PACK MATERIAL:
AND MESH SIZE
VOLUME ADDED FT^3

WELL CASING: FLUSH THREADED PVC SCHEDULE 40 ☐
FLUSH THREADED PVC SCHEDULE 80 ☐
OTHER ☐

SCREEN MATERIAL:
SCREEN TYPE: FACTORY CUT ☐ CONTINUOUS SLOT ☐ OTHER ☐
MANUFACTURER
SLOT SIZE: 0. IN
SLOTTED LENGTH: FT

BACKFILL MATERIAL (BELOW FILTER PACK): NONE ☐ OTHER ☐