**29-05 38th AVENUE**

**QUEENS COUNTY**

**LONG ISLAND CITY, NEW YORK**

# SITE MANAGEMENT PLAN

**NYSDEC Site Number: C241250**

**Prepared for:**

FH 2BRO Building Corporation
23-01 41st Avenue
Long Island City, New York 11101

**Prepared by:**

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**Revisions to Final Approved Site Management Plan:**

| Revision No. | Date Submitted | Summary of Revision | NYSDEC Approval Date |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

**AUGUST 2025**

## CERTIFICATION STATEMENT

I, Spiro Dongaris, certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and Green Remediation (DER-31).

__ Spiro Dongaris __ P.E.

8/6/2025
_____DATE



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## List of Acronyms

| | |
|---|---|
| AS | Air Sparging |
| ASP | Analytical Services Protocol |
| BCA | Brownfield Cleanup Agreement |
| BCP | Brownfield Cleanup Program |
| BMP | Best Management Practice |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| CAMP | Community Air Monitoring Plan |
| C/D | Construction and Demolition |
| CFR | Code of Federal Regulation |
| CLP | Contract Laboratory Program |
| COC | Certificate of Completion |
| CO2 | Carbon Dioxide |
| CP | Commissioner Policy |
| DER | Division of Environmental Remediation |
| DUSR | Data Usability Summary Report |
| EC | Engineering Control |
| ECL | Environmental Conservation Law |
| ELAP | Environmental Laboratory Approval Program |
| ERP | Environmental Restoration Program |
| EWP | Excavation Work Plan |
| GHG | Greenhouse Gas |
| GWE&T | Groundwater Extraction and Treatment |
| HASP | Health and Safety Plan |
| IC | Institutional Control |
| NYSDEC | New York State Department of Environmental Conservation |
| NYSDOH | New York State Department of Health |
| NYCRR | New York Codes, Rules and Regulations |
| O&M | Operation and Maintenance |
| OM&M | Operation, Maintenance and Monitoring |
| OSHA | Occupational Safety and Health Administration |
| OU | Operable Unit |
| P.E. or PE | Professional Engineer |
| PFAS | Per- and Polyfluoroalkyl Substances |
| PID | Photoionization Detector |
| PRP | Potentially Responsible Party |
| PRR | Periodic Review Report |
| QA/QC | Quality Assurance/Quality Control |
| QAPP | Quality Assurance Project Plan |
| QEP | Qualified Environmental Professional |
| RAO | Remedial Action Objective |
| RAWP | Remedial Action Work Plan |
| RCRA | Resource Conservation and Recovery Act |
| RI/FS | Remedial Investigation/Feasibility Study |

| | |
|---|---|
| ROD | Record of Decision |
| RP | Remedial Party |
| RSO | Remedial System Optimization |
| SAC | State Assistance Contract |
| SCG | Standards, Criteria and Guidelines |
| SCO | Soil Cleanup Objective |
| SMP | Site Management Plan |
| SOP | Standard Operating Procedures |
| SOW | Statement of Work |
| SPDES | State Pollutant Discharge Elimination System |
| SSD | Sub-slab Depressurization |
| SVE | Soil Vapor Extraction |
| SVI | Soil Vapor Intrusion |
| TAL | Target Analyte List |
| TCL | Target Compound List |
| TCLP | Toxicity Characteristic Leachate Procedure |
| USEPA | United States Environmental Protection Agency |
| UST | Underground Storage Tank |
| VCA | Voluntary Cleanup Agreement |
| VCP | Voluntary Cleanup Program |

# ES EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Site Management Plan (SMP):

Site Identification: Index No.
C241250-04-21 29-05 38th Avenue, Long Island City

| | |
|---|---|
| Institutional Controls: | 1. The property may be used for restricted residential use; |
| | 2. The following ICs must be maintained:<br>• All ECs must be operated and maintained as specified in this SMP;<br>• All ECs must be inspected at a frequency and in a manner defined in the SMP;<br>• The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the NYSDEC;<br>• Groundwater and other environmental or public health monitoring must be performed as defined in this SMP;<br>• Data and information pertinent to Site management must be reported at the frequency and in a manner as defined in this SMP;<br>• All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;<br>• Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP; |

Site Identification: Index No.

C241250-04-21 29-05 38th Avenue, Long Island City

| | | |
|---|---|---|
| | • Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP;<br>• Access to the Site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement;<br>• The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries, and any potential impacts that are identified must be monitored or mitigated;<br>• Vegetable gardens and farming on the Site are prohibited; and | |
| | 3. All ECs must be inspected at a frequency and in a manner defined in the SMP. | |
| | | |
| Engineering Controls: | 1. Soil Vapor Extraction System. | |
| | 2. Sub-Slab Depressurization System. | |
| Monitoring: | | |
| 1. Remedial System Monitoring | | Quarterly |
| 2. Remedial System Sampling | | Quarterly |
| 3. Soil Vapor Intrusion Evaluation for New Buildings | | As needed |
| 4. Groundwater Monitoring Wells MW-1, MW-2 and MW-3 | | Quarterly |
| Maintenance: | | |
| 1. Blower maintenance | | As needed |

Site Identification: Index No.
C241250-04-21 29-05 38th Avenue, Long Island City

| Reporting: | |
|---|---|
| 1. Groundwater and Treatment System Data | Quarterly |
| 2. Periodic Review Report | Annually |

Further descriptions of the above requirements are provided in detail in the latter sections of this Site Management Plan

# 1.0 INTRODUCTION

## 1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the 29-05 38th Avenue Site, located at 37-42 30th Street in the Long Island City neighborhood of the Borough of Queens, New York (hereinafter referred to as the "Site"). Figure 1 shows the Site location. The Site is currently in the New York State (NYS) Brownfield Cleanup Program (BCP), Index No. C241250-04-21, which is administered by New York State Department of Environmental Conservation (NYSDEC or Department).

FH 2BRO Builder Corp. entered into a Brownfield Cleanup Agreement (BCA) on April 21, 2021 with the NYSDEC to remediate the Site. The boundaries of the Site are more fully described in the metes and bounds site description that is part of the Environmental Easement provided in Appendix A.

After completion of the remedial work, some contamination was left at this site, which is hereafter referred to as "remaining contamination". Institutional and Engineering Controls (ICs and ECs) have been incorporated into the site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC, and recorded with the Queens County Clerk, requires compliance with this SMP and all ECs and ICs placed on the site.

This SMP was prepared to manage remaining contamination at the Site until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

It is important to note that:

- This SMP details the Site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the Environmental Easement, which is grounds for revocation of the Certificate of Completion (COC); and

- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6 NYCRR Part 375 and the BCA (Site #C241250) for the Site, and thereby subject to applicable penalties.

All reports associated with the Site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the Site is provided in Appendix B of this SMP.

This SMP was prepared by Athenica Environmental Engineering PLLC, on behalf of FH 2BRO Builder Corp., in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Environmental Easement for the Site.

## 1.2 Revisions and Alterations

Revisions and alterations to this plan will be proposed in writing to the NYSDEC's project manager. The NYSDEC can also make changes to the SMP or request revisions from the remedial party. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shutdown of a remedial system, post-remedial removal of contaminated sediment or soil, or other significant change to the Site conditions. All approved alterations must conform with Article 145 Section 7209 of the Education Law regarding the application of professional seals and alterations. For example, any changes to as-built drawings must be stamped by a New York State-licensed Professional Engineer. In accordance with the Environmental Easement for the Site, the NYSDEC project manager will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

## 1.3 Notifications

Notifications will be submitted by the property owner to the NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

1. 60-day advance notice of any proposed changes in site use that are required under the terms of the BCA, 6 NYCRR Part 375 and/or Environmental Conservation Law.

2. 7-day advance notice of any field activity associated with the remedial program.

3. 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan. If the ground-intrusive activity qualifies as a change of use as defined in 6 NYCRR Part 375, the above mentioned 60-day advance notice is also required.

4. Notice within 48 hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.

5. Notice within 48 hours of any non-routine maintenance activities.

6. Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

7. Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the site or the responsibility for implementing this SMP will include the following notifications:

8. At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the Brownfield Cleanup Agreement (BCA), and all approved work plans and reports, including this SMP.

9. Within 15 days after the transfer of all or part of the Site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

Table 1 on the following page includes contact information for the above notifications. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix B.

**Table 1: Notifications***

| **Name** | **Contact Information** | **Required Notification**** |
|---|---|---|
| Javier Perez-Maldonado | (518) 402-8172, javier.perez-maldonado@dec.ny.gov | All Notifications |
| William Bennett | (518) 402-9543, william.bennett@dec.ny.gov | All Notifications |
| Kelly Lewandowski | (518) 402-9569, kelly.lewandowski@dec.ny.gov | Notifications 1 and 8 |
| Michele Dolan | (518) 402-7860<br>michele.dolan@health.ny.gov | Notifications 4, 6, and 7 |

* Note: Notifications are subject to change and will be updated as necessary.

** Note: Numbers in this column reference the numbered bullets in the notification list in this section.

# 2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

## 2.1 Site Location and Description

The Site is located in Long Island City, Queens County, New York and is identified as Block 371 and Lot 38 on the Queens County Tax Map (see Figure 1). The Site is an approximately 0.243-acre area and is bounded by a multi-family residential building to the northeast, 30th Street to the southeast, 38th Avenue to the southwest, and Old Ridge Road to the northwest (see Figure 2 – Site Layout Map). The boundaries of the site are more fully described in Appendix A –Environmental Easement. The owner of the Site parcel at the time of issuance of this SMP is:

- FH 2BRO Builder Corp.

## 2.2 Physical Setting

### 2.2.1 Land Use

The Site consists of the following: an eight-story mixed-use commercial and residential building. The Site is zoned residential and manufacturing and is currently under construction; planned uses of the redeveloped Site are a commercial grocery store on the first and second floors, and residential above.

The properties adjoining the Site and in the neighborhood surrounding the Site primarily include commercial, industrial, and residential properties. The properties immediately south of the Site include commercial and residential properties; the properties immediately north of the Site include residential properties; the properties immediately east of the Site include commercial and residential properties; and the properties to the west of the Site include residential and industrial properties.

### 2.2.2 Geology

Based on findings of the 2021 Remedial Investigation (RI) at the Site, along with the 2020 investigation conducted for the New York City Office of Environmental

Remediation, the stratigraphy of the Site, from the surface down, generally consists of brown sand with some silt or clay, underlain by bedrock. Historic fill (as determined predominantly by brick fragments within the soil) was encountered at a depth up to 10 feet. Bedrock, as indicated by boring refusal and retrieval of small pieces of mica schist, was encountered at depths ranging from 38 to 50 feet bgs.

Groundwater was encountered within the native sands, at depths (measured in monitoring wells) ranged from approximately 23 to 29.3 feet bgs. No evidence of perched groundwater was identified during the previous Site investigations. Based on data collected during drilling at the Site, the shallow unconsolidated aquifer extends to bedrock, identified at the Site at depths ranging from 38 to 50 feet bgs.

Based on calculated groundwater elevations, shallow groundwater at the Site flows toward the west-southwest, and deep groundwater flows toward the west-northwest. The groundwater flow in both horizons is toward the East River, located approximately 4,200 feet to the west of the Site.

A geologic cross section is shown in Figure 3.

### 2.2.3 Hydrogeology

Groundwater was encountered within the native sands, at depths (measured in monitoring wells) ranged from approximately 23 to 29.3 feet bgs. No evidence of perched groundwater was identified during the previous Site investigations. Based on data collected during drilling at the Site, the shallow unconsolidated aquifer extends to bedrock, identified at the Site at depths ranging from 38 to 50 feet bgs.

Based on calculated groundwater elevations, shallow groundwater at the Site flows toward the west-southwest, and deep groundwater flows toward the west-northwest, as shown on Figures 4A and 4B. Groundwater elevations are summarized in Table 2. The groundwater flow in both horizons is toward the East River, located approximately 4,200 feet to the west of the Site.

Groundwater monitoring well construction logs are provided in Appendix C.

## 2.3 Investigation and Remedial History

Historic Sanborn maps presented in the March 2000 Phase I Environmental Site Assessment (ESA) by Middleton Environmental, Inc. (Middleton), showed that the Site had historically been developed with four buildings. From southeast to northwest, these buildings included a 1-story commercial building, 1.5-story warehouse, 1-story residential building, and a 2-story residential building. Historic Sanborn maps identify the commercial building in the southeastern portion of the Site as an automotive service facility and gasoline station from 1947 until at least 1950. The 1.5-story warehouse is identified as a carpet cleaning facility from 1936 until 2006. These buildings were demolished in early 2021. The 1-story and 2-story residential buildings in the northwestern portion of the Site were constructed circa 1898 and 1936, respectively, and were utilized for residential use from construction until they were demolished in October 2021. The Site remained vacant until construction for the current building began June 2023.

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. Full titles for each of the reports referenced below are provided in Section 8.0 – References.

- *Phase I Environmental Site Assessment Report* for the Site prepared by Middleton Environmental, Inc., dated March 2020 (Site),
- *Remedial Investigation Report* for the Site prepared by Athenica, dated July 2020, and
- *Remedial Investigation Report* for 37-24 & 37-28 30th Street (north adjoining property) prepared by GEI Consulting Engineers and Scientists, dated January 2020, and
- *Remedial Investigation Report* for 29-05 38th Avenue prepared by Athenica, dated May 2022.

*March 2020 Middleton Phase I – Site*

A Phase I ESA was completed for the Site in March 2020 by Middleton Environmental Inc. (Middleton). The scope of the Phase I ESA included a Site visit, historical research, and a review of regulatory database records.

The Recognized Environmental Conditions (RECs) that were identified by Middleton relate to the past use of the Site by a carpet cleaning facility and by an auto

repair facility/gasoline station, and the reported presence of underground gasoline storage tanks.

*July 2020 Athenica Remedial Investigation Report – Site*

Athenica Environmental Services Inc. (Athenica) conducted a Remedial Investigation (RI) of the Site in response to the RECs identified by the 2020 Phase I ESA and to satisfy the requirements for investigation and remediation of properties subject to oversight by the New York City Office of Environmental Remediation (OER) for E-Designations for potential hazardous materials. The following scope of work was completed to characterize subsurface conditions at the Site:

- Implemented a Ground-Penetrating Radar (GPR) survey across accessible portions of the Site;
- Advanced 7 soil borings to a depth of 15 feet below ground surface (bgs) and collected 15 soil samples for analysis;
- Installed 4 temporary monitoring wells to establish groundwater flow and collected 5 groundwater samples for analysis;
- Installed 6 temporary soil vapor probes and collected 6 vapor samples and 1 outdoor ambient air sample for analysis.

Soil samples collected during the RI were compared to 6NYCRR Part 375-6.8 Unrestricted Use Soil Cleanup Objectives (SCOs) and Restricted Residential Use SCOs. Overall, the findings of the soil results were consistent with contaminants associated with historic fill, with exceedances of Restricted Residential SCOs identified only for a few semi-volatile organic compounds (SVOCs) and metals. No volatile organic compounds (VOCs), pesticides, or polychlorinated biphenyls (PCBs) were detected at concentrations above Unrestricted Use SCOs. Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) and 1,4-dioxane were not detected in the soil sample collected for these analyses.

Groundwater samples collected during the 2020 RI were compared to 6NYCRR Part 703.5 Class GA Groundwater Quality Standards (GQS). The only VOCs detected at concentrations above GQS were chloroform and the chlorinated solvent tetrachloroethene (PCE). Minor exceedances for three SVOCs (in one sample only) and dissolved metals

were also identified in the groundwater samples. No PCBs or pesticides were detected in any of the groundwater samples. Concentrations of several PFAS were detected in the groundwater from one monitoring well.

Soil vapor samples collected during the RI were not compared to any evaluation criteria as there is no applicable NYSDEC or New York State Department of Health (NYSDOH) evaluation criteria. Elevated concentrations of PCE (greater than 1,000 micrograms per cubic meter ($\mu g/m^3$)) were detected in each of the six vapor samples collected at the Site. Generally lower concentrations of trichloroethene (TCE), a breakdown product of PCE, were also detected in each of the six vapor samples. Various petroleum related compounds, including benzene, toluene, ethylbenzene, and xylenes (collectively BTEX), were also detected at relatively low concentrations in the soil vapor samples.

Based on the findings of the 2020 investigation and the historic use of the Site, PCE and TCE were identified as contaminants of concern (COCs) for the Site, along with gasoline-related compounds (i.e., BTEX).

Other significant findings of the RI were as follows:

- A geophysical anomaly was identified within the footprint of the former warehouse building and was identified as a potential underground storage tank (UST) – this anomaly was located in the area where historic Sanborn maps showed an underground gasoline tank;
- Another anomaly at the southeast corner of the Site (within the area of the former gasoline station) was interpreted as indicative of disturbed soils, likely due to prior excavation activities from removal of gasoline tanks associated with the former gasoline station;
- Depth to groundwater at the Site ranged from 23.83 to 28.13 feet below ground surface (bgs),
- Groundwater flow beneath the Site was determined to be generally from east to west,
- Site stratigraphy, from the surface down, was determined to be historic fill (generally present), underlain by approximately 10 feet of coarse-to-fine sand with silt and clay, and approximately 10 feet of poorly graded sand and clay,

- Bedrock was not identified at any on-Site boring locations.

*January 2021 GEI Remediation Investigation – North-adjoining Property*

GEI Consulting Engineers and Scientists (GEI) completed a RI at the northeast-adjoining property, located at 37-24 and 37-28 30th Street. This northeast-adjoining property is enrolled in the New York State BCP as Site Number C241214, and the overall purpose of the RI was to satisfy the overall BCP requirements for characterization and delineation of identified contaminants at this property. To achieve this objective, the scope of the RI included advancing soil borings; installing shallow and deep temporary monitoring wells; installing soil vapor implants; collecting representative soil, groundwater, and soil vapor samples for laboratory analysis; and measuring groundwater elevations to determine the horizontal and vertical groundwater flow directions. In addition, samples from one upgradient well and one downgradient well were analyzed for emerging contaminants (1,4-dioxane and PFAS).

Significant findings of the RI were as follows:

- Exceedances of Unrestricted Use SCOs in the soil were generally limited to metals found within materials identified as urban or historic fill.
- Exceedances of Class GA GQS were identified for VOCs, SVOCs, and metals. The SVOC exceedances were minor and limited to two monitoring wells. The exceedances for metals were concluded to be naturally occurring or related to road salting operations, rather than historic operations at the property, and metals were therefore not considered to be chemicals of concern (COCs). The VOC exceedances were almost specifically limited to the chlorinated solvents PCE and TCE. PCE was detected at every temporary monitoring well, with exceedances of GQS identified in samples from 8 of the 13 temporary monitoring wells. TCE was also detected in samples from every monitoring well, but exceedances of GQS for TCE were limited to only two wells (one shallow and one deep).
- Detectable concentrations of PFAS were detected in samples from upgradient and downgradient monitoring wells, and 1,4-dioxane was detected in one sample.
- Chlorinated solvents PCE and TCE were detected in all seven soil vapor samples. Elevated concentrations of these chlorinated solvents were generally detected

throughout the Site, with the highest concentrations detected located in the northern and eastern portions of the property. Petroleum-related VOCs were also detected in four of the soil vapor sampling samples. Consistent with the groundwater contamination, chlorinated VOCs in the soil vapor samples were attributed to former dry-cleaning facilities that had operated within the eastern portion of the property. No other on- or off-site source were identified for the adverse impacts observed in soil vapor.

*2022 Remedial Investigation Report – Site*

The summary of findings is based on the RI, as well as information gathered from previous investigations conducted at and in the vicinity of the Site.

Soil

The impacts to soil, where present, are limited to metals and PAHs at concentrations typically associated with historic fill. It is assumed that no remedial action would be necessary below the proposed excavation depth for redevelopment based on the finding of this RI.

Groundwater

Eleven (11) temporary monitoring wells were installed to evaluate groundwater quality at the Site. The temporary wells were installed as five (5) 2-well clusters (designated as WC-1S/D, WC-3S/D, WC-4S/D, WC-5S/D, and WC-6S/D), and one (1) shallow well (designated as TW-2). Each well cluster consisted of one (1) shallow monitoring well screened across the water table and one (1) monitoring well screened at a deeper interval. The shallow monitoring well of each well cluster and temporary well TW-2 were installed so that the monitoring wells would intersect the groundwater surface, identified at approximately 27 feet bgs. The deeper monitoring wells were installed to boring refusal, at depths ranging from 38 to 49 feet bgs, which was concluded to represent bedrock. The nomenclature of each monitoring well identifies its location and monitoring interval (e.g., WC-1S, WC-1D).

PCE was detected in all 11 groundwater samples, with detected concentrations ranging from 1.6 µg/L to 120 µg/L; these concentrations were above the Class GA GQS in nine (9) of the 11 samples (all but the ones collected from wells WC-3D and WC-6D). PCE concentrations that exceeded the Class GA GQS of 5 µg/L ranged from 7.6 µg/L in the sample from WC-6S to 120 µg/L in the sample from WC-3S. TCE was detected in 10 of the 11 groundwater samples, but all concentrations were below the Class GA GWS of 5 µg/L (the highest TCE concentration was 2.0 µg/L in the sample from WC-4S). No other VOCs were detected in any of the groundwater samples at concentrations above Class GA GQS.

Groundwater sampling results from upgradient wells (WC-1S and WC-1D) show that significant concentrations of PCE are also migrating onto the Site, from unidentified upgradient sources (the PCE concentration in the sample from upgradient deep well WC-1D (25 µg/L) is the second highest detection in the deep well samples, exceeded only by the 40 µg/L detected in the sample from WC-4D).

No detectable concentrations of 1,4-Dioxane were identified in the groundwater samples. Ten individual PFAS compounds were detected in groundwater sample WC-1S and 11 individual PFAS compounds were detected in groundwater sample WC-5S (the only two groundwater samples analyzed for these parameters), at concentrations ranging from 0.00179 µg/L to 0.0352 µg/L.

Soil Vapor

A total of five (5) soil vapor probes, designated as SVP-1 through SVP-5, were installed at the Site. The soil vapor probes were each installed to a depth of approximately 14 feet bgs, representing the estimated depth of planned excavation for the future Site redevelopment.

Chlorinated solvents PCE and TCE, were detected in all of the soil vapor samples. The highest concentrations of these VOCs were detected in the southern and central portions of the Site. The highest concentration of PCE was detected in soil vapor sample SVP-2 at 23,000 micrograms per cubic meter (µg/$m^3$). The highest concentration of TCE was detected in soil vapor sample SVP-3 at 520 µg/$m^3$.

## 2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed in the Decision Document dated May 26, 2023 are as follows:

### Groundwater

RAOs for Public Health Protection

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

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the on-Site source of groundwater or surface water contamination.

### Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.

RAOs for Environmental Protection

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

### Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into the Site building.

## 2.5 Remaining Contamination

### 2.5.1 Soil

Remedial excavation was performed in the central and southern portions of the Site. Specifically, the remedial excavation area was split into a 5-foot-deep area in the southern corner of the Site and a 15-foot-deep area in the central area of the Site, in accordance with the RAWP, and as shown on Figure 2. Endpoint samples were collected from the sidewalls and base of each excavation area. While endpoint samples collected from the sidewalls of both remedial excavation areas and the base of the 5-foot excavation area exhibited exceedances of Unrestricted Use SCOs (predominantly for metals, which are not Site-specific contaminants of concern), all base samples collected from across both remedial excavation areas, at a depth of 15 feet below sidewalk level, did not contain any exceedances of Unrestricted Use SCOs, with the exception of acetone, which was detected at 0.057 milligrams per kilogram (mg/kg) in EP-B-6 (only just exceeding the SCO of 0.05 mg/kg). Acetone is a common laboratory contaminant and is not attributed to historic Site activities or Site conditions. Following the initial endpoint sampling, excavation activities progressed to the final design depth and extent to accommodate construction of the new Site building and deeper endpoint samples were collected in areas where initial base samples showed parameters above SCOs. As excavation reached the sheeting and shoring, which functioned as the support of excavation (SOE), no physical sidewalls remained to collect additional samples. No further excavation or sampling was feasible due to structural and logistical constraints. The laboratory results of endpoint soil samples collected at the base of the excavation indicates that remaining soil at the Site meets Track 1 Unrestricted Use SCOs.

Table 3 and Figures 5A through 5C summarize the results of all soil samples collected as endpoints and compared to the Unrestricted Use SCOs at the Site after completion of remedial action.

### 2.5.2 Groundwater

Three permanent groundwater monitoring wells (designated as MW-1, MW-2, and MW-3) were installed at the Site to monitor post-treatment groundwater quality. Monitoring wells are sampled quarterly with events having taken place in July and

September 2023, and February, May, August, and November 2024. Most recent groundwater monitoring results (from November 2024) indicate that the upgradient well (MW-1) contains a concentration of PCE of 0.360 µg/L while the two downgradient wells, MW-2 and MW-3, exhibit concentrations of 9.91 µg/L and 15.9 µg/L of PCE, respectively. Quarterly groundwater monitoring is to continue until cessation of the monitoring has been authorized by the NYSDEC project manager.

Table 4 and Figure 6 summarize the results of all samples of groundwater that exceed the Class GA Ambient Water Quality Standards and Guidance Values (AWQSGVs) after completion of the remedial action.

### 2.5.3 Soil Vapor

Prior to the remedial action and during the Remedial Investigation, a total of five soil vapor probes were installed at the Site to a pre-excavation depth of approximately 14 feet bgs.

Chlorinated solvents PCE and TCE were detected in all of the soil vapor samples. The highest concentrations of these VOCs were detected in the southern and central portions of the Site. The highest concentration of PCE was detected in soil vapor sample SVP-2 at 23,000 micrograms per cubic meter (µg/$m^3$). The highest concentration of TCE was detected in soil vapor sample SVP-3 at 520 µg/$m^3$.

As part of Soil Vapor Extraction (SVE) system start-up, baseline soil vapor samples were collected and analyzed for VOCs. Results revealed the presence of VOCs, including TCE and PCE. TCE concentrations ranged from 0.81 µg/$m^3$ to 19 µg/$m^3$, while PCE concentrations were higher, ranging from 2.4 µg/$m^3$ to 1,200 µg/$m^3$ across monitoring points. Importantly, these data exhibit a marked decrease from previous sample results, suggesting that remedial actions have significantly reduced contaminant levels in soil vapor. The remaining soil vapor contamination is managed and treated by the on-Site SVE system.

Table 5 and Figure 7 summarize the results of all samples of soil vapor.

# 3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

## 3.1 General

Since remaining contamination exists at the site, Institutional Controls (ICs) and Engineering Controls (ECs) are required to protect human health and the environment. This IC/EC Plan describes the procedures for the implementation and management of all IC/ECs at the site. The IC/EC Plan is one component of the SMP and is subject to revision by the NYSDEC Project Manager.

This plan provides:

- A description of all IC/ECs on the site;
- The basic implementation and intended role of each IC/EC;
- A description of the key components of the ICs set forth in the Environmental Easement;
- A description of the controls to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of IC/ECs, such as the implementation of the Excavation Work Plan (EWP) (as provided in Appendix D) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site; and
- Any other provisions necessary to identify or establish methods for implementing the IC/ECs required by the site remedy, as determined by the NYSDEC project manager.

## 3.2 Institutional Controls

A series of ICs is required by the Decision Document to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination; and, (3) limit the use and development of the site to Restricted Residential uses only. Adherence to these ICs on the site is required by the Environmental Easement and will be implemented under this SMP. ICs identified in the Environmental Easement

may not be discontinued without an amendment to, or extinguishment of, the Environmental Easement. These ICs are:

- The property may be used for restricted residential use;
- All ECs must be operated and maintained as specified in this SMP;
- All ECs must be inspected at a frequency and in a manner defined in the SMP;
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;
- Groundwater and other environmental or public health monitoring must be performed as defined in this SMP;
- Data and information pertinent to Site management must be reported at the frequency and in a manner as defined in this SMP;
- All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;
- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP;
- Access to the Site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement;
- The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries, and any potential impacts that are identified must be monitored or mitigated; and

Vegetable gardens and farming on the Site are prohibited.

## 3.3 Engineering Controls

### 3.3.1 Soil Vapor Extraction System

A Soil Vapor Extraction (SVE) system has been installed beneath the building to remove PCE-, and TCE-impacted soil vapor (detected during previous sampling events) and to mitigate potential vapor intrusion into the new building. The area of operation covers portions of the Site where previous testing identified elevated soil vapor concentrations. The SVE system has been designed in accordance with applicable guidance as well as any applicable local and State requirements, including those of the NYCDOB.

The SVE system consists of five individual soil vapor extraction wells, each consisting of 4-inch diameter, Schedule 40 perforated PVC piping installed vertically beneath the cellar's concrete floor slab (i.e., SVE well). Each well connects to an individual 4-inch cast iron riser pipe to the ceiling of the cellar; all cast iron pipes are then manifolded to 4-inch cast iron piping running horizontally along the cellar ceiling to the northwestern corner of the cellar. The piping is then plumbed into an enclosure containing a radial blower. The blower discharge is passed through carbon filtration drums, before being discharged to the atmosphere via a single 4-inch cast iron vertical riser pipe that extends to the second floor roof of the new building. The blower exhaust has been placed a minimum of 10 feet from any air intakes or occupiable spaces.

Each of the five SVE wells are equipped with gate valves, vacuum gauges, flow rate sensors, and sample ports (for temperature probes or follow-up soil vapor sampling). All vacuum gauges are Dwyer Series 2015 vacuum gauges. Eight permanent monitoring points have been installed at locations shown on Figure 8, and will be utilized to monitor vacuum established by the SVE system and for follow-up soil vapor sampling. Each monitoring point is capped with a flush-mounted metal cover.

Procedures for operating and maintaining the SVE system are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As-built drawings, signed and sealed by a PE who is licensed and registered in New York State, are included as Appendix E.

The Soil Vapor Extraction (SVE) system was activated on October 7, 2024, and has been operating continuously since that date. Confirmatory sampling was conducted on October 8, 2024, to assess system performance. The sampling activities included measuring vacuum and flow rates at each extraction well and at the SVE system itself. All sampling points recorded a vacuum of at least -7 inches water column pressure and an air flow rate of 50 to 60 cubic feet per minute (cfm) or greater. These results confirm that the SVE system is functioning as designed, effectively maintaining the required operational parameters.

### 3.3.2 Sub-Slab Depressurization System

The SVE system components (blower, extraction wells, and monitoring points) additionally serve as a sub-slab depressurization system to mitigate potential vapor intrusion into the new building. The SSDS provides an applied vacuum beneath the entire footprint of the Site building, including the shallower slab portion in the northeast corner of the Site.

In addition to the five SVE extraction wells, the SSDS includes an additional sub-slab extraction well (SSDS well), consisting of a 3-inch diameter Schedule 40 cast iron pipe installed directly beneath the upper cellar's concrete floor slab. The SSDS well connects to the overhead 4-inch cast iron SVE piping running horizontally along the cellar ceiling to the northwestern corner of the cellar, and into the SVE blower.

The SSDS well is equipped with a gate valve, vacuum gauge (Dwyer Series 2005). In addition to the eight SVE monitoring points (which also allow SSDS vacuum to be measured), five additional permanent monitoring points (MP-9 through MP-13) have been installed at locations shown on Figure 8, and will be utilized to monitor vacuum established by the SSDS. Each monitoring point is capped with a flush-mounted metal cover.

Procedures for operating and maintaining the SSDS system are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As-built drawings, signed and sealed by a PE who is licensed and registered in New York State, are included as Appendix E.

The SSDS system was activated on October 7, 2024, and has been operating continuously since that date (the additional monitoring points and SSDS well were added by January 2025). Confirmatory sampling was conducted February 4, 2025 to assess system performance. The results of this sampling are shown on the embedded table on Figure 8. The sampling activities included measuring vacuum at each extraction well and at the SVE system itself, including the SSDS well and SSDS monitoring points. All sampling points recorded a vacuum of at least -0.1 inches water column pressure. These results confirm that the SSDS system is functioning as designed, effectively maintaining the required operational parameters.

### 3.3.3 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered completed when monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.4 of NYSDEC DER-10. Unless waived by the NYSDEC, confirmation samples of applicable environmental media are required before terminating any remedial actions at the site. Confirmation samples require Category B deliverables, independent data validation, and preparation of a Data Usability Summary Report (DUSR).

As discussed below, the NYSDEC may approve termination of a groundwater monitoring program. When a remedial party receives this approval, the remedial party will decommission all Site-related monitoring, injection and recovery wells in accordance with the requirements of the NYSDEC CP-43 policy.

The remedial party will also conduct any needed Site restoration activities, such as asphalt patching and decommissioning treatment system equipment.

#### 3.3.3.1 – Soil Vapor Extraction (SVE) System and Sub-Slab Depressurization System

Operation of the SVE/SSD system will not be discontinued unless prior written approval is granted by the NYSDEC and NYSDOH. Conditions that could potentially

warrant discontinuing the SVE/SSD system include: (1) contaminant concentrations in soil vapor that are significantly reduced from those previously detected; or (2) the NYSDEC has determined that the SVE/SSD system has reached the limit of its effectiveness. This assessment will be based in part on post-remediation contaminant levels in groundwater collected from the existing monitoring wells and/or soil vapor samples collected at the Site. If monitoring data indicate that the SVE/SSD system is no longer necessary, a proposal for confirmatory soil vapor intrusion sampling will be submitted to the NYSDEC and NYSDOH for review and approval.

3.3.3.2 - Monitoring Wells Associated with Chemical Oxidation

Groundwater monitoring activities to assess chemical oxidation will continue, as determined by the NYSDEC Project Manager in consultation with the NYSDOH Project Manager, until residual groundwater concentrations are found to be consistently below ambient water quality standards or the Site SCGs, or have become asymptotic at an acceptable level over an extended period. If monitoring data indicate that monitoring may no longer be required, a proposal to discontinue the remedy will be submitted to the NYSDEC Project Manager by the remedial party. Monitoring will continue until permission to discontinue is granted in writing by the NYSDEC Project Manager. If groundwater contaminant levels become asymptotic at a level that is not acceptable to the NYSDEC, additional injections, source removal, treatment and/or control measures will be evaluated.

# 4.0 MONITORING AND SAMPLING PLAN

## 4.1 General

This Monitoring and Sampling Plan describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC Project Manager. Details regarding the sampling procedures, data quality usability objectives, analytical methods, etc. for all samples collected as part of Site management for the Site are included in the Quality Assurance Project Plan provided in Appendix F. All work will be performed under the Health and Safety Plan provided in Appendix G and associated Community Air Monitoring Plan (CAMP) provided in Appendix H.

This Monitoring and Sampling Plan describes the methods to be used for:

- Sampling and analysis of all appropriate media (e.g., groundwater, indoor air, soil vapor, soils);
- Assessing compliance with applicable NYSDEC standards, criteria and guidance (SCGs), particularly groundwater standards and applicable 6NYCRR Part 375 SCOs for soil; and
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment;

To adequately address these issues, this Monitoring and Sampling Plan provides information on:

- Sampling locations, protocol and frequency;
- Information on all designed monitoring systems;
- Analytical sampling program requirements;
- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and
- Annual inspection and periodic certification.

Reporting requirements are provided in Section 6.0 of this SMP.

## 4.2 Site-Wide Inspection

Site-wide inspections will be performed at a minimum of once per year. These periodic inspections must be conducted when the ground surface is visible (i.e. no snow cover). Site-wide inspections will be performed by a qualified person who directly reports to a PE who is licensed and registered in New York State. Modification to the frequency or duration of the inspections will require approval from the NYSDEC Project Manager. Site-wide inspections will also be performed after all severe weather conditions that may affect ECs or monitoring devices. During these inspections, an inspection form will be completed as provided in Appendix I – Site Management Forms. The form will compile sufficient information to assess the following:

- Compliance with all ICs, including Site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General site conditions at the time of the inspection;
- Whether stormwater management systems, such as basins and outfalls, are working as designed;
- The Site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection; and
- Confirm that Site records are up to date.

Inspections of all remedial components installed at the Site will be conducted. A comprehensive Site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether ECs continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria; and

- If Site records are complete and up to date.

Reporting requirements are outlined in Section 6.0 of this plan.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs that reduces or has the potential to reduce the effectiveness of ECs in place at the Site, verbal notice to the NYSDEC Project Manager must be given by noon of the following day. In addition, an inspection of the Site will be conducted within 5 days of the event to verify the effectiveness of the IC/ECs implemented at the Site by a qualified environmental professional, as defined in 6 NYCCR Part 375. Written confirmation must be provided to the NYSDEC Project Manager within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public. The remedial party will submit follow-up status reports to the NYSDEC within 45 days of the event on actions taken to respond to any emergency event requiring ongoing responsive action, describing and documenting actions taken to restore the effectiveness of the ECs.

## 4.3 Treatment System Monitoring and Sampling

### 4.3.1 Remedial System Monitoring

Monitoring of the SVE and SSD systems will be performed on a routine basis, as identified in Table 6 Remedial System Monitoring Requirements and Schedule (see below). The monitoring of remedial systems must be conducted by a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State. Modification to the frequency or sampling requirements will require approval from the NYSDEC Project Manager. A visual inspection of the complete system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the SVE/SSD system has been reported or an emergency occurs that is deemed likely to affect the operation of the system. SVE/SSD system components to be monitored include, but are not limited to, the components included in Table 6 below.

**Table 6 – Remedial System Monitoring Requirements and Schedule**

| Remedial System Component | Monitoring Parameter | Operating Range | Monitoring Schedule |
|---|---|---|---|
| Blower | Flow Rate<br>Vacuum Level | 50 – 200 CFM<br>1 INWC to 15 INWC | Quarterly |
| Condensate Knockout Drum | Water Level | Drain when 50% full | Quarterly |
| SVE Extraction Wells (5) | Flow Rate<br>Vacuum Level | 10 – 70 CFM<br>1 INWC to 15 INWC | Quarterly |
| SSDS Extraction Well (1) | Vacuum Level | 1 INWC to 5 INWC | Quarterly |
| Monitoring Points (13) | Vacuum Level | 0.01 INWC to 15 INWC | Quarterly |
| Effluent from Blower (Prior To Treatment) | Total VOC Concentration (PID) | N/A | Quarterly |
| Discharge | Total VOC Concentration (PID) | 0 PPM – 5 PPM | Quarterly |

A complete list of components to be inspected is provided in the Inspection Checklist, provided in Appendix I – Site Management Forms. If any equipment readings are not within their specified operation range, any equipment is observed to be malfunctioning or the system is not performing within specifications; maintenance and repair, as per the Operation and Maintenance Plan, is required immediately.

### 4.3.2 Remedial System Sampling

Samples shall be collected from the SVE/SSD system on a routine basis. Sampling locations, required analytical parameters and schedule are provided in Table 7 – Remedial System Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC Project Manager. VOC sampling shall be completed at each of the SVE wells, and at the pre-treatment and post-treatment discharges of the SVE blower. All VOC readings should be taken without shutting down the SVE system, and with the blower operating under normal parameters.

The nearest extraction well to each monitoring point may be temporarily throttled down to avoid vacuum interference that could potentially prevent readings.

**Table 7 – Remedial System Sampling Requirements and Schedule**

| Sampling Location | Analytical Parameters | | Schedule |
|---|---|---|---|
| | Total VOCs (Handheld PID Meter) | VOCs (EPA Method TO-15) | |
| Extraction Wells (EW-1, EW-2, EW-3, EW-4, EW-5) | X | X | Quarterly |
| Effluent from Blower (Prior to Carbon) | X | X | Quarterly |
| SVE Discharge (Post-carbon) | X | X | Quarterly |

Detailed sample collection and analytical procedures and protocols are provided in Appendix J – Field Sampling Plan and Appendix F – Quality Assurance Project Plan.

The remedial party will properly dispose of all wastes generated by the remedial system at off-Site disposal facilities according to local, state and federal laws and regulations. Wastes will be tested before disposal to comply with the permit conditions of the disposal facility. Wastes generated at this Site include spent activated carbon, contained in sealed 55-gallon drums, and condensate stored in the knockout drum. Each drum will be removed and transported off-Site by a licensed waste handler, for off-Site disposal. All condensate from the knockout drum will be characterized and disposed properly.

## 4.4 Post-Remediation Media Monitoring and Sampling

Samples shall be collected from the SVE system on a routine basis. Sampling locations, required analytical parameters and schedule are provided in Table 8 – Remedial System Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC Project Manager. All VOC samples should be collected without shutting down the SVE system, and with the blower operating under normal parameters. The nearest extraction well to each monitoring point may be temporarily throttled down to avoid vacuum interference that could potentially prevent readings.

To confirm effective mitigation of soil vapor, indoor air (IA) sampling will be conducted during heating season, prior to building occupancy, and within 30 days of building envelope completion (including functioning of air handling/HVAC systems). The sampling will include the collection of two indoor air samples in the cellar of the building. One sample will be collected in the garage, near SVE monitoring point MP-3, and one sample will be proposed in the tenant gymnasium, near SVE monitoring point MP-8, and one sample will be collected from the storage room, near MP-12. Each sample will be collected over a 24-hour period, utilizing pre-cleaned Summa canisters provided by the laboratory. The flow-rate for sample collection also will not exceed 0.2 liters per minute, as established by New York State Department of Health (NYSDOH) guidance. The Summa canisters will be submitted to a NYSDOH Environmental Laboratory Approval Program (ELAP)-approved laboratory and analyzed for VOCs by U.S. Environmental Protection Agency Method TO-15.

NYSDEC will be notified a minimum of seven calendar days prior to initiation of any field work associated with this task. Upon receipt of the analytical results, a letter will be provided to NYSDEC to document the findings.

**Table 8 – Post Remediation Sampling Requirements and Schedule**

| Sampling Location | Analytical Parameters | | Schedule |
|---|---|---|---|
| | VOCs (Method 8620) | VOCs (EPA Method TO-15) | |
| Groundwater Monitoring Wells: MW-1, MW-2, MW-3 | X | | Quarterly |
| Indoor Air in the Cellar (near MP-3, MP-8, and MP-12) | | X | Prior to building occupancy and within 30 days of building envelope completion (and during the heating season if possible) |

Detailed sample collection and analytical procedures and protocols are provided in Appendix J – Field Sampling Plan and Appendix F – Quality Assurance Project Plan.

### 4.4.1 Groundwater Sampling

Groundwater monitoring will be performed quarterly to assess the performance of the remedy. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager.

The network of monitoring wells has been installed to monitor groundwater quality upgradient of the Site and at two on-Site locations near the downgradient property boundary.

**Table 9 – Groundwater Monitoring Wells**

| Well Location | Purpose | Location | Diameter | Depth | Screened Interval |
|---|---|---|---|---|---|
| MW-1 | Off-Site Up-Gradient | 40.7544929, -73.9326014 | 2” | 35.11’ below TOC* | 25’ to 35’ |
| MW-2 | On-Site Downgradient | 40.7545363, -73.9330835 | 2” | 14.87’ below TOC* | 5’ to 15’ |
| MW-3 | On-Site Downgradient | 40.7545574, -73.9331955 | 2” | 15.24’ below TOC* | 5’ to 15’ |

*MW-1 installed in sidewalk, at grade. MW-2 and MW-3 installed to top of cellar slab.

As part of the groundwater monitoring, one upgradient off-Site well and two on-Site wells (as shown on Figures 2 and 6) are sampled to evaluate the effectiveness of the remedial system, as well as the effectiveness of the in-situ chemical oxidation injections. The remedial party will measure depth to the water table at each monitoring well in the network before sampling. Post-treatment groundwater samples will be collected on a quarterly basis. These groundwater samples will be analyzed for VOCs using Method 8260C. Groundwater sampling will continue until results indicate that monitoring is no longer necessary and a request for cessation of groundwater monitoring is submitted to NYSDEC for review and approval. Upon completion of required groundwater sampling,

these wells will be properly abandoned in accordance with NYSDEC requirements. Quarterly groundwater monitoring results can be found on Table 4.

Monitoring well construction logs are included in Appendix C of this document.

If biofouling or silt accumulation occurs in any of the monitoring wells, the affected well(s) will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced if an event renders the wells unusable. Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC Project Manager will be notified prior to any repair or decommissioning of any monitoring well for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent Periodic Review Report. Well decommissioning without replacement will be done only with the prior approval of the NYSDEC Project Manager. Well abandonment will be performed in accordance with the NYSDEC guidance document titled "CP-43: Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be replaced in kind in the nearest available location, unless otherwise approved by the NYSDEC Project Manager.

The sampling frequency may only be modified with the approval of the NYSDEC Project Manager. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC Project Manager.

Deliverables for the groundwater monitoring program are specified in Section 7.0 – Reporting Requirements.

### 4.4.2 Soil Vapor Sampling

An indoor air sampling event will be conducted to verify that the vapor intrusion mitigation measures at the Site (SVE, sub-slab depressurization, etc.) are effective. The sampling will include collection of three indoor air samples in the cellar of the building. One sample will be collected in the garage area near SVE monitoring point MP-3, and the second sample will be collected in the tenant gymnasium, near SVE monitoring point MP-8, and the third sample will be collected in the upper cellar storage room, near MP-12 (see

Figure 8). Each sample will be collected over a 24-hour period, utilizing pre-cleaned Summa canisters provided by the laboratory, and prior to building occupancy, within 30 days of building envelope completion (including functioning of air handling/HVAC systems), and during the heating season (November 15 through March 31) if possible. Additional confirmatory indoor air sampling event(s) may be required during the subsequent heating season. The flow-rate for sample collection will not exceed 0.2 liters per minute, as established by the Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006, with updates. The Summa canisters will be submitted to a NYSDOH Environmental Laboratory Approval Program (ELAP)-approved laboratory and analyzed for VOCs by U.S. Environmental Protection Agency Method TO-15. Additional sampling procedures are described in the Field Sampling Plan in Appendix J.

If monitoring data indicate that the SVE or SSD system is no longer necessary, a proposal for confirmatory soil vapor intrusion sampling will be submitted to the NYSDEC and NYSDOH for review and approval.

Deliverables for the soil vapor intrusion sampling events are specified in Section 6.0 – Reporting Requirements.

#### 4.4.3 Monitoring and Sampling Protocol

All sampling activities will be recorded in a field book and associated sampling log as provided in Appendix I – Site Management Forms. Other observations (e.g., groundwater monitoring well integrity) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. Additional detail regarding monitoring and sampling protocols are provided in the Site-specific Field Sampling Plan provided as Appendix J of this document.

# 5.0 OPERATION AND MAINTENANCE PLAN

## 5.1 General

This Operation and Maintenance Plan provides a brief description of the measures necessary to operate, monitor and maintain the mechanical components of the remedy selected for the Site. This Operation and Maintenance Plan:

- Includes the procedures necessary to allow individuals unfamiliar with the site to operate and maintain the SVE/SSD system;
- Will be updated periodically to reflect changes in site conditions or the manner in which the SVE/SSD system is operated and maintained.

Further detail regarding the Operation and Maintenance of the SVE/SSD system is provided in Appendix K – Operation and Maintenance Manual. A copy of this Operation and Maintenance Manual, along with the complete SMP, is to be maintained at the site. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of this SMP.

## 5.2 Remedial System (or other Engineering Control) Performance Criteria

The SVE system has been designed with a regenerative blower capable of producing enough negative pressure in the sub-slab as to be able to remove any potential off-gases from areas identified as soil vapor hotspots. The blower is designed to target and extract chlorinated solvents from the area of concern identified during delineation sampling, adsorb to an activated carbon filtration system. The system is also designed to induce sub-slab depressurization across the entire Site footprint to mitigate potential soil vapor intrusion. The system discharge is located on the roof of the 2-story portion of the building, at a location a minimum of 10 feet from any air intake, window, or occupiable space. The 5 Horsepower (HP) regenerative blower is located in an enclosure within the cellar, and is provided with electricity via a dedicated 3-phase circuit. The blower is designed for continuous duty, and will be used continuously.

In order to extract soil vapor from the subsurface, the system is designed to extract from five individual soil vapor wells, each maintaining a 17 to 22 foot radius of influence over the target area. Each well is designed to maintain a flow rate of 100 to 200 Cubic Feet per Minute (CFM) and 10 to 15 inches of water column at each riser.

Each extraction well riser is equipped with valves, sample points, vacuum gauges, and flow rate sensors.

Visual and audible alarms, which signal when vacuum is lost at any riser, are powered independently from the blower, such that if the blower causes the breaker to trip, the alarms will still provide an alarm status.

## 5.3 Operation and Maintenance of the Soil Vapor Extraction System

The following sections provide a description of the operations and maintenance of the SVE system. Cut-sheets and as-built drawings for the SVE system are provided in Appendix K – Operations and Maintenance Manual.

### 5.3.1 System Start-Up and Testing

The SVE system consists of five individual 4" SVE wells installed beneath the cellar slab, connected to five individual 4" cast iron riser pipes. Each of the riser pipes is outfitted with a Dwyer DS-200 flow sensor with Dwyer 2SQRT vacuum gauge, a Dwyer 2015 magnehelic gauge, a sample port, and a gate valve. The SVE enclosure in the northwest corner of the cellar contains the SVE blower (Ametek Rotron 5hp Regenerative Blower Model #EN757F72XL), electrical control panel, 55-gallon condensate knockout drum, and an additional flow rate sensor with vacuum gauge (to monitor the system as a whole). The discharge from the SVE enclosure is then plumbed to two sequential carbon filtration drums, located adjacent to the enclosure. The discharge from the carbon drums is discharged to the atmosphere via a vertical riser pipe located above the roofline on the 2-story portion of the building. The discharge is outfitted with a U-shaped cap to prevent rainwater intrusion.

The SVE system also includes eight permanent monitoring points that are utilized to monitor vacuum, and allow for soil vapor sampling. Each monitoring point is capped with a flush-mounted metal cover.

The following steps were taken during the initial startup, and should be completed for any subsequent re-startups:

- All gate valves should be rotated to their fully open positions to allow maximum airflow. The SVE makeup air valve should be fully opened to reduce vacuum throughout the system.
- The condensate knockout drum should be properly drained, and the drain valve closed.
- The SVE blower should be switched on, from a dedicated 3-phase 230 volt electrical service. The blower should be monitored by an electrician to ensure no overvolting occurs.
- Vacuum readings and flow rate readings should be measured from the blower enclosure, and from each riser pipe.
- Vacuum readings should be measured from each of the monitoring points until vacuum readings stabilize.
- System tuning should be performed, including tuning gate valves on each riser, and adjusting the SVE makeup air valve to ensure vacuum influence across all monitoring points.
- Effluent should be measured using a handheld PID meter to ensure there is no breakthrough on any of the carbon treatment drums.
- All SVE components should be checked for leaks, including vertical and overhead piping, PVC piping within the SVE enclosure, plumbing to the carbon treatment drums, and around tubing to gauges.

The system testing described above will be conducted if, in the course of the Soil Vapor Extraction system lifetime, the system goes down or significant changes are made to the system and the system must be restarted.

### 5.3.2 Routine System Operation and Maintenance

The system as designed is generally maintenance free. If any of the components fail (blower, gauges, alarms), they must be replaced with equivalent components. The system should be inspected monthly by building management to ensure that all components are operating. Additionally, the condensate knockout drum should be drained monthly to prevent damage.

The system should also be fully inspected annually, by the environmental consultant, including testing vacuum and PID readings at each monitoring point.

Please see the manufacturer's instructions regarding routine system operation and maintenance, provided in Appendix K – Operations and Maintenance Manual.

### 5.3.3 Non-Routine Operation and Maintenance

The SVE is equipped with an alarm which produces a visible and audible alarm when insufficient vacuum is detected in the system. If an alarm occurs, the environmental consultant should be notified and the system should be inspected by the PE.

Additionally, since risers are located within an active parking garage, parking attendants and/or tenants should ensure that vehicles do not impact riser pipes. Building ownership should consider installing bollards surrounding each riser, where feasible. Signage should be placed along riser pipes.

### 5.3.4 System Monitoring Devices and Alarms

The Soil Vapor Extraction system has multiple warning devices to indicate that the system is not operating properly. These include an alarm notification at the SVE inlet pipe (Radonaway Checkpoint II); and an alarm for high water level in the condensate knockout drum (which shuts the system down when full). The alarm at the inlet also doubles as a system monitoring device and an alarm signifying blower failure. In the event that either warning device is activated, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the SVE system will be restarted immediately. Operational problems will be noted in the Periodic Review Report to be prepared for that reporting period.

## 5.4 Operation and Maintenance of the Sub-Slab Depressurization System

The following sections provide a description of the operations and maintenance of the SSDS. Cut-sheets and as-built drawings for the SSDS system are provided in Appendix K – Operations and Maintenance Manual.

### 5.4.1 System Start-Up and Testing

The SSDS is connected to the SVE blower piping and discharge, and operates concurrently. In addition to the SVE piping discussed previously, the SSDS includes one additional 3" SSDS well, installed beneath the shallower cellar slab. This well is connected to a riser outfitted with a Dwyer 2005 magnehelic gauge and a gate valve.

The SVE system utilizes the eight permanent SVE vacuum monitoring points that are utilized to monitor vacuum, in addition to five sub-slab monitoring points located outside the SVE area. Each monitoring point is capped with a flush-mounted metal cover.

The following steps were taken during the initial startup, and should be completed for any subsequent re-startups:

- All gate valves should be rotated to their fully open positions to allow maximum airflow. The SVE makeup air valve should be fully opened to reduce vacuum throughout the system.

- The condensate knockout drum should be properly drained, and the drain valve closed.
- The SVE blower should be switched on, from a dedicated 3-phase 230 volt electrical service. The blower should be monitored by an electrician to ensure no overvolting occurs.
- Vacuum readings and flow rate readings should be measured from the blower enclosure, and from each riser pipe.
- Vacuum readings should be measured from each of the monitoring points until vacuum readings stabilize.
- System tuning should be performed, including tuning gate valves on each riser, and adjusting the SVE makeup air valve to ensure vacuum influence across all monitoring points.
- Effluent should be measured using a handheld PID meter to ensure there is no breakthrough on any of the carbon treatment drums.
- All SVE and SSDS components should be checked for leaks, including vertical and overhead piping, PVC piping within the SVE enclosure, plumbing to the carbon treatment drums, and around tubing to gauges.

The system testing described above will be conducted if, in the course of the SSDS lifetime, the system goes down or significant changes are made to the system and the system must be restarted.

### 5.4.2 Routine System Operation and Maintenance

The system as designed is generally maintenance free. If any of the components fail (blower, gauges, alarms), they must be replaced with equivalent components. The system should be inspected monthly by building management to ensure that all components are operating. Additionally, the condensate knockout drum should be drained monthly to prevent damage.

The system should also be fully inspected annually, by the environmental consultant, including testing vacuum readings at each monitoring point.

Please see the manufacturer's instructions regarding routine system operation and maintenance, provided in Appendix K – Operations and Maintenance Manual.

### 5.4.3 Non-Routine Operation and Maintenance

The SVE/SSDS is equipped with an alarm (Radonaway Checkpoint II) which produces a visible and audible alarm when insufficient vacuum is detected in the system. If an alarm occurs, the environmental consultant should be notified and the system should be inspected by the PE.

Additionally, since some of the risers are located within an active parking garage, parking attendants and/or tenants should ensure that vehicles do not impact riser pipes. Building ownership should consider installing bollards surrounding each riser, where feasible. Signage should be placed along riser pipes.

### 5.4.4 System Monitoring Devices and Alarms

The Soil Vapor Extraction system has multiple warning devices to indicate that the system is not operating properly. These include an alarm notification at the SVE inlet pipe; and an alarm for high water level in the condensate knockout drum (which shuts the system down when full). The alarm at the inlet also doubles as a system monitoring device and an alarm signifying blower failure In the event that either warning device is activated, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the SVE system will be restarted immediately. Operational problems will be noted in the Periodic Review Report to be prepared for that reporting period.

# 6.0. PERIODIC ASSESSMENTS/EVALUATIONS

## 6.1 Climate Change Vulnerability Assessment

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation, resulting from global climactic change and instability, have the potential to significantly impact the performance, effectiveness and protectiveness of a given site and associated remedial systems. Vulnerability assessments provide information so that the Site and associated remedial systems are prepared for the impacts of the increasing frequency and intensity of severe storms/weather events and associated flooding.

This section provides a current vulnerability assessment that evaluates the vulnerability of the Site and/or engineering controls to severe storms/weather events and associated flooding. This section also identifies vulnerability assessment updates that will be conducted for the Site in Periodic Review Reports.

The Site can be considered relatively invulnerable to severe storms/weather events and associated flooding, as the Site is not located within a flood plain, low-lying or low-lying area. Additionally, the Site is not located near the shoreline and is, therefore, less susceptible to sea level rise or storm surge events. The Site building occupies the entire footprint of the Site, with a cellar mat slab underlying the entire building. The foundation is encapsulated by waterproofing/vapor barrier, therefore, there are minimal to no areas of the Site which may flood during severe rain events.

As mentioned, the entire Site footprint is covered by the Site building and is not susceptible to erosion during severe rain events. The associated SVE system is protected from extreme weather by being located within the cellar of the Site building.

High wind events may impact the upper floors of the Site building, but it is unlikely, as the building has been built in accordance with New York City Department of Buildings building code, and must be able to withstand high winds.

As the Site is not located within a vegetated area, risk of wildfire is extremely low. Drought conditions should not affect the Site or the remedial system, as water is provided by the NYCDEP.

The Site is susceptible to electricity loss during storm events/extreme weather. As such, the SVE system is vulnerable to being shutdown, however battery operated alarms would be triggered, as well as the generator for the building.

There is no risk of contaminant release as there are no storage locations of potential contaminants located on-Site.

## 6.2 Green Remediation Evaluation

NYSDEC's DER-31 Green Remediation requires that green remediation concepts and techniques be considered during all states of the remedial program including Site management, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of any implemented green technology. This section provides an environmental footprint analysis of the remedy, as implemented at the time of this SMP. This section of the SMP also provides a summary of green remediation evaluations to be completed for the Site during Site management and reported in Periodic Review Reports (PRRs).

As part of the green remediation evaluation, an environmental footprint analysis was conducted using the US EPA Spreadsheets for Environmental Footprint Analysis (SEFA) to evaluate the performance of the Soil Vapor Extraction (SVE) system. The analysis quantified greenhouse gas (GHG) emissions, energy consumption, and material use and waste associated with the 5.0-horsepower blower used in the remediation process. Results indicate annual energy consumption of approximately 36,266 kWh and GHG emissions of 13.07 metric tons $CO_2$/year, primarily due to electricity use. Material use includes 800 pounds of activated carbon for vapor treatment, with corresponding waste generation from spent carbon and captured contaminants. The SEFA tool highlighted opportunities for improvement, such as integrating renewable energy sources, transitioning to reactivated carbon, and optimizing blower efficiency. These recommendations align

with EPA guidelines for sustainable remediation and will guide future site management practices to minimize environmental impacts.

## 1. GHG Emissions

**Results:**

- **13.07 metric tons $CO_2e$/year** (based on a U.S. average electricity emission factor of 0.4 kg $CO_2e$/kWh).

**EPA Benchmarks/Goals:**

- Sustainable remediation aims to minimize carbon footprints by:
  - Using **low-carbon energy sources** (e.g., renewable energy).
  - Enhancing **energy efficiency** in equipment.

**Comparison:**

- The GHG emissions could be reduced significantly if the system uses electricity from renewable sources (e.g., solar, wind). For example:
  - If powered by a renewable energy mix, emissions could approach **0 metric tons $CO_2e$/year**.
  - Alternatively, using a regional grid with lower emission factors could reduce emissions by 10-50%.

**Improvement Opportunities:**

- Investigate using **on-site solar panels** or purchasing renewable energy credits (RECs).
- Optimize operational efficiency to minimize blower runtime or energy intensity.

## 2. Energy Consumption

**Results:**

- **36,266 kWh/year** for 24/7 operation of a 5.0 HP blower.

**EPA Benchmarks/Goals:**

- Sustainable remediation encourages energy efficiency:
  - EPA recommends minimizing operational energy use by **right-sizing equipment** or adding **automation controls**.

**Comparison:**

- Energy consumption is reasonable for continuous operation but could be optimized:
    - Consider using **variable-frequency drives (VFDs)**, which can reduce energy use by 10-30% depending on system demand.
    - Evaluate whether 24/7 operation is necessary or if intermittent operation could suffice.

**Improvement Opportunities:**

Implement **real-time monitoring** and adjust blower settings dynamically based on soil vapor concentrations.

## 3. Material Use and Waste

**Results:**

- **Materials Used**:
    - ~800 lbs/year of activated carbon.
    - ~1-5 gallons/year of lubricants.
    - ~10-20 lbs/year of filters.
- **Waste Generated**:
    - ~800 lbs/year of spent carbon.
    - ~200 lbs/year of captured TCE.
    - ~1-5 gallons/year of spent oil.

**EPA Benchmarks/Goals:**

- EPA's sustainable remediation guidelines aim to:
    - Maximize **reuse/recycling** of materials.
    - Minimize hazardous waste requiring specialized disposal.
    - Opt for environmentally friendly materials.

**Comparison:**

- **Activated Carbon**: Thermal reactivation of spent carbon can reduce waste generation by up to 90%, compared to disposal.
- **Lubricants and Filters**: Current waste is modest, but transitioning to **long-life lubricants** and **reusable filters** could further reduce environmental impacts.

**Improvement Opportunities:**

- Use **reactivated carbon** instead of virgin carbon to reduce resource extraction impacts.
- Implement a **waste recycling program** for spent filters and packaging materials.

### 6.2.1 Timing of Green Remediation Evaluations

For major remedial system components, green remediation evaluations and corresponding modifications will be undertaken as part of a formal Remedial System Optimization (RSO), or at any time that the NYSDEC project manager feels appropriate, (e.g. during significant maintenance events or in conjunction with storm recovery activities).

Modifications resulting from green remediation evaluations will be routinely implemented and scheduled to occur during planned/routine operation and maintenance activities after approval from the NYSDEC project manager. Reporting of these modifications will be presented in the PRR.

### 6.2.2 Remedial Systems

Remedial systems will be operated properly considering the current site conditions to conserve materials and resources to the greatest extent possible. Consideration will be given to operating rates and use of reagents and consumables. Spent materials will be sent for recycling, as appropriate.

### 6.2.3 Building Operations

Structures including buildings and sheds will be operated and maintained to provide for the most efficient operation of the remedy, while minimizing energy, waste generation and water consumption.

### 6.2.4 Frequency of System Checks, Sampling and Other Periodic Activities

Transportation to and from the Site, use of consumables in relation to visiting the Site in order to conduct system checks and/or collect samples, and shipping samples to a laboratory for analyses have direct and/or inherent energy costs. The schedule and/or means of these periodic activities have been prepared so that these tasks can be

accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources.

#### 6.2.5 Metrics and Reporting

As discussed in Section 7.0 and as shown in Appendix I – Site Management Forms, information on energy usage, solid waste generation, transportation and shipping, water usage and land use and ecosystems will be recorded to facilitate and document consistent implementation of green remediation during site management and to identify corresponding benefits. A set of metrics has been developed and will be evaluated over time to ensure that green remediation actions are achieving the desired results.

## 6.3 Remedial System Optimization

A Remedial System Optimization (RSO) study will be conducted any time that the NYSDEC project manager or the remedial party requests in writing that an in-depth evaluation of the remedy is needed. An RSO may be appropriate if any of the following occur:

- The remedial actions have not met or are not expected to meet RAOs in the time frame estimated in the Decision Document;
- The management and operation of the remedial system is exceeding the estimated costs;
- The remedial system is not performing as expected or as designed;
- Previously unidentified source material may be suspected;
- Plume shift has potentially occurred;
- Site conditions change due to development, change of use, change in groundwater use, etc.;
- There is an anticipated transfer of the site management to another remedial party or agency; and

- A new and applicable remedial technology becomes available.

An RSO will provide a critique of a site's conceptual model, give a summary of past performance, document current cleanup practices, summarize progress made toward the site's cleanup goals, gather additional performance or media specific data and information and provide recommendations for improvements to enhance the ability of the present system to reach RAOs or to provide a basis for changing the remedial strategy.

The RSO study will focus on overall site cleanup strategy, process optimization and management with the intent of identifying impediments to cleanup and improvements to site operations to increase efficiency, cost effectiveness and remedial time frames. Green remediation technology and principals are to be considered when performing the RSO.

# 7.0. REPORTING REQUIREMENTS

## 7.1 Site Management Reports

All Site management inspection, maintenance and monitoring events will be recorded on the appropriate site management forms provided in Appendix I. These forms are subject to NYSDEC revision. All site management inspection, maintenance, and monitoring events will be conducted by a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State.

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of Table 10 and summarized in the Periodic Review Report.

**Table 10: Schedule of Interim Monitoring/Inspection Reports**

| Task/Report | Reporting Frequency* |
|---|---|
| Inspection Report | Quarterly |
| Periodic Review Report | Annually, or as otherwise determined by the NYSDEC |

* The frequency of events will be conducted as specified until otherwise approved by the NYSDEC project manager.

All interim monitoring/inspections reports will include, at a minimum:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;

- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);
- Type of samples collected (e.g., sub-slab vapor, indoor air, outdoor air);
- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation);
- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format);
- Any observations, conclusions, or recommendations; and
- A determination as to whether contaminant conditions have changed since the last reporting event.

Routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting maintenance activities;
- Description of maintenance activities performed;
- Any modifications to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

Non-routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Description of non-routine activities performed;

- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and

- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link http://www.dec.ny.gov/chemical/62440.html.

## 7.2 Periodic Review Report

A Periodic Review Report (PRR) will be submitted to the NYSDEC Project Manager beginning 16 months after the Certificate of Completion is issued. In the event that the Site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the Site described in Appendix A – Environmental Easement. After submittal of the initial Periodic Review Report (PRR), the next PRR shall be submitted annually to the NYSDEC Project Manager or at another frequency as may be required by the NYSDEC Project Manager. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the site.

- Results of the required annual site inspections, fire inspections and severe condition inspections, if applicable.

- Description of any change of use, import of materials, or excavation that occurred during the certifying period.

- All applicable site management forms and other records generated for the site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.

- Identification of any wastes generated during the reporting period, along with waste characterization data, manifests, and disposal documentation.

- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.

- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor, etc.), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These tables and figures will include a presentation of past data as part of an evaluation of contaminant concentration trends, including but not limited to:
  - Trend monitoring graphs that present groundwater contaminant levels from before the start of the remedy implementation to the most current sampling data;
  - Trend monitoring graphs depicting system influent analytical data on a per event and cumulative basis;
  - O&M data summary tables;
  - A current plume map for sites with remaining groundwater contamination; and
  - A groundwater elevation contour map for each gauging event.
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html.

- A site evaluation, which includes the following:
  - The compliance of the remedy with the requirements of the site-specific Remedial Action Work Plan (RAWP), Record of Decision (ROD) or Decision Document;
  - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
  - Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored;
  - Recommendations regarding any necessary changes to the remedy and/or Monitoring and Sampling Plan;

- An update to the climate change vulnerability assessment if Site or external conditions have changed since the previous assessment, and recommendations to address vulnerabilities.
- A summary of the Green Remediation evaluation, including a quantitative and qualitative overview of a Site's environmental impacts and recommendations to improve the remedy's environmental footprint. The PRR will include the completed Summary of Green Remediation Metrics form provided in Appendices.
- An evaluation of trends in contaminant levels in the affected media to determine if the remedy continues to be effective in achieving remedial goals as specified by the RAWP, ROD or Decision Document; and
- The overall performance and effectiveness of the remedy.

- A performance summary for all treatment systems at the site during the calendar year, including information such as:
  - The number of days the system operated for the reporting period;
  - The average, high, and low flows per day;
  - The contaminant mass removed and the cost per pound of mass removed during the certification period and during the life of the treatment system;
  - A description of breakdowns and/or repairs along with an explanation for any significant downtime;
  - A description of the resolution of performance problems;
  - Alarm conditions;
  - Trends in equipment failure;
  - A summary of the performance, effluent and/or effectiveness monitoring; and
  - Comments, conclusions, and recommendations based on data evaluation. Recommendations must address how receptors would be impacted. Recommendations can include:
    - Proposals to address efficiency and costs such as: instituting remote operation, system changes to decrease maintenance costs and downtime, and system changes to decrease energy use; and
    - Proposals to modify or shut down a treatment system due to remediation completion, system performance or changed

conditions. System shutdowns are addressed in Section 6.4 of DER-10.

### 7.2.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, a qualified environmental professional as defined in 6 NYCRR Part 375 or PE licensed to practice and registered in New York State will prepare, and include in the Periodic Review Report, the following certification as per the requirements of NYSDEC DER-10:

"*For each institutional or engineering control identified for the site, I certify that all of the following statements are true:*

- *The inspection of the Site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*
- *The institutional control and/or engineering control employed at this Site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any Site management plan for this control;*
- *Access to the Site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the Site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the Site is compliant with the environmental easement;*
- *The engineering control systems are performing as designed and are effective;*

- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program; and*

- *The information presented in this report is accurate and complete.*

*I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner/Remedial Party or Owner's/Remedial Party's Designated Site Representative] for the site."*

*"I certify that the New York State Education Department has granted a Certificate of Authorization to provide Professional Engineering services to the firm that prepared this Periodic Review Report."*

- *No new information has come to my attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of off-site contamination are no longer valid; and*

- *The assumptions made in the qualitative exposure assessment remain valid.*

The signed certification will be included in the Periodic Review Report.

The Periodic Review Report will be submitted, in electronic format, to the NYSDEC Project Manager and the NYSDOH Project Manager. The Periodic Review Report may also need to be submitted in hard-copy format if requested by the NYSDEC Project Manager.

## 7.3 Corrective Measures Work Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control or failure to conduct site management activities, a Corrective Measures Work Plan will be submitted to the NYSDEC project manager for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the

Corrective Measures Work Plan until it has been approved by the NYSDEC Project Manager.

## 7.4 Remedial System Optimization Report

If an RSO is to be performed (see Section 6.3), upon completion of an RSO, an RSO report must be submitted to the NYSDEC project manager for approval. A general outline for the RSO report is provided in Appendix M. The RSO report will document the research/ investigation and data gathering that was conducted, evaluate the results and facts obtained, present a revised conceptual site model and present recommendations. RSO recommendations are to be implemented upon approval from the NYSDEC. Additional work plans, design documents, HASPs etc., may still be required to implement the recommendations, based upon the actions that need to be taken. A final engineering report and update to the SMP may also be required.

The RSO report will be submitted, in electronic format, to the NYSDEC project manager and the NYSDOH project manager.

## 8.0 REFERENCES

6 NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.

NYSDEC DER-10 – "Technical Guidance for Site Investigation and Remediation".

NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (April 2000 addendum).

# TABLES

**Table 2**
**Groundwater Elevations**
**29-05 38th Avenue**

| Well | Top of Casing Elevation (ft) | Depth to Groundwater (ft) | Groundwater Elevation (Shallow) (ft) | Groundwater Elevation (Deep) (ft) |
|---|---|---|---|---|
| WC-1S | 94.81 | 24.95 | 69.86 | |
| WC-1D | 94.89 | 25.02 | | 69.87 |
| TW-2 | 95.63 | 26.04 | 69.59 | |
| WC-3S | 95.84 | 27.01 | 68.83 | |
| WC-3D | 96.12 | 27 | | 69.12 |
| WC-4S | 95.86 | 26.02 | 69.84 | |
| WC-4D | 96.22 | 27.05 | | 69.17 |
| WC-5S | 96.75 | 28.3 | 68.45 | |
| WC-5D | 97.64 | 28.82 | | 68.82 |
| WC-6S | 99.94 | 31.32 | 68.62 | |
| WC-6D | 99.95 | 31.05 | | 68.9 |
| MW-1* | 100.00 | 23.42 | 76.58 | |
| MW-2* | 85.01 | 9.46 | 75.55 | |
| MW-3* | 85.43 | 10.26 | 75.17 | |

Note:
1. All elevations surveyed to a common random datum, assigned to 100'.
2. Non asterisk wells refer to 2021 BCP RI wells, gauged on November 22, 2021.
3. *Asterisk noted wells refer to Permanent Monitoring wells, gauged in November 2024

Table 3A
Summary of Remaining Soil Sample Exceedances
29-05 38th Avenue

| Sample ID<br>York ID<br>Sampling Date<br>Client Matrix | | 6NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives | 6NYCRR Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential | Tank-NE<br>22D1128-01<br>04/21/2022<br>Soil | | Tank-Bottom<br>22D1128-02<br>04/21/2022<br>Soil | | Tank-SW<br>22D1128-03<br>04/21/2022<br>Soil | | Tank-SE<br>22D1128-04<br>04/21/2022<br>Soil | | Tank-NW<br>22D1128-05<br>04/21/2022<br>Soil | | Tank-Dup<br>22D1128-06<br>04/21/2022<br>Soil | | Tank-S-1-23-6-21<br>23F1453-01<br>06/21/2023<br>Soil | | Tank-DUP-23-6-21<br>23F1453-05<br>06/21/2023<br>Soil | | Tank-S-2-23-6-21<br>23F1453-02<br>06/21/2023<br>Soil | | Tank-S-3-23-6-21<br>23F1453-03<br>06/21/2023<br>Soil | | Tank-B-1-23-6-21<br>23F1453-04<br>06/21/2023<br>Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Compound** | **CAS Number** | | | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| **VOA, 8260 MASTER** | | mg/Kg | mg/Kg | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | |
| **Dilution Factor** | | | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 100 | | 1 | | 1 | | 1 | |
| 1,2,4-Trimethylbenzene | 95-63-6 | 3.6 | 52 | 0.0018 | U | 0.0028 | U | 0.0029 | U | 0.0023 | U | 0.0025 | U | 0.0015 | U | 0.069 | | **4.3** | D | 0.0022 | U | 0.0023 | U | 0.0021 | U |
| 1,3,5-Trimethylbenzene | 108-67-8 | 8.4 | 52 | 0.0018 | U | 0.0028 | U | 0.0029 | U | 0.0023 | U | 0.0025 | U | 0.0015 | U | 0.088 | | 0.18 | | 0.0022 | U | 0.052 | | 0.0022 | J |
| Benzene | 71-43-2 | 0.06 | 4.8 | 0.0018 | U | 0.0028 | U | 0.0029 | U | 0.0023 | U | 0.0025 | U | 0.0015 | U | 0.0022 | U | 0.0021 | U | 0.0022 | U | 0.0023 | U | 0.0021 | U |
| Ethyl Benzene | 100-41-4 | 1 | 41 | 0.0018 | U | 0.0028 | U | 0.0029 | U | 0.0023 | U | 0.0025 | U | 0.0015 | U | 0.0022 | U | 0.037 | | 0.0022 | U | 0.0023 | U | 0.0021 | U |
| Isopropylbenzene | 98-82-8 | ~ | ~ | 0.0018 | U | 0.0028 | U | 0.0029 | U | 0.0023 | U | 0.0025 | U | 0.0015 | U | 0.0022 | U | 0.035 | | 0.0022 | U | 0.0023 | U | 0.0021 | U |
| Methyl tert-butyl ether (MTBE) | 1634-04-4 | 0.93 | 100 | 0.0018 | U | 0.0028 | U | 0.0029 | U | 0.0023 | U | 0.0025 | U | 0.0015 | U | 0.0022 | U | 0.0021 | U | 0.0022 | U | 0.0023 | U | 0.0021 | U |
| Naphthalene | 91-20-3 | 12 | 100 | 0.0018 | U | 0.0028 | U | 0.0029 | U | 0.0023 | U | 0.0025 | U | 0.0015 | U | 0.0022 | U | 2.7 | D | 0.0022 | U | 0.0023 | U | 0.0021 | U |
| n-Butylbenzene | 104-51-8 | 12 | 100 | 0.0018 | U | 0.0028 | U | 0.0029 | U | 0.0023 | U | 0.0025 | U | 0.0015 | U | 0.0022 | U | 0.0021 | U | 0.0022 | U | 0.021 | | 0.0021 | U |
| n-Propylbenzene | 103-65-1 | 3.9 | 100 | 0.0018 | U | 0.0028 | U | 0.0029 | U | 0.0023 | U | 0.0025 | U | 0.0015 | U | 0.0022 | U | 0.071 | | 0.0022 | U | 0.0023 | U | 0.0021 | U |
| o-Xylene | 95-47-6 | ~ | ~ | 0.0018 | U | 0.0028 | U | 0.0029 | U | 0.0023 | U | 0.0025 | U | 0.0015 | U | 0.067 | | 0.14 | | 0.0022 | U | 0.020 | | 0.0021 | U |
| p- & m- Xylenes | 179601-23-1 | ~ | ~ | 0.0037 | U | 0.0057 | U | 0.0058 | U | 0.0046 | U | 0.0050 | U | 0.0029 | U | 0.032 | | 0.11 | | 0.0044 | U | 0.0046 | U | 0.0042 | U |
| p-Isopropyltoluene | 99-87-6 | ~ | ~ | 0.0018 | U | 0.0028 | U | 0.0029 | U | 0.0023 | U | 0.0025 | U | 0.0015 | U | 0.024 | | 0.052 | | 0.0022 | U | 0.015 | | 0.0021 | U |
| sec-Butylbenzene | 135-98-8 | 11 | 100 | 0.0018 | U | 0.0028 | U | 0.0029 | U | 0.0023 | U | 0.0025 | U | 0.0015 | U | 0.0022 | U | 0.069 | | 0.0022 | U | 0.0023 | U | 0.0021 | U |
| tert-Butylbenzene | 98-06-6 | 5.9 | 100 | 0.0018 | U | 0.0028 | U | 0.0029 | U | 0.0023 | U | 0.0025 | U | 0.0015 | U | 0.0022 | U | 0.0021 | U | 0.0022 | U | 0.0023 | U | 0.0021 | U |
| Toluene | 108-88-3 | 0.7 | 100 | 0.0018 | U | 0.0028 | U | 0.0029 | U | 0.0023 | U | 0.0025 | U | 0.0015 | U | 0.010 | | 0.022 | | 0.0022 | U | 0.0023 | U | 0.0021 | U |
| Xylenes, Total | 1330-20-7 | 0.26 | 100 | 0.0055 | U | 0.0085 | U | 0.0088 | U | 0.0069 | U | 0.0075 | U | 0.0044 | U | 0.099 | | 0.25 | | 0.0066 | U | 0.020 | | 0.0063 | U |
| **SVOA, 8270 MASTER** | | mg/Kg | mg/Kg | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | |
| **Dilution Factor** | | | | 2 | | 2 | | 2 | | 2 | | 5 | | 2 | | 2 | | 2 | | 2 | | 2 | | 2 | |
| 2-Methylnaphthalene | 91-57-6 | ~ | ~ | NT | | NT | | NT | | NT | | NT | | NT | | 0.416 | D | 0.720 | D | 0.0450 | U | 0.176 | D | 0.710 | D |
| Acenaphthene | 83-32-9 | 20 | 100 | 0.0544 | JD | 0.0450 | U | 0.0482 | U | 0.0485 | U | 0.157 | D | 0.0451 | U | 0.0634 | JD | 0.0883 | JD | 0.0450 | U | 0.0730 | JD | 0.119 | D |
| Acenaphthylene | 208-96-8 | 100 | 100 | 0.0461 | U | 0.0450 | U | 0.0482 | U | 0.0485 | U | 0.0603 | JD | 0.0451 | U | 0.0437 | U | 0.0469 | U | 0.0450 | U | 0.0453 | U | 0.0448 | U |
| Anthracene | 120-12-7 | 100 | 100 | 0.102 | D | 0.0450 | U | 0.0482 | U | 0.0485 | U | 0.596 | D | 0.0451 | U | 0.0467 | JD | 0.0591 | JD | 0.0920 | D | 0.222 | D | 0.0971 | D |
| Benzo(a)anthracene | 56-55-3 | 1 | 1 | 0.230 | D | 0.0450 | U | 0.0484 | JD | 0.125 | D | **2.59** | D | 0.0697 | JD | 0.0453 | JD | 0.0469 | U | 0.274 | D | 0.390 | D | 0.180 | D |
| Benzo(a)pyrene | 50-32-8 | 1 | 1 | 0.278 | D | 0.0450 | U | 0.0638 | JD | 0.169 | D | **2.67** | D | 0.0697 | JD | 0.0437 | U | 0.0469 | U | 0.231 | D | 0.297 | D | 0.153 | D |
| Benzo(b)fluoranthene | 205-99-2 | 1 | 1 | 0.231 | D | 0.0450 | U | 0.0515 | JD | 0.145 | D | **2.02** | D | 0.0669 | JD | 0.0437 | U | 0.0469 | U | 0.213 | D | 0.264 | D | 0.143 | D |
| Benzo(g,h,i)perylene | 191-24-2 | 100 | 100 | 0.151 | D | 0.0450 | U | 0.0482 | U | 0.121 | D | 1.52 | D | 0.0467 | JD | 0.0437 | U | 0.0469 | U | 0.143 | D | 0.179 | D | 0.100 | D |
| Benzo(k)fluoranthene | 207-08-9 | 0.8 | 3.9 | 0.207 | D | 0.0450 | U | 0.0482 | U | 0.124 | D | **1.69** | D | 0.0568 | JD | 0.0437 | U | 0.0469 | U | 0.185 | D | 0.241 | D | 0.124 | D |
| Chrysene | 218-01-9 | 1 | 3.9 | 0.227 | D | 0.0450 | U | 0.0482 | U | 0.135 | D | **2.45** | D | 0.0590 | JD | 0.0437 | U | 0.0486 | JD | 0.260 | D | 0.353 | D | 0.176 | D |
| Dibenzo(a,h)anthracene | 53-70-3 | 0.33 | 0.33 | 0.0610 | JD | 0.0450 | U | 0.0482 | U | 0.0485 | U | **0.577** | D | 0.0451 | U | 0.0437 | U | 0.0469 | U | 0.0450 | U | 0.0453 | U | 0.0448 | U |
| Fluoranthene | 206-44-0 | 100 | 100 | 0.478 | D | 0.0450 | U | 0.0768 | JD | 0.214 | D | 4.27 | D | 0.0985 | D | 0.0940 | D | 0.117 | D | 0.598 | D | 0.940 | D | 0.354 | D |
| Fluorene | 86-73-7 | 30 | 100 | 0.0492 | JD | 0.0450 | U | 0.0482 | U | 0.0485 | U | 0.144 | D | 0.0451 | U | 0.201 | D | 0.257 | D | 0.0450 | U | 0.124 | D | 0.306 | D |
| Indeno(1,2,3-cd)pyrene | 193-39-5 | 0.5 | 0.5 | 0.195 | D | 0.0450 | U | 0.0484 | JD | 0.135 | D | **1.69** | D | 0.0561 | JD | 0.0437 | U | 0.0469 | U | 0.164 | D | 0.220 | D | 0.116 | D |
| Naphthalene | 91-20-3 | 12 | 100 | 0.0461 | U | 0.0450 | U | 0.0482 | U | 0.0485 | U | 0.0855 | JD | 0.0451 | U | 0.0437 | U | 0.0469 | U | 0.0450 | U | 0.0636 | JD | 0.0448 | U |
| Phenanthrene | 85-01-8 | 100 | 100 | 0.425 | D | 0.0450 | U | 0.0482 | U | 0.0889 | JD | 2.40 | D | 0.0496 | JD | 0.428 | D | 0.567 | D | 0.444 | D | 1.05 | D | 0.698 | D |
| Pyrene | 129-00-0 | 100 | 100 | 0.432 | D | 0.0450 | U | 0.0745 | JD | 0.201 | D | 4.27 | D | 0.0884 | JD | 0.130 | D | 0.153 | D | 0.513 | D | 0.848 | D | 0.402 | D |
| **Lead by EPA 6010** | | mg/Kg | mg/Kg | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | |
| **Dilution Factor** | | | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | | | | | | | | | | |
| Lead | 7439-92-1 | 63 | 400 | 53.7 | | 9.33 | | 54.3 | | **99.1** | | **115** | | 42.4 | | NT | | NT | | NT | | NT | | NT | |

**NOTES:**
Exceeds Unrestricted Use Soil Cleanup Objectives
Exceeds Unrestricted Use and Restricted Residential Use Soil Cleanup Objectives

**Q is the Qualifier Column with definitions as follows:**
D=result is from an analysis that required a dilution
J=analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated
U=analyte not detected at or above the level indicated
NT=this indicates the analyte was not a target for this sample
~=this indicates that no regulatory limit has been established for this analyte

Table 3B
Summary of Remaining Soil Sample Exceedances
29-05 38th Avenue

| Sample ID<br>York ID<br>Sampling Date<br>Client Matrix | | 6NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives | 6NYCRR Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential | EP-B-1<br>23F0631-01<br>06/08/2023<br>Soil | | EP-B-2<br>23F0631-10<br>06/09/2023<br>Soil | | EP-B-3<br>23F0631-11<br>06/09/2023<br>Soil | | EP-B-4<br>23F1164-01<br>06/15/2023<br>Soil | | EP-B-5<br>23F1164-02<br>06/15/2023<br>Soil | | EP-B-6<br>23F1164-03<br>06/15/2023<br>Soil | | EP-B-7<br>23F1523-04<br>06/22/2023<br>Soil | | EP-B-8<br>23F2088-01<br>06/29/2023<br>Soil | | EP-B-9<br>23F2088-02<br>06/29/2023<br>Soil | | EP-S-1<br>23F0631-02<br>06/08/2023<br>Soil | | EP-S-2<br>23F0631-04<br>06/08/2023<br>Soil | | EP-S-3<br>23F0631-06<br>06/09/2023<br>Soil | | EP-S-4<br>23F0631-07<br>06/09/2023<br>Soil | | EP-S-5<br>23F0631-08<br>06/09/2023<br>Soil | | EP-S-6<br>23F0631-09<br>06/09/2023<br>Soil | | EP-S-7<br>23F1523-01<br>06/22/2023<br>Soil | | EP-S-8<br>23F1523-02<br>06/22/2023<br>Soil | | EP-S-9<br>23F1523-03<br>06/22/2023<br>Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Compound** | **CAS Number** | | | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| **Volatile Organics, 8260 - Comprehensive** | | mg/Kg | mg/Kg | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | |
| **Dilution Factor** | | | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | |
| 1,1,1,2-Tetrachloroethane | 630-20-6 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,1,1-Trichloroethane | 71-55-6 | 0.68 | 100 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113) | 76-13-1 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,1,2-Trichloroethane | 79-00-5 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,1-Dichloroethane | 75-34-3 | 0.27 | 26 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,1-Dichloroethene | 75-35-4 | 0.33 | 100 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,1-Dichloropropene | 563-58-6 | ~ | ~ | NT | | NT | | NT | | NT | | NT | | NT | | 0.0021 | U | 0.0023 | U | 0.0021 | U | NT | | NT | | NT | | NT | | NT | | NT | | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,2,3-Trichlorobenzene | 87-61-6 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,2,3-Trichloropropane | 96-18-4 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,2,4-Trichlorobenzene | 120-82-1 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,2,4-Trimethylbenzene | 95-63-6 | 3.6 | 52 | 0.0025 | U | 0.0045 | J | 0.026 | | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0091 | | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,2-Dibromo-3-chloropropane | 96-12-8 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,2-Dibromoethane | 106-93-4 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,2-Dichlorobenzene | 95-50-1 | 1.1 | 100 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,2-Dichloroethane | 107-06-2 | 0.02 | 3.1 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,2-Dichloropropane | 78-87-5 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,3,5-Trimethylbenzene | 108-67-8 | 8.4 | 52 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,3-Dichlorobenzene | 541-73-1 | 2.4 | 49 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,3-Dichloropropane | 142-28-9 | ~ | ~ | NT | | NT | | NT | | NT | | NT | | NT | | 0.0021 | U | 0.0023 | U | 0.0021 | U | NT | | NT | | NT | | NT | | NT | | NT | | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,4-Dichlorobenzene | 106-46-7 | 1.8 | 13 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 1,4-Dioxane | 123-91-1 | 0.1 | 13 | 0.050 | U | 0.051 | U | 0.051 | U | 0.050 | U | 0.049 | U | 0.058 | U | 0.043 | U | 0.046 | U | 0.043 | U | 0.043 | U | 0.048 | U | 0.042 | U | 0.067 | U | 0.068 | U | 0.051 | U | 0.050 | U | 0.049 | U | 0.046 | U |
| 2,2-Dichloropropane | 594-20-7 | ~ | ~ | NT | | NT | | NT | | NT | | NT | | NT | | 0.0021 | U | 0.0023 | U | 0.0021 | U | NT | | NT | | NT | | NT | | NT | | NT | | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 2-Butanone | 78-93-3 | 0.12 | 100 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 2-Chlorotoluene | 95-49-8 | ~ | ~ | NT | | NT | | NT | | NT | | NT | | NT | | 0.0021 | U | 0.0023 | U | 0.0021 | U | NT | | NT | | NT | | NT | | NT | | NT | | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 2-Hexanone | 591-78-6 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 4-Chlorotoluene | 106-43-4 | ~ | ~ | NT | | NT | | NT | | NT | | NT | | NT | | 0.0021 | U | 0.0023 | U | 0.0021 | U | NT | | NT | | NT | | NT | | NT | | NT | | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| 4-Methyl-2-pentanone | 108-10-1 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Acetone | 67-64-1 | 0.0500 | 100 | 0.0050 | U | 0.0051 | U | 0.049 | | 0.033 | | 0.022 | | **0.057** | | 0.0070 | J | 0.0071 | JB | 0.0070 | J | 0.0043 | U | 0.0048 | U | **0.063** | | 0.0067 | U | **0.086** | | **0.13** | | 0.018 | | 0.014 | | **0.059** | |
| Acrolein | 107-02-8 | ~ | ~ | 0.0050 | U | 0.0051 | U | 0.0051 | U | 0.0050 | U | 0.0049 | U | 0.0058 | U | 0.0043 | U | 0.0046 | U | 0.0043 | U | 0.0043 | U | 0.0048 | U | 0.0042 | U | 0.0067 | U | 0.0068 | U | 0.0051 | U | 0.0050 | U | 0.0049 | U | 0.0046 | U |
| Acrylonitrile | 107-13-1 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Benzene | 71-43-2 | 0.06 | 4.8 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Bromobenzene | 108-86-1 | ~ | ~ | NT | | NT | | NT | | NT | | NT | | NT | | 0.0021 | U | 0.0023 | U | 0.0021 | U | NT | | NT | | NT | | NT | | NT | | NT | | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Bromochloromethane | 74-97-5 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Bromodichloromethane | 75-27-4 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Bromoform | 75-25-2 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Bromomethane | 74-83-9 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Carbon disulfide | 75-15-0 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Carbon tetrachloride | 56-23-5 | 0.76 | 2.4 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Chlorobenzene | 108-90-7 | 1.1 | 100 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Chloroethane | 75-00-3 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Chloroform | 67-66-3 | 0.37 | 49 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Chloromethane | 74-87-3 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| cis-1,2-Dichloroethylene | 156-59-2 | 0.25 | 100 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| cis-1,3-Dichloropropylene | 10061-01-5 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Cyclohexane | 110-82-7 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Dibromochloromethane | 124-48-1 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Dibromomethane | 74-95-3 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Dichlorodifluoromethane | 75-71-8 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Ethyl Benzene | 100-41-4 | 1 | 41 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Hexachlorobutadiene | 87-68-3 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Isopropylbenzene | 98-82-8 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Methyl acetate | 79-20-9 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.020 | | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Methyl tert-butyl ether (MTBE) | 1634-04-4 | 0.93 | 100 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Methylcyclohexane | 108-87-2 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0029 | J | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Methylene chloride | 75-09-2 | 0.05 | 100 | 0.0067 | J | 0.0051 | U | 0.0051 | U | 0.0050 | U | 0.0049 | U | 0.0058 | U | 0.0043 | U | 0.0046 | U | 0.0043 | U | 0.0043 | U | 0.0048 | U | 0.0042 | U | 0.0067 | U | 0.0068 | U | 0.0051 | U | 0.0050 | U | 0.0280 | | 0.0046 | U |
| n-Butylbenzene | 104-51-8 | 12 | 100 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| n-Propylbenzene | 103-65-1 | 3.9 | 100 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| o-Xylene | 95-47-6 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| p- & m- Xylenes | 179601-23-1 | ~ | ~ | 0.0050 | U | 0.0051 | U | 0.0051 | U | 0.0050 | U | 0.0049 | U | 0.0058 | U | 0.0043 | U | 0.0046 | U | 0.0043 | U | 0.0043 | U | 0.0048 | U | 0.0042 | U | 0.0067 | U | 0.0068 | U | 0.0051 | U | 0.0050 | U | 0.0049 | U | 0.0046 | U |
| p-Isopropyltoluene | 99-87-6 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| sec-Butylbenzene | 135-98-8 | 11 | 100 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Styrene | 100-42-5 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| tert-Butyl alcohol (TBA) | 75-65-0 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0026 | J | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| tert-Butylbenzene | 98-06-6 | 5.9 | 100 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Tetrachloroethylene | 127-18-4 | 1.3 | 19 | 0.0025 | U | 0.0069 | | 0.012 | | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.010 | | 0.0034 | U | 0.0400 | | 0.0035 | J | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Toluene | 108-88-3 | 0.7 | 100 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0032 | J | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| trans-1,2-Dichloroethene | 156-60-5 | 0.19 | 100 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| trans-1,3-Dichloropropene | 10061-02-6 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| trans-1,4-dichloro-2-butene | 110-57-6 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | NT | | NT | | NT | | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | NT | | NT | | NT | | |
| Trichloroethene | 79-01-6 | 0.47 | 21 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Trichlorofluoromethane | 75-69-4 | ~ | ~ | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Vinyl acetate | 108-05-4 | ~ | ~ | NT | | NT | | NT | | NT | | NT | | NT | | 0.0021 | U | 0.0023 | U | 0.0021 | U | NT | | NT | | NT | | NT | | NT | | NT | | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Vinyl Chloride | 75-01-4 | 0.02 | 0.9 | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0025 | U | 0.0024 | U | 0.0029 | U | 0.0021 | U | 0.0023 | U | 0.0021 | U | 0.0022 | U | 0.0024 | U | 0.0021 | U | 0.0034 | U | 0.0034 | U | 0.0025 | U | 0.0025 | U | 0.0024 | U | 0.0023 | U |
| Xylenes, Total | 1330-20-7 | 0.26 | 100 | 0.0075 | U | 0.0076 | U | 0.0077 | U | 0.0075 | U | 0.0073 | U | 0.0086 | U | 0.0064 | U | 0.0068 | U | 0.0064 | U | 0.0065 | U | 0.0073 | U | 0.0062 | U | 0.010 | U | 0.010 | U | 0.0076 | U | 0.0074 | U | 0.0073 | U | 0.0069 | U |

**NOTES:**

Exceeds Unrestricted Use Soil Cleanup Objectives

Exceeds Unrestricted Use and Restricted Residential Use Soil Cleanup Objectives

**Q is the Qualifier Column with definitions as follows:**

D=result is from an analysis that required a dilution

U=analyte not detected at or above the level indicated

B=analyte found in the analysis batch blank

NT=this indicates the analyte was not a target for this sample

~=this indicates that no regulatory limit has been established for this analyte

Table 3B (Continued)
Summary of Remaining Soil Sample Exceedances
29-05 38th Avenue

| Sample ID<br>York ID<br>Sampling Date<br>Client Matrix | | 6NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives | 6NYCRR Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential | EP-B-1<br>23F0631-01<br>06/08/2023<br>Soil | | EP-B-2<br>23F0631-10<br>06/09/2023<br>Soil | | EP-B-3<br>23F0631-11<br>06/09/2023<br>Soil | | EP-B-4<br>23F1164-01<br>06/15/2023<br>Soil | | EP-B-5<br>23F1164-02<br>06/15/2023<br>Soil | | EP-B-6<br>23F1164-03<br>06/15/2023<br>Soil | | EP-B-7<br>23F1523-04<br>06/22/2023<br>Soil | | EP-B-8<br>23F2088-01<br>06/29/2023<br>Soil | | EP-B-9<br>23F2088-02<br>06/29/2023<br>Soil | | EP-S-1<br>23F0631-02<br>06/08/2023<br>Soil | | EP-S-2<br>23F0631-04<br>06/08/2023<br>Soil | | EP-S-3<br>23F0631-06<br>06/09/2023<br>Soil | | EP-S-4<br>23F0631-07<br>06/09/2023<br>Soil | | EP-S-5<br>23F0631-08<br>06/09/2023<br>Soil | | EP-S-6<br>23F0631-09<br>06/09/2023<br>Soil | | EP-S-7<br>23F1523-01<br>06/22/2023<br>Soil | | EP-S-8<br>23F1523-02<br>06/22/2023<br>Soil | | EP-S-9<br>23F1523-03<br>06/22/2023<br>Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Compound** | **CAS Number** | mg/Kg | mg/Kg | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| **Semi-Volatiles, 8270 - Comprehensive** | | mg/Kg | mg/Kg | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | |
| **Dilution Factor** | | | | 2 | | 2 | | 2 | | 2 | | 2 | | 2 | | 2 | | 2 | | 2 | | 2 | | 2 | | 2 | | 2 | | 2 | | 2 | | 2 | | 2 | | 2 | |
| 1,1-Biphenyl | 92-52-4 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 1,2,4,5-Tetrachlorobenzene | 95-94-3 | ~ | ~ | 0.0862 | U | 0.0895 | U | 0.102 | U | 0.0894 | U | 0.0909 | U | 0.112 | U | 0.0904 | U | 0.0871 | U | 0.0904 | U | 0.0852 | U | 0.0871 | U | 0.0941 | U | 0.0998 | U | 0.102 | U | 0.0902 | U | 0.0873 | U | 0.0887 | U | 0.0898 | U |
| 1,2,4-Trichlorobenzene | 120-82-1 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 1,2-Dichlorobenzene | 95-50-1 | 1.1 | 100 | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 1,2-Diphenylhydrazine (as Azobenzene) | 122-66-7 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 1,3-Dichlorobenzene | 541-73-1 | 2.4 | 49 | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 1,4-Dichlorobenzene | 106-46-7 | 1.8 | 13 | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 2,3,4,6-Tetrachlorophenol | 58-90-2 | ~ | ~ | 0.0862 | U | 0.0895 | U | 0.102 | U | 0.0894 | U | 0.0909 | U | 0.112 | U | 0.0904 | U | 0.0871 | U | 0.0904 | U | 0.0852 | U | 0.0871 | U | 0.0941 | U | 0.0998 | U | 0.102 | U | 0.0902 | U | 0.0873 | U | 0.0887 | U | 0.0898 | U |
| 2,4,5-Trichlorophenol | 95-95-4 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 2,4,6-Trichlorophenol | 88-06-2 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 2,4-Dichlorophenol | 120-83-2 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 2,4-Dimethylphenol | 105-67-9 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 2,4-Dinitrophenol | 51-28-5 | ~ | ~ | 0.0862 | U | 0.0895 | U | 0.102 | U | 0.0894 | U | 0.0909 | U | 0.112 | U | 0.0904 | U | 0.0871 | U | 0.0904 | U | 0.0852 | U | 0.0871 | U | 0.0941 | U | 0.0998 | U | 0.102 | U | 0.0902 | U | 0.0873 | U | 0.0887 | U | 0.0898 | U |
| 2,4-Dinitrotoluene | 121-14-2 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 2,6-Dinitrotoluene | 606-20-2 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 2-Chloronaphthalene | 91-58-7 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 2-Chlorophenol | 95-57-8 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 2-Methylnaphthalene | 91-57-6 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 2-Methylphenol | 95-48-7 | 0.33 | 100 | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 2-Nitroaniline | 88-74-4 | ~ | ~ | 0.0862 | U | 0.0895 | U | 0.102 | U | 0.0894 | U | 0.0909 | U | 0.112 | U | 0.0904 | U | 0.0871 | U | 0.0904 | U | 0.0852 | U | 0.0871 | U | 0.0941 | U | 0.0998 | U | 0.102 | U | 0.0902 | U | 0.0873 | U | 0.0887 | U | 0.0898 | U |
| 2-Nitrophenol | 88-75-5 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 3- & 4-Methylphenols | 65794-96-9 | 0.33 | 100 | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 3,3-Dichlorobenzidine | 91-94-1 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 3-Nitroaniline | 99-09-2 | ~ | ~ | 0.0862 | U | 0.0895 | U | 0.102 | U | 0.0894 | U | 0.0909 | U | 0.112 | U | 0.0904 | U | 0.0871 | U | 0.0904 | U | 0.0852 | U | 0.0871 | U | 0.0941 | U | 0.0998 | U | 0.102 | U | 0.0902 | U | 0.0873 | U | 0.0887 | U | 0.0898 | U |
| 4,6-Dinitro-2-methylphenol | 534-52-1 | ~ | ~ | 0.0862 | U | 0.0895 | U | 0.102 | U | 0.0894 | U | 0.0909 | U | 0.112 | U | 0.0904 | U | 0.0871 | U | 0.0904 | U | 0.0852 | U | 0.0871 | U | 0.0941 | U | 0.0998 | U | 0.102 | U | 0.0902 | U | 0.0873 | U | 0.0887 | U | 0.0898 | U |
| 4-Bromophenyl phenyl ether | 101-55-3 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 4-Chloro-3-methylphenol | 59-50-7 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 4-Chloroaniline | 106-47-8 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 4-Chlorophenyl phenyl ether | 7005-72-3 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| 4-Nitroaniline | 100-01-6 | ~ | ~ | 0.0862 | U | 0.0895 | U | 0.102 | U | 0.0894 | U | 0.0909 | U | 0.112 | U | 0.0904 | U | 0.0871 | U | 0.0904 | U | 0.0852 | U | 0.0871 | U | 0.0941 | U | 0.0998 | U | 0.102 | U | 0.0902 | U | 0.0873 | U | 0.0887 | U | 0.0898 | U |
| 4-Nitrophenol | 100-02-7 | ~ | ~ | 0.0862 | U | 0.0895 | U | 0.102 | U | 0.0894 | U | 0.0909 | U | 0.112 | U | 0.0904 | U | 0.0871 | U | 0.0904 | U | 0.0852 | U | 0.0871 | U | 0.0941 | U | 0.0998 | U | 0.102 | U | 0.0902 | U | 0.0873 | U | 0.0887 | U | 0.0898 | U |
| Acenaphthene | 83-32-9 | 20 | 100 | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Acenaphthylene | 208-96-8 | 100 | 100 | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Acetophenone | 98-86-2 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Aniline | 62-53-3 | ~ | ~ | 0.173 | U | 0.179 | U | 0.204 | U | 0.179 | U | 0.182 | U | 0.224 | U | 0.181 | U | 0.174 | U | 0.181 | U | 0.171 | U | 0.174 | U | 0.188 | U | 0.200 | U | 0.205 | U | 0.181 | U | 0.175 | U | 0.178 | U | 0.180 | U |
| Anthracene | 120-12-7 | 100 | 100 | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.124 | D | 0.112 | D | 0.105 | D | 0.0916 | D | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Atrazine | 1912-24-9 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Benzaldehyde | 100-52-7 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Benzidine | 92-87-5 | ~ | ~ | 0.173 | U | 0.179 | U | 0.204 | U | 0.179 | U | 0.182 | U | 0.224 | U | 0.181 | U | 0.174 | U | 0.181 | U | 0.171 | U | 0.174 | U | 0.188 | U | 0.200 | U | 0.205 | U | 0.181 | U | 0.175 | U | 0.178 | U | 0.180 | U |
| Benzo(a)anthracene | 56-55-3 | 1 | 1 | 0.0432 | U | 0.126 | D | 0.180 | D | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.557 | D | 0.303 | D | 0.703 | D | 0.408 | D | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Benzo(a)pyrene | 50-32-8 | 1 | 1 | 0.0432 | U | 0.104 | D | 0.177 | D | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.549 | D | 0.258 | D | 0.539 | D | 0.350 | D | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Benzo(b)fluoranthene | 205-99-2 | 1 | 1 | 0.0432 | U | 0.135 | D | 0.209 | D | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.691 | D | 0.327 | D | 0.598 | D | 0.470 | D | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Benzo(g,h,i)perylene | 191-24-2 | 100 | 100 | 0.0432 | U | 0.0758 | JD | 0.102 | D | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.396 | D | 0.169 | D | 0.322 | D | 0.239 | D | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Benzo(k)fluoranthene | 207-08-9 | 0.8 | 3.9 | 0.0432 | U | 0.0544 | JD | 0.0772 | JD | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.252 | D | 0.126 | D | 0.244 | D | 0.190 | D | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Benzoic acid | 65-85-0 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Benzyl alcohol | 100-51-6 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Benzyl butyl phthalate | 85-68-7 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Bis(2-chloroethoxy)methane | 111-91-1 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Bis(2-chloroethyl)ether | 111-44-4 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Bis(2-chloroisopropyl)ether | 108-60-1 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Bis(2-ethylhexyl)phthalate | 117-81-7 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Caprolactam | 105-60-2 | ~ | ~ | 0.0862 | U | 0.0895 | U | 0.102 | U | 0.0894 | U | 0.0909 | U | 0.112 | U | 0.0904 | U | 0.0871 | U | 0.0904 | U | 0.0852 | U | 0.0871 | U | 0.0941 | U | 0.0998 | U | 0.102 | U | 0.0902 | U | 0.0873 | U | 0.0887 | U | 0.0898 | U |
| Carbazole | 86-74-8 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Chrysene | 218-01-9 | 1 | 3.9 | 0.0432 | U | 0.122 | D | 0.161 | D | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.600 | D | 0.315 | D | 0.658 | D | 0.423 | D | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Dibenzo(a,h)anthracene | 53-70-3 | 0.33 | 0.33 | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0956 | D | 0.0500 | U | 0.0956 | JD | 0.0700 | JD | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Dibenzofuran | 132-64-9 | 7 | 59 | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Diethyl phthalate | 84-66-2 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Dimethyl phthalate | 131-11-3 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Di-n-butyl phthalate | 84-74-2 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Di-n-octyl phthalate | 117-84-0 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Diphenylamine | 122-39-4 | ~ | ~ | 0.0862 | U | 0.0895 | U | 0.102 | U | 0.0894 | U | 0.0909 | U | 0.112 | U | 0.0904 | U | 0.0871 | U | 0.0904 | U | 0.0852 | U | 0.0871 | U | 0.0941 | U | 0.0998 | U | 0.102 | U | 0.0902 | U | 0.0873 | U | 0.0887 | U | 0.0898 | U |
| Fluoranthene | 206-44-0 | 100 | 100 | 0.0432 | U | 0.240 | D | 0.320 | D | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.962 | D | 0.659 | D | 0.801 | D | 0.717 | D | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Fluorene | 86-73-7 | 30 | 100 | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Hexachlorobenzene | 118-74-1 | 0.33 | 1.2 | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Hexachlorobutadiene | 87-68-3 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Hexachlorocyclopentadiene | 77-47-4 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Hexachloroethane | 67-72-1 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Indeno(1,2,3-cd)pyrene | 193-39-5 | 0.5 | 0.5 | 0.0432 | U | 0.0637 | JD | 0.105 | D | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.399 | D | 0.172 | D | 0.306 | D | 0.239 | D | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Isophorone | 78-59-1 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Naphthalene | 91-20-3 | 12 | 100 | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Nitrobenzene | 98-95-3 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| N-Nitrosodimethylamine | 62-75-9 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| N-nitroso-di-n-propylamine | 621-64-7 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| N-Nitrosodiphenylamine | 86-30-6 | ~ | ~ | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Pentachlorophenol | 87-86-5 | 0.8 | 6.7 | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Phenanthrene | 85-01-8 | 100 | 100 | 0.0432 | U | 0.162 | D | 0.209 | D | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.476 | D | 0.456 | D | 0.352 | D | 0.348 | D | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Phenol | 108-95-2 | 0.33 | 100 | 0.0432 | U | 0.0449 | U | 0.0509 | U | 0.0448 | U | 0.0456 | U | 0.0561 | U | 0.0453 | U | 0.0437 | U | 0.0453 | U | 0.0427 | U | 0.0436 | U | 0.0472 | U | 0.0500 | U | 0.0512 | U | 0.0452 | U | 0.0437 | U | 0.0444 | U | 0.0450 | U |
| Pyrene | 129-00-0 | 100 | 100 | 0.0432 | U | 

Table 3B (Continued)
Summary of Remaining Soil Sample Exceedances
29-05 38th Avenue

| Sample ID<br>York ID<br>Sampling Date<br>Client Matrix | | 6NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives | 6NYCRR Part 375 Restricted Use Soil Cleanup Objectives - Restricted Residential | EP-B-1<br>23F0631-01<br>06/08/2023<br>Soil | | EP-B-2<br>23F0631-10<br>06/09/2023<br>Soil | | EP-B-3<br>23F0631-11<br>06/09/2023<br>Soil | | EP-B-4<br>23F1164-01<br>06/15/2023<br>Soil | | EP-B-5<br>23F1164-02<br>06/15/2023<br>Soil | | EP-B-6<br>23F1164-03<br>06/15/2023<br>Soil | | EP-B-7<br>23F1523-04<br>06/22/2023<br>Soil | | EP-B-8<br>23F2088-01<br>06/29/2023<br>Soil | | EP-B-9<br>23F2088-02<br>06/29/2023<br>Soil | | EP-S-1<br>23F0631-02<br>06/08/2023<br>Soil | | EP-S-2<br>23F0631-04<br>06/08/2023<br>Soil | | EP-S-3<br>23F0631-06<br>06/09/2023<br>Soil | | EP-S-4<br>23F0631-07<br>06/09/2023<br>Soil | | EP-S-5<br>23F0631-08<br>06/09/2023<br>Soil | | EP-S-6<br>23F0631-09<br>06/09/2023<br>Soil | | EP-S-7<br>23F1523-01<br>06/22/2023<br>Soil | | EP-S-8<br>23F1523-02<br>06/22/2023<br>Soil | | EP-S-9<br>23F1523-03<br>06/22/2023<br>Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Compound** | **CAS Number** | mg/Kg | mg/Kg | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| **Metals, Target Analyte** | | mg/Kg | mg/Kg | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | |
| **Dilution Factor** | | | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | |
| Aluminum | 7429-90-5 | ~ | ~ | | | 8,030 | | 10,200 | | 6,120 | | 7,430 | | 7,660 | | 7,470 | | 5,140 | | 7,470 | | 6,650 | | 5,630 | | 12,200 | | 9,630 | | 10,600 | | 11,000 | | 4,200 | | 4,370 | | 7,610 | |
| Antimony | 7440-36-0 | ~ | ~ | 2.17 | U | 2.24 | U | 2.57 | U | 3.91 | | 3.76 | | 4.45 | | 4.64 | | 2.18 | U | 4.64 | | 2.18 | U | 2.20 | U | 2.37 | U | 2.54 | U | 2.57 | U | 2.26 | U | 3.91 | | 2.22 | U | 5.60 | |
| Arsenic | 7440-38-2 | 13 | 16 | 1.30 | U | 1.35 | U | 1.58 | | 4.84 | | 8.02 | | 5.32 | | 7.61 | | 4.13 | | 7.61 | | 1.31 | U | 1.32 | U | 1.68 | | 1.53 | U | 2.52 | | 2.14 | | 2.52 | | 2.24 | | 4.42 | |
| Barium | 7440-39-3 | 350 | 400 | 33.9 | | 47.3 | | 59 | | 38.9 | | 61.7 | | 45.8 | | 42.4 | | 32 | | 42.4 | | 42.3 | | 42.7 | | 69.0 | | 48.9 | | 102 | | 58 | | 34.5 | | 34.2 | | 45.6 | |
| Beryllium | 7440-41-7 | 7.2 | 72 | 0.0440 | U | 0.0450 | U | 0.0520 | U | 0.046 | U | 0.046 | U | 0.057 | U | 0.0460 | U | 0.0440 | U | 0.0460 | U | 0.044 | U | 0.044 | U | 0.048 | U | 0.051 | U | 0.052 | U | 0.046 | U | 0.0440 | U | 0.0450 | U | 0.0450 | U |
| Cadmium | 7440-43-9 | 2.5 | 4.3 | 0.261 | U | 0.269 | U | 0.516 | | 0.274 | U | 0.274 | U | 0.338 | U | 0.272 | U | 0.262 | U | 0.272 | U | 0.391 | | 0.274 | U | 0.284 | U | 0.305 | U | 0.354 | | 0.381 | | 0.264 | U | 0.267 | U | 0.270 | U |
| Calcium | 7440-70-2 | ~ | ~ | 1,120 | B | 1,260 | B | 4,950 | B | 1,800 | | 2,040 | | 3,000 | | 3,850 | | 11,800 | | 3,850 | | 922 | B | 1,080 | B | 4,390 | B | 1,540 | B | 3,120 | B | 3,670 | B | 7,840 | B | 19,700 | B | 5,990 | B |
| Chromium | 7440-47-3 | ~ | ~ | 13.9 | | 13.6 | | 17 | | 13.8 | | 17.5 | | 16.9 | | 17.8 | | 11.9 | | 17.8 | | 15.300 | | 14 | | 18.5 | | 14.6 | | 18.6 | | 17.6 | | 9.11 | | 10.8 | | 14.5 | |
| Cobalt | 7440-48-4 | ~ | ~ | 5.49 | | 5.44 | | 6.24 | | 6.74 | | 8.88 | | 8.17 | | 8.10 | | 5.81 | | 8.10 | | 6.39 | | 6.20 | | 6.27 | | 6.29 | | 6.67 | | 7.04 | | 6.21 | | 5.03 | | 6.90 | |
| Copper | 7440-50-8 | 50 | 270 | 14.3 | | 20.6 | | 22.7 | | 14.2 | | 16.5 | | 20.8 | | 17.7 | | 12.3 | | 17.7 | | 12.9 | | 15.8 | | 31 | | 25.500 | | 26.6 | | 28.2 | | 21.8 | | 14.5 | | 17.9 | |
| Iron | 7439-89-6 | ~ | ~ | 9,150 | | 11,200 | | 12,900 | | 11,900 | | 13,600 | | 13,700 | | 14,700 | | 10,500 | | 14,700 | | 10,200 | | 9,990 | | 13,800 | | 11,900 | | 13,500 | | 14,500 | | 10,800 | | 8,860 | | 14,400 | |
| Lead | 7439-92-1 | 63 | 400 | 3.59 | | 30.6 | | 39.1 | | 8.09 | | 8.36 | | 8.66 | | 12.2 | | 9.12 | | 12.2 | | 2.18 | | 2.39 | | **95.4** | | 43 | | **363** | | **68.3** | | 8.25 | | 6.84 | | 31.1 | |
| Magnesium | 7439-95-4 | ~ | ~ | 2,320 | | 2,910 | | 3,530 | | 3,440 | | 4,160 | | 4,540 | | 4,670 | | 7,340 | | 4,670 | | 3,160 | | 2,540 | | 3,080 | | 3,330 | | 3,310 | | 3,220 | | 5,470 | | 10,100 | | 5,130 | |
| Manganese | 7439-96-5 | 1600 | 2000 | 272 | | 298 | | 352 | | 233 | | 335 | | 310 | | 304 | | 242 | | 304 | | 231 | | 342 | | 296 | | 323 | | 305 | | 311 | | 227 | | 171 | | 311 | |
| Nickel | 7440-02-0 | 30 | 310 | 10.6 | | 11.5 | | 13.2 | | 13.1 | | 17 | | 16.3 | | 15.8 | B | 10.9 | B | 15.8 | B | 12 | | 12.6 | | 13.5 | | 12.5 | | 13.6 | | 13.6 | | 9.830 | | 10.9 | | 14.4 | |
| Potassium | 7440-09-7 | ~ | ~ | 874 | B | 950 | B | 1,420 | B | 1,110 | | 1,130 | | 1,410 | | 1,180 | | 859 | | 1,180 | | 1,210 | B | 1,010 | B | 1,270 | B | 1,050 | B | 1,230 | B | 1,150 | B | 844 | | 1,070 | | 993 | |
| Selenium | 7782-49-2 | 3.9 | 180 | **6.20** | | **6.69** | | **6.78** | | 2.29 | U | 2.29 | U | 2.81 | U | 2.27 | U | 2.18 | U | 2.27 | U | **4.83** | | **6.31** | | **7.15** | | **6.80** | | **9.08** | | **8.24** | | 2.20 | U | 3.18 | | 2.25 | U |
| Silver | 7440-22-4 | 2 | 180 | 0.438 | U | 0.452 | U | 0.519 | U | 0.461 | U | 0.461 | U | 0.567 | U | 0.457 | U | 0.440 | U | 0.457 | U | 0.440 | U | 0.443 | U | 0.477 | U | 0.513 | U | 0.518 | U | 0.456 | U | 0.444 | U | 0.448 | U | 0.454 | U |
| Sodium | 7440-23-5 | ~ | ~ | 63.4 | | 68.3 | | 163 | | 131 | | 112 | | 227 | | 197 | | 132 | | 197 | | 43.7 | U | 45.2 | | 188 | | 105 | | 163 | | 133 | | 114 | | 142 | | 142 | |
| Thallium | 7440-28-0 | ~ | ~ | 2.17 | U | 2.24 | U | 2.57 | U | 2.29 | U | 3.09 | | 2.81 | U | 3.32 | | 2.18 | U | 3.32 | | 2.18 | U | 2.20 | U | 2.37 | U | 2.54 | U | 2.57 | U | 2.26 | U | 2.20 | U | 2.22 | U | 2.25 | U |
| Vanadium | 7440-62-2 | ~ | ~ | 13.9 | | 18.1 | | 22.2 | | 18.7 | | 24.3 | | 22.8 | | 27.6 | | 15 | | 27.6 | | 16.6 | | 16.2 | | 22.7 | | 19.5 | | 22.7 | | 21.9 | | 22.9 | | 15.0 | | 22.1 | |
| Zinc | 7440-66-6 | 109 | 10000 | 33.8 | | 32.2 | | 40.5 | | 39.2 | | 37.8 | | 38.3 | | 36.1 | | 28.9 | | 36.1 | | 37 | | 34.1 | | 44.4 | | 35.1 | | 44.1 | | 41.8 | | 29.5 | | 26.6 | | 32.3 | |
| **Mercury by 7473** | | mg/Kg | mg/Kg | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | | mg/Kg | |
| **Dilution Factor** | | | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | |
| Mercury | 7439-97-6 | 0.18 | 0.81 | 0.0313 | U | 0.0946 | | 0.0914 | | 0.0933 | | 0.0329 | U | 0.156 | | 0.0326 | U | 0.0314 | U | 0.0326 | U | 0.0315 | U | 0.0316 | U | **0.284** | | 0.111 | | 0.166 | | **0.231** | | 0.0317 | U | 0.0320 | U | 0.0324 | U |

**NOTES:**

Exceeds Unrestricted Use Soil Cleanup Objectives

Exceeds Unrestricted Use and Restricted Residential Use Soil Cleanup Objectives

**Q is the Qualifier Column with definitions as follows:**

U=analyte not detected at or above the level indicated

B=analyte found in the analysis batch blank

~=this indicates that no regulatory limit has been established for this analyte

Table 4
Summary of Remaining Groundwater Sample Exceedances
29-05 38th Avenue

| Sample ID | | NYSDEC TOGS Standards and Guidance Values - GA | MW-1 | | | | | | | | MW-2 | | | | | | | | MW-3 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| York ID | | | 23I2024-01 | | 24B0556-01 | | 24E0519-01 | | 24H1598-01 | | 23I2024-02 | | 24B0556-02 | | 24E0519-02 | | 24H1598-02 | | 23I2024-03 | | 24B0556-03 | | 24E0519-03 | | 24H1598-03 | |
| Sampling Date | | | 09/28/2023 | | 02/08/2024 | | 05/07/2024 | | 08/22/2024 | | 09/28/2023 | | 02/08/2024 | | 05/07/2024 | | 08/22/2024 | | 09/28/2023 | | 02/08/2024 | | 05/07/2024 | | 08/22/2024 | |
| Client Matrix | | | Ground Water | | | | | | | | Ground Water | | | | | | | | Ground Water | | | | | | | |
| Compound | CAS Number | | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| **Volatile Organics, 8260 - Comprehensive** | | ug/L | ug/L | | ug/L | | ug/L | | ug/L | | ug/L | | ug/L | | ug/L | | ug/L | | ug/L | | ug/L | | ug/L | | ug/L | |
| **Dilution Factor** | | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | |
| 1,1,1,2-Tetrachloroethane | 630-20-6 | 5 | 0.20 | U | 0.22 | U | 0.22 | U | 0.22 | U | 0.20 | U | 0.22 | U | 0.22 | U | 0.22 | U | 0.20 | U | 0.22 | U | 0.22 | U | 0.22 | U |
| 1,1,1-Trichloroethane | 71-55-6 | 5 | 0.20 | U | 0.27 | U | 0.27 | U | 0.27 | U | 0.20 | U | 0.27 | U | 0.27 | U | 0.27 | U | 0.20 | U | 0.27 | U | 0.27 | U | 0.27 | U |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | 5 | 0.20 | U | 0.26 | U | 0.26 | U | 0.26 | U | 0.20 | U | 0.26 | U | 0.26 | U | 0.26 | U | 0.20 | U | 0.26 | U | 0.26 | U | 0.26 | U |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113) | 76-13-1 | 5 | 0.20 | U | 0.29 | U | 0.29 | U | 0.29 | U | 0.20 | U | 0.29 | U | 0.29 | U | 0.29 | U | 0.20 | U | 0.29 | U | 0.29 | U | 0.29 | U |
| 1,1,2-Trichloroethane | 79-00-5 | 1 | 0.20 | U | 0.25 | U | 0.25 | U | 0.25 | U | 0.20 | U | 0.25 | U | 0.25 | U | 0.25 | U | 0.20 | U | 0.25 | U | 0.25 | U | 0.25 | U |
| 1,1-Dichloroethane | 75-34-3 | 5 | 0.20 | U | 0.27 | U | 0.27 | U | 0.27 | U | 0.20 | U | 0.27 | U | 0.27 | U | 0.27 | U | 0.20 | U | 0.27 | U | 0.27 | U | 0.27 | U |
| 1,1-Dichloroethene | 75-35-4 | 5 | 0.20 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.20 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.20 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| 1,2,3-Trichlorobenzene | 87-61-6 | 5 | 0.20 | U | 0.22 | U | 0.22 | U | 0.22 | U | 0.20 | U | 0.22 | U | 0.22 | U | 0.22 | U | 0.20 | U | 0.22 | U | 0.22 | U | 0.22 | U |
| 1,2,3-Trichloropropane | 96-18-4 | 0.04 | 0.20 | U | 0.27 | U | 0.27 | U | 0.27 | U | 0.20 | U | 0.27 | U | 0.27 | U | 0.27 | U | 0.20 | U | 0.27 | U | 0.27 | U | 0.27 | U |
| 1,2,4-Trichlorobenzene | 120-82-1 | 5 | 0.20 | U | 0.14 | U | 0.14 | U | 0.14 | U | 0.20 | U | 0.14 | U | 0.14 | U | 0.14 | U | 0.20 | U | 0.14 | U | 0.14 | U | 0.14 | U |
| 1,2,4-Trimethylbenzene | 95-63-6 | 5 | 0.20 | U | 0.31 | U | 0.31 | U | 0.31 | U | 0.20 | U | 0.31 | U | 0.31 | U | 0.31 | U | 0.20 | U | 0.31 | U | 0.31 | U | 0.31 | U |
| 1,2-Dibromo-3-chloropropane | 96-12-8 | 0.04 | 0.20 | U | 0.43 | U | 0.43 | U | 0.43 | U | 0.20 | U | 0.43 | U | 0.43 | U | 0.43 | U | 0.20 | U | 0.43 | U | 0.43 | U | 0.43 | U |
| 1,2-Dibromoethane | 106-93-4 | 0.0006 | 0.20 | U | 0.22 | U | 0.22 | U | 0.22 | U | 0.20 | U | 0.22 | U | 0.22 | U | 0.22 | U | 0.20 | U | 0.22 | U | 0.22 | U | 0.22 | U |
| 1,2-Dichlorobenzene | 95-50-1 | 3 | 0.20 | U | 0.27 | U | 0.27 | U | 0.27 | U | 0.20 | U | 0.27 | U | 0.27 | U | 0.27 | U | 0.20 | U | 0.27 | U | 0.27 | U | 0.27 | U |
| 1,2-Dichloroethane | 107-06-2 | 0.6 | 0.20 | U | 0.38 | U | 0.38 | U | 0.38 | U | 0.20 | U | 0.38 | U | 0.38 | U | 0.38 | U | 0.20 | U | 0.38 | U | 0.38 | U | 0.38 | U |
| 1,2-Dichloropropane | 78-87-5 | 1 | 0.20 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.20 | U | 0.33 | U | 0.33 | U | 0.33 | U | 0.20 | U | 0.33 | U | 0.33 | U | 0.33 | U |
| 1,3,5-Trimethylbenzene | 108-67-8 | 5 | 0.20 | U | 0.35 | U | 0.35 | U | 0.35 | U | 0.20 | U | 0.35 | U | 0.35 | U | 0.35 | U | 0.20 | U | 0.35 | U | 0.35 | U | 0.35 | U |
| 1,3-Dichlorobenzene | 541-73-1 | 3 | 0.20 | U | 0.28 | U | 0.28 | U | 0.28 | U | 0.20 | U | 0.28 | U | 0.28 | U | 0.28 | U | 0.20 | U | 0.28 | U | 0.28 | U | 0.28 | U |
| 1,3-Dichloropropane | 142-28-9 | 5 | NT | | 0.26 | U | 0.26 | U | 0.26 | U | NT | | 0.26 | U | 0.26 | U | 0.26 | U | NT | | 0.26 | U | 0.26 | U | 0.26 | U |
| 1,4-Dichlorobenzene | 106-46-7 | 3 | 0.20 | U | 0.31 | U | 0.31 | U | 0.31 | U | 0.20 | U | 0.31 | U | 0.31 | U | 0.31 | U | 0.20 | U | 0.31 | U | 0.31 | U | 0.31 | U |
| 1,4-Dioxane | 123-91-1 | 0.35 | 40 | U | 35 | U | 35 | U | 35 | U | 40 | U | 35 | U | 35 | U | 35 | U | 40 | U | 35 | U | 35 | U | 35 | U |
| 2-Butanone | 78-93-3 | 50 | 0.20 | U | 0.42 | U | 0.42 | U | 0.42 | U | 0.20 | U | 0.42 | U | 0.42 | U | 0.42 | U | 0.20 | U | 0.42 | U | 0.42 | U | 0.42 | U |
| 2-Hexanone | 591-78-6 | 50 | 0.20 | U | 0.32 | U | 0.32 | U | 0.32 | U | 0.20 | U | 0.32 | U | 0.32 | U | 0.32 | U | 0.20 | U | 0.32 | U | 0.32 | U | 0.32 | U |
| 4-Methyl-2-pentanone | 108-10-1 | ~ | 0.20 | U | 0.37 | U | 0.37 | U | 0.37 | U | 0.20 | U | 0.37 | U | 0.37 | U | 0.37 | U | 0.20 | U | 0.37 | U | 0.37 | U | 0.37 | U |
| Acetone | 67-64-1 | 50 | 1.0 | U | 1.3 | U | 1.3 | U | 1.3 | U | 1.0 | U | 1.3 | U | 1.3 | U | 1.7 | J | 13 | | 6.6 | | 1.4 | J | 3.3 | |
| Acrolein | 107-02-8 | ~ | 0.20 | U | 0.45 | U | 0.45 | U | 0.45 | U | 0.20 | U | 0.45 | U | 0.45 | U | 0.45 | U | 0.20 | U | 0.45 | U | 0.45 | U | 0.45 | U |
| Acrylonitrile | 107-13-1 | ~ | 0.20 | U | 0.42 | U | 0.42 | U | 0.42 | U | 0.20 | U | 0.42 | U | 0.42 | U | 0.42 | U | 0.20 | U | 0.42 | U | 0.42 | U | 0.42 | U |
| Benzene | 71-43-2 | 1 | 0.20 | U | 0.28 | U | 0.28 | U | 0.28 | U | 0.20 | U | 0.28 | U | 0.28 | U | 0.28 | U | 0.20 | U | 0.28 | U | 0.28 | U | 0.28 | U |
| Bromochloromethane | 74-97-5 | 5 | 0.20 | U | 0.35 | U | 0.35 | U | 0.35 | U | 0.20 | U | 0.35 | U | 0.35 | U | 0.35 | U | 0.20 | U | 0.35 | U | 0.35 | U | 0.35 | U |
| Bromodichloromethane | 75-27-4 | 50 | 0.20 | U | 0.25 | U | 0.25 | U | 0.25 | U | 0.20 | U | 0.25 | U | 0.25 | U | 0.25 | U | 0.20 | U | 0.25 | U | 0.25 | U | 0.25 | U |
| Bromoform | 75-25-2 | 50 | 0.20 | U | 0.16 | U | 0.16 | U | 0.16 | U | 0.20 | U | 0.76 | | 0.16 | U | 0.39 | J | 0.20 | U | 0.53 | | 0.24 | J | 0.16 | U |
| Bromomethane | 74-83-9 | 5 | 0.20 | U | 0.12 | U | 0.12 | U | 0.12 | U | 0.20 | U | 0.12 | U | 0.12 | U | 0.12 | U | 0.20 | U | 0.12 | U | 0.12 | U | 0.12 | U |
| Carbon disulfide | 75-15-0 | ~ | 0.20 | U | 0.36 | U | 0.36 | U | 0.36 | U | 0.20 | U | 0.36 | U | 0.36 | U | 0.36 | U | 0.22 | J | 0.36 | U | 0.36 | U | 0.36 | U |
| Carbon tetrachloride | 56-23-5 | 5 | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U |
| Chlorobenzene | 108-90-7 | 5 | 0.20 | U | 0.28 | U | 0.28 | U | 0.28 | U | 0.20 | U | 0.28 | U | 0.28 | U | 0.28 | U | 0.20 | U | 0.28 | U | 0.28 | U | 0.28 | U |
| Chloroethane | 75-00-3 | 5 | 0.20 | U | 0.45 | U | 0.45 | U | 0.45 | U | 0.20 | U | 0.45 | U | 0.45 | U | 0.45 | U | 0.20 | U | 0.45 | U | 0.45 | U | 0.45 | U |
| Chloroform | 67-66-3 | 7 | 4.6 | | **7.9** | | **7.2** | | 6.1 | | 0.47 | J | 1.8 | | 0.51 | | 0.99 | | 2.3 | | 0.60 | | 0.57 | | 2.1 | |
| Chloromethane | 74-87-3 | 5 | 0.20 | U | 0.37 | U | 0.37 | U | 0.37 | U | 0.20 | U | 0.37 | U | 0.37 | U | 0.37 | U | 0.20 | U | 0.37 | U | 0.37 | U | 0.37 | U |
| cis-1,2-Dichloroethene | 156-59-2 | 5 | 0.20 | U | 0.29 | U | 0.29 | U | 0.29 | U | 0.20 | U | 0.29 | U | 0.29 | U | 0.29 | U | 0.20 | U | 0.29 | U | 0.29 | U | 0.29 | U |
| cis-1,3-Dichloropropene | 10061-01-5 | 0.4 | 0.20 | U | 0.26 | U | 0.26 | U | 0.26 | U | 0.20 | U | 0.26 | U | 0.26 | U | 0.26 | U | 0.20 | U | 0.26 | U | 0.26 | U | 0.26 | U |
| Cyclohexane | 110-82-7 | ~ | 0.20 | U | 0.49 | U | 0.49 | U | 0.49 | U | 0.20 | U | 0.49 | U | 0.49 | U | 0.49 | U | 0.20 | U | 0.49 | U | 0.49 | U | 0.49 | U |
| Dibromochloromethane | 124-48-1 | 50 | 0.20 | U | 0.15 | U | 0.15 | U | 0.15 | U | 0.20 | U | 0.15 | U | 0.15 | U | 0.15 | U | 0.20 | U | 0.15 | U | 0.15 | U | 0.15 | U |
| Dibromomethane | 74-95-3 | ~ | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U | 0.20 | U |
| Dichlorodifluoromethane | 75-71-8 | 5 | 0.20 | U | 0.45 | U | 0.45 | U | 0.45 | U | 0.20 | U | 0.45 | U | 0.45 | U | 0.45 | U | 0.20 | U | 0.45 | U | 0.45 | U | 0.45 | U |
| Ethyl Benzene | 100-41-4 | 5 | 0.20 | U | 0.29 | U | 0.29 | U | 0.29 | U | 0.20 | U | 0.29 | U | 0.29 | U | 0.29 | U | 0.42 | J | 0.29 | U | 0.29 | U | 0.29 | U |
| Hexachlorobutadiene | 87-68-3 | 0.5 | 0.20 | U | 0.24 | U | 0.24 | U | 0.24 | U | 0.20 | U | 0.24 | U | 0.24 | U | 0.24 | U | 0.20 | U | 0.24 | U | 0.24 | U | 0.24 | U |
| Isopropylbenzene | 98-82-8 | 5 | 0.20 | U | 0.41 | U | 0.41 | U | 0.41 | U | 0.20 | U | 0.41 | U | 0.41 | U | 0.41 | U | 0.20 | U | 0.41 | U | 0.41 | U | 0.41 | U |
| Methyl acetate | 79-20-9 | ~ | 0.20 | U | 0.44 | U | 0.44 | U | 0.44 | U | 0.20 | U | 0.44 | U | 0.44 | U | 0.44 | U | 0.20 | U | 0.44 | U | 0.44 | U | 0.44 | U |
| Methyl tert-butyl ether (MTBE) | 1634-04-4 | 10 | 0.20 | U | 0.24 | U | 0.24 | U | 0.24 | U | 0.20 | U | 0.24 | U | 0.24 | U | 0.24 | U | 0.20 | U | 0.24 | U | 0.24 | U | 0.24 | U |
| Methylcyclohexane | 108-87-2 | ~ | 0.20 | U | 0.48 | U | 0.48 | U | 0.48 | U | 0.20 | U | 0.48 | U | 0.48 | U | 0.48 | U | 0.20 | U | 0.48 | U | 0.48 | U | 0.48 | U |
| Methylene chloride | 75-09-2 | 5 | 1.0 | U | 0.40 | U | 0.40 | U | 0.40 | U | 1.0 | U | 0.40 | U | 0.40 | U | 0.40 | U | 1.0 | U | 0.40 | U | 0.40 | U | 0.40 | U |
| Naphthalene | 91-20-3 | 10 | NT | | 0.21 | U | 0.21 | U | 0.21 | U | NT | | 0.21 | U | 0.21 | U | 0.63 | J | NT | | 0.21 | U | 0.21 | U | 0.27 | J |
| n-Butylbenzene | 104-51-8 | 5 | 0.20 | U | 0.40 | U | 0.40 | U | 0.40 | U | 0.20 | U | 0.40 | U | 0.40 | U | 0.40 | U | 0.20 | U | 0.40 | U | 0.40 | U | 0.40 | U |
| n-Propylbenzene | 103-65-1 | 5 | 0.20 | U | 0.38 | U | 0.38 | U | 0.38 | U | 0.20 | U | 0.38 | U | 0.38 | U | 0.38 | U | 0.20 | U | 0.38 | U | 0.38 | U | 0.38 | U |
| o-Xylene | 95-47-6 | 5 | 0.20 | U | 0.26 | U | 0.26 | U | 0.26 | U | 0.20 | U | 0.26 | U | 0.26 | U | 0.26 | U | 0.20 | U | 0.26 | U | 0.26 | U | 0.26 | U |
| p- & m- Xylenes | 179601-23-1 | ~ | 0.50 | U | 0.58 | U | 0.58 | U | 0.58 | U | 0.50 | U | 0.58 | U | 0.58 | U | 0.58 | U | 0.50 | U | 0.58 | U | 0.58 | U | 0.58 | U |
| p-Diethylbenzene | 105-05-5 | ~ | NT | | 0.34 | U | 0.34 | U | 0.34 | U | NT | | 0.34 | U | 0.34 | U | 0.34 | U | NT | | 0.34 | U | 0.34 | U | 0.34 | U |
| p-Ethyltoluene | 622-96-8 | ~ | NT | | 0.20 | U | 0.20 | U | 0.20 | U | NT | | 0.20 | U | 0.20 | U | 0.20 | U | NT | | 0.20 | U | 0.20 | U | 0.20 | U |
| p-Isopropyltoluene | 99-87-6 | 5 | 0.20 | U | 0.38 | U | 0.38 | U | 0.38 | U | 0.20 | U | 0.38 | U | 0.38 | U | 0.38 | U | 1.2 | | 0.38 | U | 0.38 | U | 0.38 | U |
| sec-Butylbenzene | 135-98-8 | 5 | 0.20 | U | 0.44 | U | 0.44 | U | 0.44 | U | 0.20 | U | 0.44 | U | 0.44 | U | 0.44 | U | 0.20 | U | 0.44 | U | 0.44 | U | 0.44 | U |
| Styrene | 100-42-5 | 5 | 0.20 | U | 0.26 | U | 0.26 | U | 0.26 | U | 0.20 | U | 0.26 | U | 0.26 | U | 0.26 | U | 0.20 | U | 0.26 | U | 0.26 | U | 0.26 | U |
| tert-Butyl alcohol (TBA) | 75-65-0 | ~ | 0.50 | U | 0.61 | U | 0.61 | U | 0.61 | U | 0.50 | U | 0.61 | U | 0.61 | U | 0.61 | U | 0.50 | U | 0.61 | U | 0.61 | U | 0.61 | U |
| tert-Butylbenzene | 98-06-6 | 5 | 0.20 | U | 0.37 | U | 0.37 | U | 0.37 | U | 0.20 | U | 0.37 | U | 0.37 | U | 0.37 | U | 0.20 | U | 0.37 | U | 0.37 | U | 0.37 | U |
| Tetrachloroethene | 127-18-4 | 5 | **14** | | **5.8** | | 4.9 | | 4.3 | | **29** | | **24** | | **6.7** | | **26** | | **40** | | 2.9 | | **7.1** | | **22** | |
| Toluene | 108-88-3 | 5 | 0.20 | U | 0.35 | U | 0.35 | U | 0.35 | U | 0.20 | U | 0.35 | U | 0.35 | U | 0.35 | U | 0.20 | U | 0.35 | U | 0.35 | U | 0.35 | U |
| trans-1,2-Dichloroethene | 156-60-5 | 5 | 0.20 | U | 0.28 | U | 0.28 | U | 0.28 | U | 0.20 | U | 0.28 | U | 0.28 | U | 0.28 | U | 0.20 | U | 0.28 | U | 0.28 | U | 0.28 | U |
| trans-1,3-Dichloropropene | 10061-02-6 | 0.4 | 0.20 | U | 0.23 | U | 0.23 | U | 0.23 | U | 0.20 | U | 0.23 | U | 0.23 | U | 0.23 | U | 0.20 | U | 0.23 | U | 0.23 | U | 0.23 | U |
| trans-1,4-dichloro-2-butene | 110-57-6 | ~ | 0.20 | U | NT | | NT | | NT | | 0.20 | U | NT | | NT | | NT | | 0.20 | U | NT | | NT | | NT | |
| Trichloroethene | 79-01-6 | 5 | 0.49 | J | 0.40 | J | 0.42 | J | 0.40 | J | 0.92 | | 0.95 | | 0.25 | J | 0.96 | | 1.4 | | 0.25 | U | 0.26 | J | 1.3 | |
| Trichlorofluoromethane | 75-69-4 | 5 | 0.20 | U | 0.34 | U | 0.34 | U | 0.34 | U | 0.20 | U | 0.34 | U | 0.34 | U | 0.34 | U | 0.20 | U | 0.34 | U | 0.34 | U | 0.34 | U |
| Vinyl Chloride | 75-01-4 | 2 | 0.20 | U | 0.47 | U | 0.47 | U | 0.47 | U | 0.20 | U | 0.47 | U | 0.47 | U | 0.47 | U | 0.20 | U | 0.47 | U | 0.47 | U | 0.47 | U |
| Xylenes, Total | 1330-20-7 | 5 | 0.60 | U | 0.84 | U | 0.84 | U | 0.84 | U | 0.60 | U | 0.84 | U | 0.84 | U | 0.84 | U | 0.60 | U | 0.84 | U | 0.84 | U | 0.84 | U |

**NOTES:**

Exceeds NYSDEC TOGS Claass GA Standards and Guidance Values

**Q is the Qualifier Column with definitions as follows:**

J=analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated

U=analyte not detected at or above the level indicated

NT=this indicates the analyte was not a target for this sample

~=this indicates that no regulatory limit has been established for this analyte

Table 5
Summary of Soil Vapor Sample Results
29-05 38th Avenue

| Sample ID | | SVP-1 | | SVP-2 | | SVP-3 | | SVP-4 | | SVP-5 | | AA-1 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| York ID | | 21K1195-01 | | 21K1195-02 | | 21K1195-03 | | 21K1195-04 | | 21K1195-05 | | 21K1195-06 | |
| Sampling Date | | 11/22/2021 | | 11/22/2021 | | 11/22/2021 | | 11/22/2021 | | 11/22/2021 | | 11/22/2021 | |
| Client Matrix | | Soil Vapor | | Soil Vapor | | Soil Vapor | | Soil Vapor | | Soil Vapor | | Outdoor Ambient Air | |
| **Compound** | **CAS Number** | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| **Volatile Organics, EPA TO15 Full List** | | ug/m3 | | ug/m3 | | ug/m3 | | ug/m3 | | ug/m3 | | ug/m3 | |
| **Dilution Factor** | | 16.02 | | 236.8 | | 229 | | 39.6 | | 29.9 | | 0.849 | |
| 1,1,1,2-Tetrachloroethane | 630-20-6 | 11 | U | 11 | U | 11 | U | 11 | U | 10 | U | 0.58 | U |
| 1,1,1-Trichloroethane | 71-55-6 | 8.7 | U | 9.0 | U | 8.7 | U | 8.6 | U | 17 | D | 0.46 | U |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | 11 | U | 11 | U | 11 | U | 11 | U | 10 | U | 0.58 | U |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113) | 76-13-1 | 12 | U | 13 | U | 12 | U | 12 | U | 160 | D | 0.65 | U |
| 1,1,2-Trichloroethane | 79-00-5 | 8.7 | U | 9.0 | U | 8.7 | U | 8.6 | U | 8.2 | U | 0.46 | U |
| 1,1-Dichloroethane | 75-34-3 | 6.5 | U | 6.7 | U | 6.5 | U | 6.4 | U | 6.1 | U | 0.34 | U |
| 1,1-Dichloroethylene | 75-35-4 | 1.6 | U | 1.6 | U | 1.6 | U | 1.6 | U | 1.5 | U | 0.084 | U |
| 1,2,4-Trichlorobenzene | 120-82-1 | 12 | U | 12 | U | 12 | U | 12 | U | 11 | U | 0.63 | U |
| 1,2,4-Trimethylbenzene | 95-63-6 | 7.9 | J | 8.1 | J | 7.9 | D | 7.8 | J | 7.3 | D | 0.75 | D |
| 1,2-Dibromoethane | 106-93-4 | 12 | U | 13 | U | 12 | U | 12 | U | 11 | U | 0.65 | U |
| 1,2-Dichlorobenzene | 95-50-1 | 9.6 | U | 9.9 | U | 9.6 | U | 9.5 | U | 9.0 | U | 0.51 | U |
| 1,2-Dichloroethane | 107-06-2 | 6.5 | U | 6.7 | U | 6.5 | U | 6.4 | U | 6.1 | U | 0.34 | U |
| 1,2-Dichloropropane | 78-87-5 | 7.4 | U | 7.6 | U | 7.4 | U | 7.3 | U | 6.9 | U | 0.39 | U |
| 1,2-Dichlorotetrafluoroethane | 76-14-2 | 11 | U | 12 | U | 11 | U | 11 | U | 10 | U | 0.59 | U |
| 1,3,5-Trimethylbenzene | 108-67-8 | 7.9 | U | 8.1 | U | 7.9 | U | 7.8 | U | 85 | D | 0.42 | J |
| 1,3-Butadiene | 106-99-0 | 11 | U | 11 | U | 11 | U | 11 | U | 9.9 | U | 0.56 | U |
| 1,3-Dichlorobenzene | 541-73-1 | 9.6 | U | 9.9 | U | 9.6 | U | 9.5 | U | 9.0 | U | 0.51 | U |
| 1,3-Dichloropropane | 142-28-9 | 7.4 | U | 7.6 | U | 7.4 | U | 7.3 | U | 6.9 | U | 0.39 | U |
| 1,4-Dichlorobenzene | 106-46-7 | 9.6 | U | 9.9 | U | 9.6 | U | 9.5 | U | 9.0 | U | 0.51 | U |
| 1,4-Dioxane | 123-91-1 | 12 | U | 12 | U | 12 | U | 11 | U | 11 | U | 0.61 | U |
| 2-Butanone | 78-93-3 | 300 | D | 400 | D | 620 | D | 180 | D | 510 | D | 1.8 | D |
| 2-Hexanone | 591-78-6 | 37 | D | 46 | D | 96 | D | 35 | D | 190 | D | 0.70 | U |
| 3-Chloropropene | 107-05-1 | 25 | U | 26 | U | 25 | U | 25 | U | 23 | U | 1.3 | U |
| 4-Methyl-2-pentanone | 108-10-1 | 6.6 | U | 6.8 | D | 6.5 | U | 6.5 | U | 6.1 | U | 0.38 | D |
| Acetone | 67-64-1 | 150 | D | 200 | D | 290 | D | 110 | D | 220 | D | 12 | D |
| Acrylonitrile | 107-13-1 | 3.5 | U | 3.6 | U | 3.5 | U | 3.4 | U | 3.2 | U | 0.18 | U |
| Benzene | 71-43-2 | 5.1 | U | 5.3 | U | 5.1 | U | 5.1 | U | 4.8 | U | 0.46 | D |
| Benzyl chloride | 100-44-7 | 8.3 | U | 8.6 | U | 8.3 | U | 8.2 | U | 7.7 | U | 0.44 | U |
| Bromodichloromethane | 75-27-4 | 11 | U | 11 | U | 11 | U | 11 | U | 10 | U | 0.57 | U |
| Bromoform | 75-25-2 | 17 | U | 17 | U | 17 | U | 16 | U | 15 | U | 0.88 | U |
| Bromomethane | 74-83-9 | 6.2 | U | 6.4 | U | 6.2 | U | 6.2 | U | 5.8 | U | 0.33 | U |
| Carbon disulfide | 75-15-0 | 5.0 | U | 5.1 | U | 5.0 | U | 4.9 | U | 5.1 | D | 0.26 | U |
| Carbon tetrachloride | 56-23-5 | 2.5 | U | 2.6 | U | 2.5 | U | 2.5 | U | 2.4 | U | 0.13 | U |
| Chlorobenzene | 108-90-7 | 7.4 | U | 7.6 | U | 7.4 | U | 7.3 | U | 6.9 | U | 0.39 | U |
| Chloroethane | 75-00-3 | 4.2 | U | 4.4 | U | 4.2 | U | 4.2 | U | 3.9 | U | 0.22 | U |
| Chloroform | 67-66-3 | 26 | D | 52 | D | 61 | D | 24 | D | 7.3 | U | 0.41 | U |
| Chloromethane | 74-87-3 | 3.3 | U | 3.4 | U | 3.3 | U | 3.3 | J | 3.1 | U | 1.2 | D |
| cis-1,2-Dichloroethylene | 156-59-2 | 1.6 | U | 1.6 | U | 1.6 | U | 1.6 | U | 1.5 | U | 0.084 | U |
| cis-1,3-Dichloropropylene | 10061-01-5 | 7.3 | U | 7.5 | U | 7.3 | U | 7.2 | U | 6.8 | U | 0.39 | U |
| Cyclohexane | 110-82-7 | 5.5 | U | 5.7 | U | 5.5 | U | 5.5 | U | 5.1 | U | 0.29 | U |
| Dibromochloromethane | 124-48-1 | 14 | U | 14 | U | 14 | U | 13 | U | 13 | U | 0.72 | U |
| Dichlorodifluoromethane | 75-71-8 | 8.7 | D | 8.2 | U | 7.9 | U | 7.8 | U | 7.4 | U | 1.8 | D |
| Ethyl acetate | 141-78-6 | 12 | U | 12 | U | 12 | U | 11 | U | 11 | U | 0.64 | D |
| Ethyl Benzene | 100-41-4 | 7.0 | J | 7.2 | U | 6.9 | U | 6.9 | U | 12 | D | 0.48 | D |
| Hexachlorobutadiene | 87-68-3 | 17 | U | 18 | U | 17 | U | 17 | U | 16 | U | 0.91 | U |
| Isopropanol | 67-63-0 | 16 | D | 8.9 | D | 13 | D | 7.8 | U | 7.3 | J | 3.8 | D |
| Methyl Methacrylate | 80-62-6 | 6.6 | U | 6.8 | U | 6.5 | U | 6.5 | U | 6.1 | U | 0.35 | U |
| Methyl tert-butyl ether (MTBE) | 1634-04-4 | 5.8 | U | 6.0 | U | 5.8 | U | 5.7 | U | 5.4 | U | 0.31 | U |
| Methylene chloride | 75-09-2 | 11 | U | 11 | U | 11 | J | 11 | U | 10 | U | 1.5 | D |
| n-Heptane | 142-82-5 | 6.6 | U | 6.8 | J | 6.5 | U | 6.5 | U | 6.1 | J | 0.49 | D |
| n-Hexane | 110-54-3 | 5.6 | U | 5.8 | U | 5.6 | U | 5.6 | U | 5.3 | U | 0.60 | D |
| o-Xylene | 95-47-6 | 7.0 | J | 7.2 | J | 6.9 | J | 6.9 | J | 66 | D | 0.74 | D |
| p- & m- Xylenes | 179601-23-1 | 17 | D | 14 | D | 15 | D | 14 | J | 22 | D | 2 | D |
| p-Ethyltoluene | 622-96-8 | 7.9 | U | 8.1 | J | 7.9 | J | 7.8 | J | 43 | D | 0.92 | D |
| Propylene | 115-07-1 | 24 | D | 17 | D | 16 | D | 19 | D | 18 | D | 0.15 | U |
| Styrene | 100-42-5 | 6.8 | U | 7.0 | U | 6.8 | U | 6.7 | U | 6.4 | U | 0.36 | U |
| Tetrachloroethylene | 127-18-4 | 5,300 | D | 23,000 | D | 18,000 | D | 10,000 | D | 6,000 | D | 11 | D |
| Tetrahydrofuran | 109-99-9 | 9.4 | U | 9.7 | U | 9.4 | U | 9.3 | U | 8.8 | U | 0.50 | J |
| Toluene | 108-88-3 | 1,300 | D | 62 | D | 71 | D | 64 | D | 140 | D | 4.4 | D |
| trans-1,2-Dichloroethylene | 156-60-5 | 6.4 | U | 6.5 | U | 6.3 | U | 6.3 | U | 5.9 | U | 0.34 | U |
| trans-1,3-Dichloropropylene | 10061-02-6 | 7.3 | U | 7.5 | U | 7.3 | U | 7.2 | U | 6.8 | U | 0.39 | U |
| Trichloroethylene | 79-01-6 | 230 | D | 330 | D | 520 | D | 91 | D | 100 | D | 0.11 | U |
| Trichlorofluoromethane (Freon 11) | 75-69-4 | 9.0 | U | 9.3 | U | 9.0 | U | 8.9 | U | 13 | D | 0.86 | D |
| Vinyl acetate | 108-05-4 | 5.6 | U | 5.8 | U | 5.6 | U | 5.6 | U | 5.3 | U | 0.30 | U |
| Vinyl bromide | 593-60-2 | 7.0 | U | 7.2 | U | 7.0 | U | 6.9 | U | 6.5 | U | 0.37 | U |
| Vinyl Chloride | 75-01-4 | 2.0 | U | 2.1 | U | 2.0 | U | 2.0 | U | 1.9 | U | 0.11 | U |

**Q is the Qualifier Column with definitions as follows:**
D=result is from an analysis that required a dilution
J=analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated
U=analyte not detected at or above the level indicated

# FIGURES




LEGEND:

Site Boundary

Environmental Easement Area

ATHENICA ENVIRONMENTAL ENGINEERING PLLC
Environmental Engineering Consultants
31-33 33RD STREET, 2ND FLOOR
ASTORIA, NEW YORK 11106
TEL: (718) 784 - 7490
FAX: (718) 784 - 4085

Block 371, Lot 8
Adapted from NYC Digital Tax Map

Environmental Easement Area Covers Site Boundary

| | |
|---|---|
| Date: | NOVEMBER 27, 2024 |
| Drawn by: | EVAN GREENBERG, EIT |
| Checked by: | KENNETH P. WENZ JR., PG, LEP |
| Drawing Scale: | NOT TO SCALE |
| Project No.: | 21-134-0741 |

Site: 29-05 38TH AVENUE
LONG ISLAND CITY, NY 11101
SITE MANAGEMENT PLAN

Figure: 1

Title: SITE LOCATION MAP

# 38th Avenue

30th Street

Old Ridge Road

EP-B-1

EP-S-3

EP-B-3

EP-S-5

EP-B-4

EP-B-5

Geophysical Anomaly

Tank SW

Tank NW

Tank SE

Tank Bottom

Tank NE

Excavation Depth: 5'

EP-S-2

EP-S-1

TW-2

EP-B-6

EP-B-2

EP-B-7

EP-B-8

Excavation Depth: 15'

EP-S-4

EP-S-9

EP-S-6

EP-S-7

EP-S-8

MW-1

MW-2

Tank-S-3-2023-6-21

Tank-S-2-2023-6-21

Tank-S-1-2023-6-21

Tank-B-1-2023-6-21

EP-B-9

MW-3

TW-1

Sloped at 45 degrees for Access to Deeper Excavation Area

S W E N

STATE OF NEW YORK
SPIRO I DONGARIS
095954
LICENSED PROFESSIONAL ENGINEER

# 37-28 30th Street

## Block: 371, Lot: 7501

Scale

=10 Feet

= 50 Feet

LEGEND:

- Site Boundary
- Sidewall Sample (7.5 Feet)
- Base Sample (15 Feet)
- Geophysical Anomaly
- Tank Locations
- Remedial Excavation to 5 Feet
- Remedial Excavation to 15' Feet
- Sloped Excavation for Access to Deeper Area
- Sidewall Sample (2.5 Feet)
- Base Sample (5 Feet)
- Permanent Groundwater Monitoring Well
- Temporary Groundwater Monitoring Well


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Environmental Engineering Consultants
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FAX: (718) 784 - 4085


Note:

5-Foot Excavation Area Samples Based on Approximate Area of 1,450 Square Feet and Perimeter of 145 Feet.
15-Foot Excavation Area Samples Based on Approximate Area of 1,950 Square Feet and Perimeter of 160 Feet.
Perimeter Lengths Exclude Sloped Area

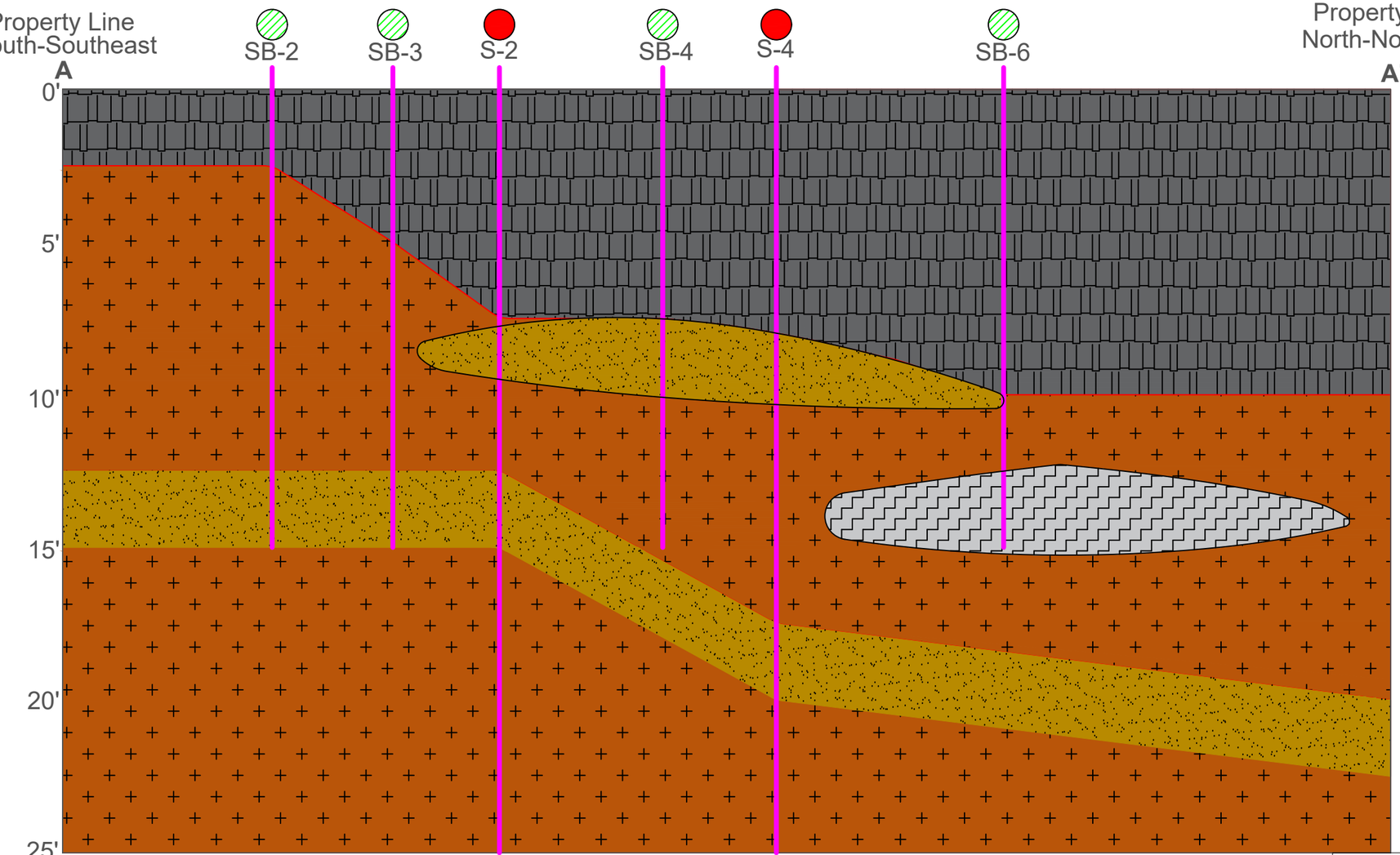
Site Block: 371, Lot: 38

| | |
|---|---|
| Date: | AUGUST 19, 2024 |
| Drawn by: | MICHAEL OLIVER |
| Checked by: | KENNETH P. WENZ JR., PG, LEP |
| Drawing Scale: | AS SHOWN |
| Project No.: | 21-134-0741 |

Site: 29-05 38TH AVENUE
LONG ISLAND CITY, NY 11101
Site Management Plan

Figure: 2

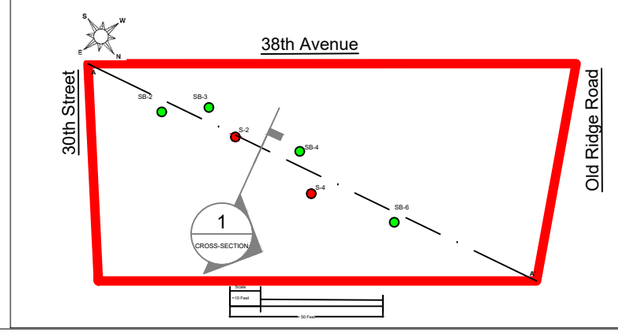
Title: SITE LAYOUT MAP




1
CROSS-SECTION

# GEOLOGICAL CROSS-SECTION (PRE-EXCAVATION)

SCALE: 1:4 Vertical Exaggeration




LEGEND:

- Fill
- Silty Sand (SM)
- Clay (SC)
- Coarse Sand (SP)
- Soil Boring from 2020 Investigation
- Soil Boring from 2021 BCP Investigation

ATHENICA ENVIRONMENTAL ENGINEERING PLLC
Environmental Engineering Consultants
31-33 31ST STREET, 2ND FLOOR
ASTORIA, NY 11106
TEL: (718) 784 - 7490
FAX: (718) 784 - 4085

Notes:
Figure reflects conditions prior to excavation

Unified Soil Classification System designations used

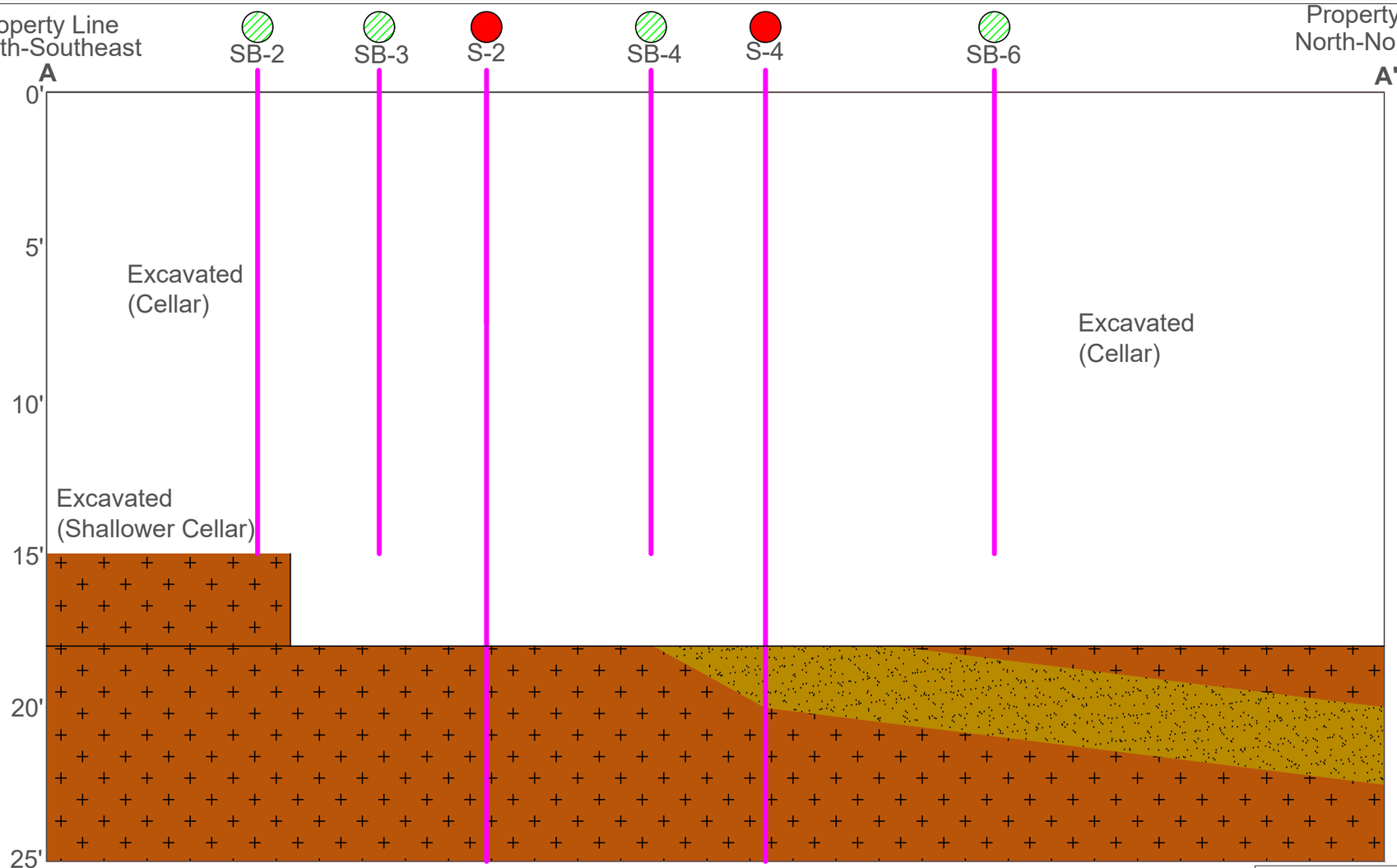
SB-X Soil Borings from 2020 Investigation
S-X Soil Borings from 2021 BCP Remedial Investigation

| | |
|---|---|
| Date: | DECEMBER 3, 2024 |
| Drawn by: | EVAN GREENBERG, EIT |
| Checked by: | KENNETH P. WENZ, JR, PG, LEP |
| Drawing Scale: | AS DRAWN |
| Project No.: | 21-134-0741 |

Site: 29-05 38TH AVENUE
LONG ISLAND CITY, NY 11101
SITE MANAGEMENT PLAN

Figure: 3A

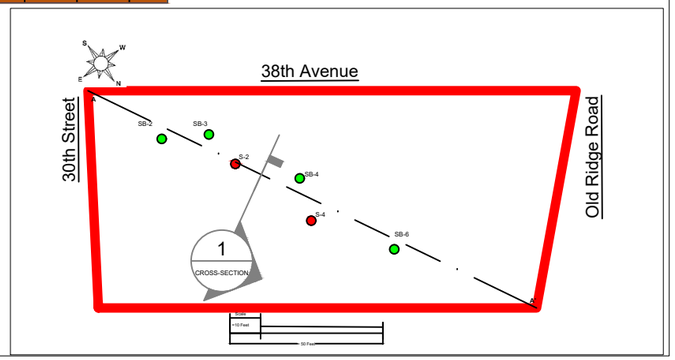
Title: GEOLOGICAL CROSS-SECTION A - A'




1
CROSS-SECTION

# GEOLOGICAL CROSS-SECTION (POST-EXCAVATION)

SCALE: 1:4 Vertical Exaggeration




LEGEND:

- Coarse Sand (SP)
- Silty Sand (SM)
- Soil Boring from 2020 Investigation
- Soil Boring from 2021 BCP Investigation

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Environmental Engineering Consultants
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ASTORIA, NY 11106
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FAX: (718) 784 - 4085

Notes:
Figure reflects conditions post-excavation

Unified Soil Classification System designations used

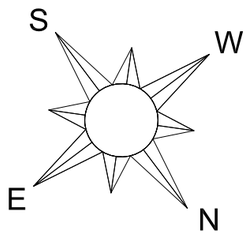
SB-X Soil Borings from 2020 Investigation
S-X Soil Borings from 2021 BCP Remedial Investigation

| | |
|---|---|
| Date: | FEBRUARY 21, 2025 |
| Drawn by: | EVAN GREENBERG, EIT |
| Checked by: | KENNETH P. WENZ, JR, PG, LEP |
| Drawing Scale: | AS DRAWN |
| Project No.: | 21-134-0741 |

Site: 29-05 38TH AVENUE
LONG ISLAND CITY, NY 11101
SITE MANAGEMENT PLAN

Figure: 3B

Title: GEOLOGICAL CROSS-SECTION A - A'




38th Avenue

30th Street

Old Ridge Road

WC-3S
68.83'

68.75'

68.5'

WC-5S
68.45'

69'

69.25'

TW-2
69.59'

69.5'

WC-6S
68.62'

69.75'

WC-1S
69.86'

WC-4S
69.84'

Scale

=10 Feet

= 50 Feet

STATE OF NEW YORK
SPIRO I DONGARIS
LICENSED PROFESSIONAL ENGINEER
090054

LEGEND:

Site Boundary

Shallow Well (2021 BCP RI)

Shallow Groundwater Flow Direction

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Environmental Engineering Consultants
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TEL: (718) 784 - 7490
FAX: (718) 784 - 4085

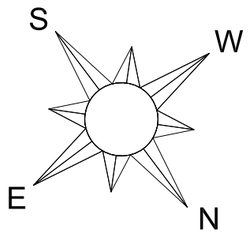
All Elevations surveyed to a common random datum, assigned to 100'.

| | |
|---|---|
| Date: | DECEMBER 4, 2024 |
| Drawn by: | EVAN GREENBERG, EIT |
| Checked by: | KENNETH P. WENZ JR., PG, LEP |
| Drawing Scale: | AS SHOWN |
| Project No.: | 21-134-0741 |

Site: 29-05 38TH AVENUE
LONG ISLAND CITY, NY 11101
SITE MANAGEMENT PLAN

Figure: 4A

Title: SHALLOW GROUNDWATER ELEVATION CONTOUR MAP




38th Avenue

30th Street

Old Ridge Road

69.75'

69.5'

69.25'

69'

WC-1D
69.87'

WC-3D
69.12'

WC-4D
69.17'

WC-5D
68.82'

WC-6D
68.9'

Scale
=10 Feet
= 50 Feet

STATE OF NEW YORK
SPIRO I DONGARIS
LICENSED PROFESSIONAL ENGINEER
095054
EXCELSIOR

LEGEND:

- Site Boundary
- Deep Well (2021 BCP RI)
- Deep Gouindwater Flow Direction

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Environmental Engineering Consultants
31-33 31ST STREET, 2ND FLOOR
ASTORIA, NY 11106
TEL: (718) 784 - 7490
FAX: (718) 784 - 4085

All Elevations surveyed to a common random datum, assigned to 100'.

| | |
|---|---|
| Date: | DECEMBER 4, 2024 |
| Drawn by: | EVAN GREENBERG, EIT |
| Checked by: | KENNETH P. WENZ JR., PG, LEP |
| Drawing Scale: | AS SHOWN |
| Project No.: | 21-134-0741 |

Site: 29-05 38TH AVENUE
LONG ISLAND CITY, NY 11101
SITE MANAGEMENT PLAN

Figure: 4B

Title: DEEP GROUNDWATER ELEVATION CONTOUR MAP

| Sample Name | EP-B-1 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| Tal Metal | | |
| Selenium | **53.6** | 3.9 |

No other compounds were detected above SCOs.

| Sample Name | Tank-NW | UU-SCOs | RR-SCOs |
|---|---|---|---|
| | mg/kg | mg/kg | mg/kg |
| SVOCs | | | |
| Benzo(a)anthracene | **2.59** | 1 | 1 |
| Benzo(a)pyrene | **2.67** | 1 | 1 |
| Benzo(b)fluoranthene | **2.02** | 1 | 1 |
| Benzo(k)fluoranthene | **1.69** | 0.8 | 3.9 |
| Chrysene | **2.45** | 1 | 3.9 |
| Dibenzo(a,h)anthracene | **0.577** | 0.33 | 0.33 |
| Indeno(1,2,3-cd)pyrene | **1.69** | 0.5 | 0.5 |
| Lead | | | |
| Lead | **115** | 63 | 400 |

No other compounds were detected above SCOs.

| Sample Name | EP-S-3 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| VOC | | |
| Acetone | **0.063** | 0.05 |
| TAL Metals | | |
| Lead | **95.4** | 63 |
| Selenium | **7.15** | 3.9 |
| Mercury | **0.284** | 0.18 |

No other compounds were detected above SCOs.

| Sample Name | EP-B-3 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| TAL Metal | | |
| Selenium | **53.9** | 3.9 |

No other compounds were detected above SCOs.

| Sample Name | EP-S-5 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| VOC | | |
| Acetone | **0.086** | 0.05 |
| TAL Metals | | |
| Lead | **363** | 63 |
| Selenium | **9.08** | 3.9 |

No other compounds were detected above SCOs.

38th Avenue

30th Street

Old Ridge Road

Geophysical Anomaly

Tank SW

Tank Bottom

Tank SE

Tank NE

EP-B-4

EP-B-5

EP-B-7

EP-B-9

EP-B-8

EP-S-8

EP-S-7

Tank-S-3-2023-6-21

Tank-B-1-2023-6-21

Tank-S-2-2023-6-21

Tank-S-1-2023-6-21

Excavation Depth: 5'

Excavation Depth: 15'

Sloped at 45 degrees for Access to Deeper Excavation Area

Scale

=10 Feet

= 50 Feet

| Sample Name | EP-S-2 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| TAL Metal | | |
| Selenium | **6.31** | 3.9 |

No other compounds were detected above SCOs.

| Sample Name | EP-S-6 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| VOC | | |
| Acetone | **0.13** | 0.05 |
| TAL Metals | | |
| Lead | **68.3** | 63 |
| Selenium | **8.24** | 3.9 |
| Mercury | **0.231** | 0.18 |

No other compounds were detected above SCOs.

| Sample Name | EP-S-1 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| TAL Metal | | |
| Selenium | **4.83** | 3.9 |

No other compounds were detected above SCOs.

| Sample Name | EP-B-6 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| VOC | | |
| Acetone | **0.057** | 0.05 |

No other compounds were detected above SCOs.

| Sample Name | EP-B-2 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| TAL Metal | | |
| Selenium | **97.8** | 3.9 |

No other compounds were detected above SCOs.

| Sample Name | EP-S-4 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| TAL Metal | | |
| Selenium | **6.80** | 3.9 |

No other compounds were detected above SCOs.

| Sample Name | EP-S-9 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| VOC | | |
| Acetone | **0.059** | 0.05 |

No other compounds were detected above SCOs.

S W E N

LEGEND:

- Site Boundary
- Sidewall Sample (7.5 Feet)
- Base Sample (15 Feet)
- Geophysical Anomaly
- Tank Locations
- Remedial Excavation to 5 Feet
- Remedial Excavation to 15' Feet
- Sloped Excavation for Access to Deeper Area
- Sidewall Sample (2.5 Feet)
- Base Sample (5 Feet)

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ASTORIA, NEW YORK 11106
TEL: (718) 784 - 7490
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5-Foot Excavation Area Samples Based on Approximate Area of 1,450 Square Feet and Perimeter of 145 Feet.
15-Foot Excavation Area Samples Based on Approximate Area of 1,950 Square Feet and Perimeter of 160 Feet.
Perimeter Lengths Exclude Sloped Area

| | |
|---|---|
| Date: | AUGUST 19, 2024 |
| Drawn by: | MICHAEL OLIVER |
| Checked by: | KENNETH P. WENZ JR., PG, LEP |
| Drawing Scale: | AS SHOWN |
| Project No.: | 21-134-0741 |

Site: 29-05 38TH AVENUE
LONG ISLAND CITY, NY 11101
SITE MANAGEMENT PLAN

Figure: 5A
Title: REMAINING SOIL SAMPLE EXCEEDANCES

| Sample Name | EP-B-1 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| Tal Metal | | |
| Selenium | **53.6** | 3.9 |

No other compounds were detected above SCOs.

| Sample Name | Tank-NW | UU-SCOs | RR-SCOs |
|---|---|---|---|
| | mg/kg | mg/kg | mg/kg |
| SVOCs | | | |
| Benzo(a)anthracene | **2.59** | 1 | 1 |
| Benzo(a)pyrene | **2.67** | 1 | 1 |
| Benzo(b)fluoranthene | **2.02** | 1 | 1 |
| Benzo(k)fluoranthene | **1.69** | 0.8 | 3.9 |
| Chrysene | **2.45** | 1 | 3.9 |
| Dibenzo(a,h)anthracene | **0.577** | 0.33 | 0.33 |
| Indeno(1,2,3-cd)pyrene | **1.69** | 0.5 | 0.5 |
| Lead | | | |
| Lead | **115** | 63 | 400 |

No other compounds were detected above SCOs.

| Sample Name | EP-S-3 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| VOC | | |
| Acetone | **0.063** | 0.05 |
| TAL Metals | | |
| Lead | **95.4** | 63 |
| Selenium | **7.15** | 3.9 |
| Mercury | **0.284** | 0.18 |

No other compounds were detected above SCOs.

| Sample Name | EP-B-3 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| TAL Metal | | |
| Selenium | **53.9** | 3.9 |

No other compounds were detected above SCOs.

| Sample Name | EP-S-5 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| VOC | | |
| Acetone | **0.086** | 0.05 |
| TAL Metals | | |
| Lead | **363** | 63 |
| Selenium | **9.08** | 3.9 |

No other compounds were detected above SCOs.

38th Avenue

30th Street

Old Ridge Road

Geophysical Anomaly

Tank SW

Tank Bottom

Tank SE

Tank NE

Excavation Depth: 5'

Excavation Depth: 15'

Tank-S-3-2023-6-21

Tank-B-1-2023-6-21

Tank-S-2-2023-6-21

Tank-S-1-2023-6-21

| Sample Name | EP-S-2 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| TAL Metal | | |
| Selenium | **6.31** | 3.9 |

No other compounds were detected above SCOs.

| Sample Name | EP-S-6 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| VOC | | |
| Acetone | **0.13** | 0.05 |
| TAL Metals | | |
| Lead | **68.3** | 63 |
| Selenium | **8.24** | 3.9 |
| Mercury | **0.231** | 0.18 |

No other compounds were detected above SCOs.

| Sample Name | EP-S-1 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| TAL Metal | | |
| Selenium | **4.83** | 3.9 |

No other compounds were detected above SCOs.

Sloped at 45 degrees for Access to Deeper Excavation Area

| Sample Name | EP-B-2 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| TAL Metal | | |
| Selenium | **97.8** | 3.9 |

No other compounds were detected above SCOs.

EP-S-8
No Compounds Detected above SCOs

| Sample Name | EP-S-9 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| VOC | | |
| Acetone | **0.059** | 0.05 |

No other compounds were detected above SCOs.

EP-S-7
No Compounds Detected above SCOs

| Sample Name | EP-S-4 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| TAL Metal | | |
| Selenium | **6.80** | 3.9 |

No other compounds were detected above SCOs.

Scale
=10 Feet
= 50 Feet

S W E N

STATE OF NEW YORK
SPIRO I DONGARIS
EXCELSIOR
095954
LICENSED PROFESSIONAL ENGINEER

LEGEND:

- Site Boundary
- Sidewall Sample (7.5 Feet)
- Base Sample (15 Feet)
- Geophysical Anomaly
- Tank Locations
- Remedial Excavation to 5 Feet
- Remedial Excavation to 15' Feet
- Sloped Excavation for Access to Deeper Area
- Sidewall Sample (2.5 Feet)
- Base Sample (5 Feet)

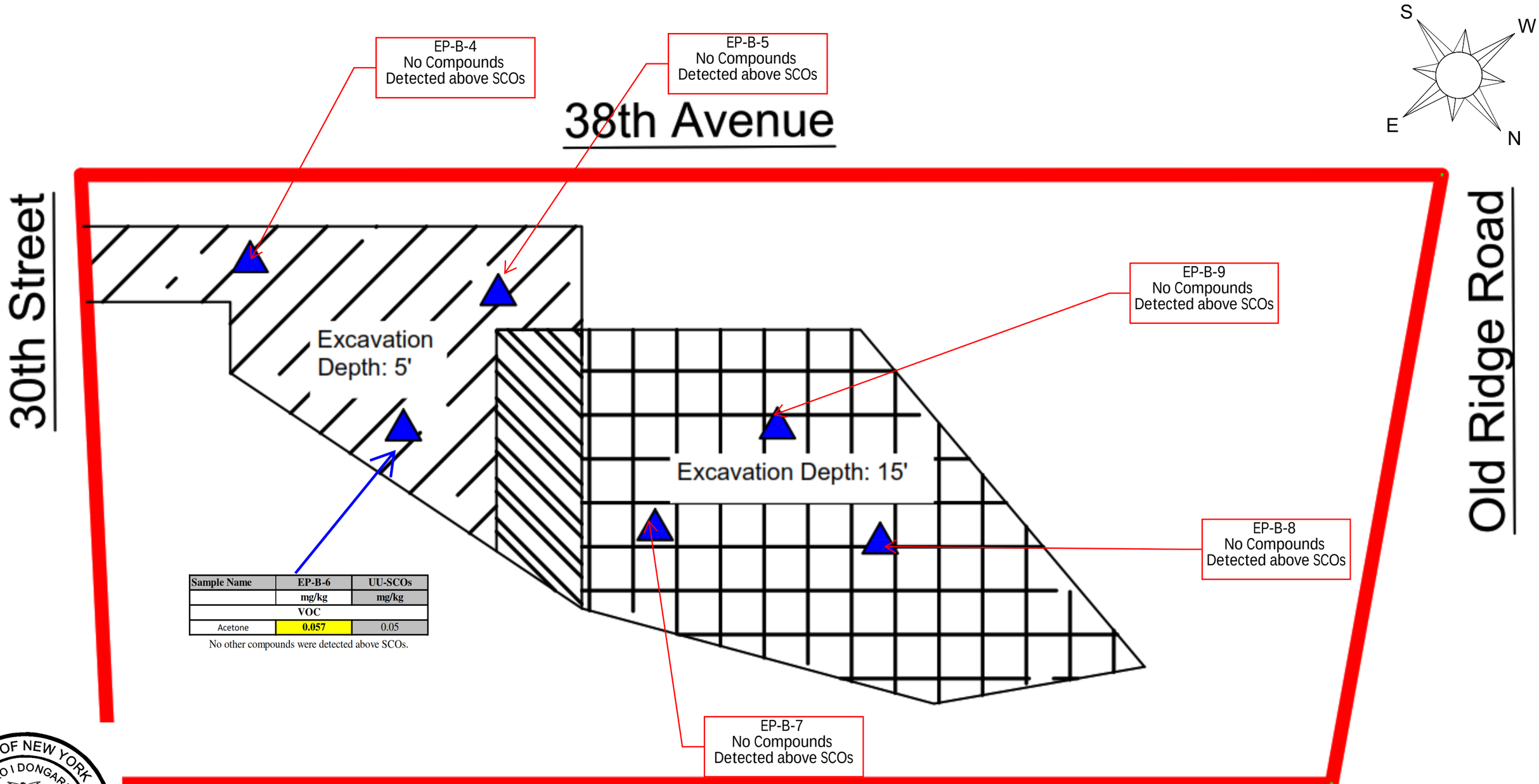
ATHENICA ENVIRONMENTAL ENGINEERING PLLC
Environmental Engineering Consultants
31-33 31ST STREET, 2ND FLOOR
ASTORIA, NEW YORK 11106
TEL: (718) 784 - 7490
FAX: (718) 784 - 4085

5-Foot Excavation Area Samples Based on Approximate Area of 1,450 Square Feet and Perimeter of 145 Feet.
15-Foot Excavation Area Samples Based on Approximate Area of 1,950 Square Feet and Perimeter of 160 Feet.
Perimeter Lengths Exclude Sloped Area

| | |
|---|---|
| Date: | AUGUST 19, 2024 |
| Drawn by: | MICHAEL OLIVER |
| Checked by: | KENNETH P. WENZ JR., PG, LEP |
| Drawing Scale: | AS SHOWN |
| Project No.: | 21-134-0741 |

Site: 29-05 38TH AVENUE
LONG ISLAND CITY, NY 11101
SITE MANAGEMENT PLAN

Figure: 5B
Title: REMAINING SOIL SAMPLE EXCEEDANCES IN SHALLOW SAMPLES




| Sample Name | EP-B-6 | UU-SCOs |
|---|---|---|
| | mg/kg | mg/kg |
| VOC | | |
| Acetone | **0.057** | 0.05 |

No other compounds were detected above SCOs.

STATE OF NEW YORK
SPIRO I DONGARIS
LICENSED PROFESSIONAL ENGINEER
095954

LEGEND:

- Site Boundary
- Sidewall Sample (7.5 Feet)
- Base Sample (15 Feet)
- Geophysical Anomaly
- Tank Locations
- Remedial Excavation to 5 Feet
- Remedial Excavation to 15' Feet
- Sloped Excavation for Access to Deeper Area
- Sidewall Sample (2.5 Feet)
- Base Sample (5 Feet)

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Environmental Engineering Consultants
31-33 31ST STREET, 2ND FLOOR
ASTORIA, NEW YORK 11106
TEL: (718) 784 - 7490
FAX: (718) 784 - 4085

5-Foot Excavation Area Samples Based on Approximate Area of 1,450 Square Feet and Perimeter of 145 Feet.
15-Foot Excavation Area Samples Based on Approximate Area of 1,950 Square Feet and Perimeter of 160 Feet.
Perimeter Lengths Exclude Sloped Area

| | |
|---|---|
| Date: | DECEMBER 3, 2024 |
| Drawn by: | EVAN GREENBERG, EIT |
| Checked by: | KENNETH P. WENZ JR., PG, LEP |
| Drawing Scale: | AS SHOWN |
| Project No.: | 21-134-0741 |

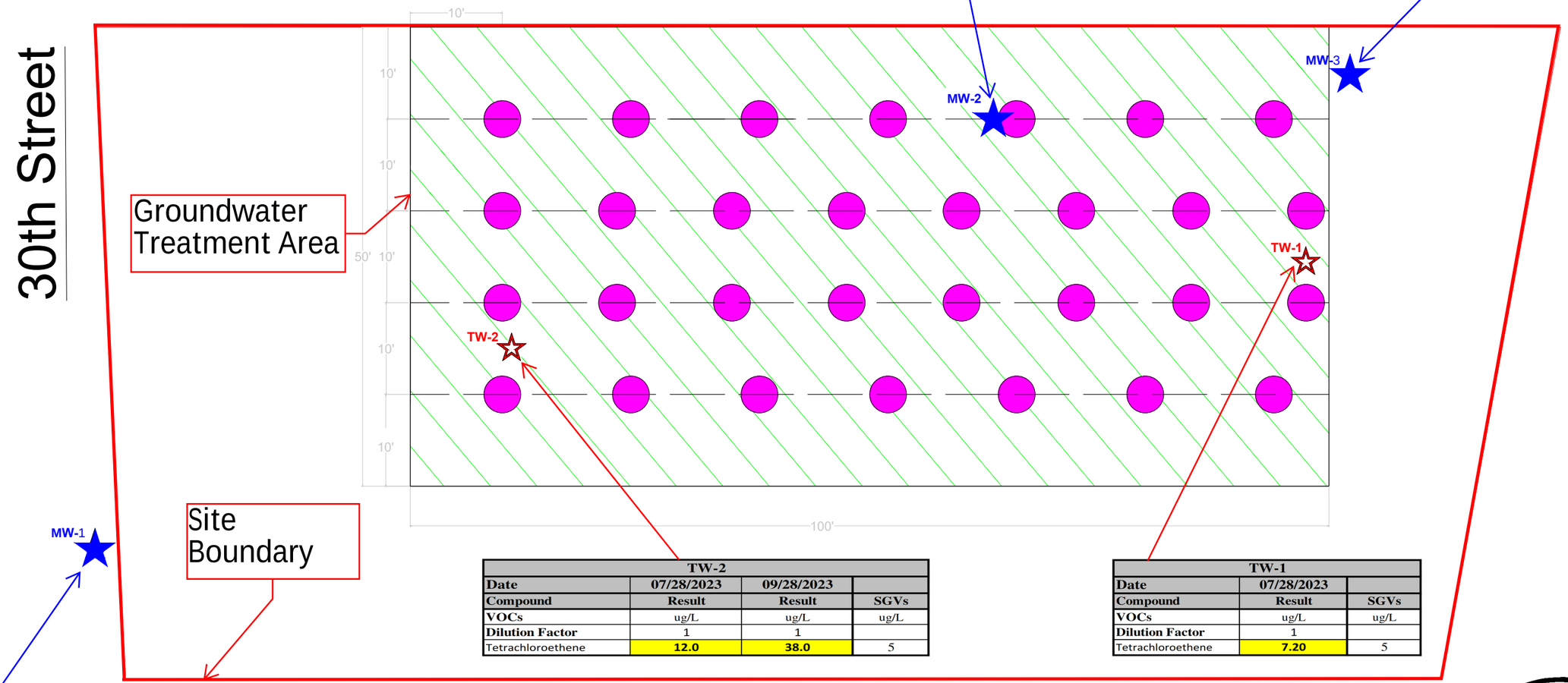
Site: 29-05 38TH AVENUE
LONG ISLAND CITY, NY 11101
SITE MANAGEMENT PLAN

Figure: 5C
Title: REMAINING SOIL SAMPLE EXCEEDANCES IN DEEPER SAMPLES

S W E N

| MW-2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date | 07/28/2023 | 09/28/2023 | 02/08/2024 | 05/07/2024 | 08/22/2024 | 11/21/2024 | |
| Compound | Result | Result | Result | Result | Result | Result | SGVs |
| VOCs | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| Dilution Factor | 1 | 1 | 1 | 1 | 1 | 1 | |
| Tetrachloroethene | **72.0** | **29.0** | **23.7** | **6.70** | **25.6** | **9.91** | 5 |

| MW-3 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date | 07/28/2023 | 09/28/2023 | 02/08/2024 | 05/07/2024 | 08/22/2024 | 11/21/2024 | |
| Compound | Result | Result | Result | Result | Result | Result | SGVs |
| VOCs | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| Dilution Factor | 1 | 1 | 1 | 1 | 1 | 1 | |
| Tetrachloroethene | **44.0** | **40.0** | 2.94 | **7.10** | **21.9** | **15.9** | 5 |




| TW-2 | | | |
|---|---|---|---|
| Date | 07/28/2023 | 09/28/2023 | |
| Compound | Result | Result | SGVs |
| VOCs | ug/L | ug/L | ug/L |
| Dilution Factor | 1 | 1 | |
| Tetrachloroethene | **12.0** | **38.0** | 5 |

| TW-1 | | |
|---|---|---|
| Date | 07/28/2023 | |
| Compound | Result | SGVs |
| VOCs | ug/L | ug/L |
| Dilution Factor | 1 | |
| Tetrachloroethene | **7.20** | 5 |

| MW-1 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Date | 07/28/2023 | 09/28/2023 | 02/08/2024 | 05/07/2024 | 08/22/2024 | 11/21/2024 | |
| Compound | Result | Result | Result | Result | Result | Result | SGVs |
| VOCs | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| Dilution Factor | | 1 | 1 | 1 | 1 | 1 | |
| Chloroform | N/A | 4.60 | **7.88** | **7.17** | 6.14 | 4.40 | 7 |
| Tetrachloroethene | N/A | **14.0** | **5.75** | 4.88 | 4.30 | 0.360 | 5 |

Scale

=10 Feet

= 50 Feet

STATE OF NEW YORK
SPIRO I DONGARIS
EXCELSIOR
095954
LICENSED PROFESSIONAL ENGINEER

LEGEND:

- Site Boundary
- ISCO Injection Point
- Temporary Well Locations
- Permanent Well Locations
- Groundwater Treatment Area

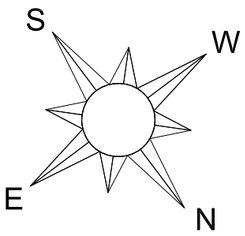

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Environmental Engineering Consultants
31-33 31ST STREET, 2ND FLOOR
ASTORIA, NEW YORK 11106
TEL: (718) 784 - 7490
FAX: (718) 784 - 4085


| | |
|---|---|
| Date: | SEPTEMBER 30, 2024 |
| Drawn by: | EVAN GREENBERG, EIT |
| Checked by: | KENNETH P. WENZ JR., PG, LEP |
| Drawing Scale: | AS SHOWN |
| Project No.: | 21-134-0741 |

Site: 29-05 38TH AVENUE
LONG ISLAND CITY, NY 11101
SITE MANAGEMENT PLAN

Figure: 6

Title: REMAINING GROUNDWATER EXCEEDANCES




| SVP-2 | | |
|---|---|---|
| **Compound** | **Result** | **Q** |
| **VOCs** | ug/m3 | |
| **Dilution Factor** | 236.8 | |
| 1,2,4-Trimethylbenzene | 8.1 | J |
| 2-Butanone | 400 | D |
| 2-Hexanone | 46 | D |
| 4-Methyl-2-pentanone | 6.8 | D |
| Acetone | 200 | D |
| Chloroform | 52 | D |
| Isopropanol | 8.9 | D |
| n-Heptane | 6.8 | J |
| o-Xylene | 7.2 | J |
| p- & m- Xylenes | 14 | D |
| p-Ethyltoluene | 8.1 | J |
| Propylene | 17 | D |
| Tetrachloroethene | 23,000 | D |
| Toluene | 62 | D |
| Trichloroethene | 330 | D |

| AA-1 | | |
|---|---|---|
| **Compound** | **Result** | **Q** |
| **VOCs** | ug/m3 | |
| **Dilution Factor** | 0.849 | |
| 1,2,4-Trimethylbenzene | 0.8 | D |
| 1,3,5-Trimethylbenzene | 0 | J |
| 2-Butanone | 2 | D |
| 4-Methyl-2-pentanone | 0 | D |
| Acetone | 12 | D |
| Benzene | 0.5 | D |
| Chloromethane | 1.2 | D |
| Dichlorodifluoromethane | 1.8 | D |
| Ethyl acetate | 0.6 | D |
| Ethyl Benzene | 0 | D |
| Isopropanol | 4 | D |
| Methylene chloride | 2 | D |
| n-Heptane | 0 | D |
| n-Hexane | 1 | D |
| o-Xylene | 1 | D |
| p- & m- Xylenes | 2.0 | D |
| p-Ethyltoluene | 1 | D |
| Tetrachloroethene | 11 | D |
| Tetrahydrofuran | 1 | J |
| Toluene | 4 | D |
| Trichlorofluoromethane (Freon 11) | 0.9 | D |

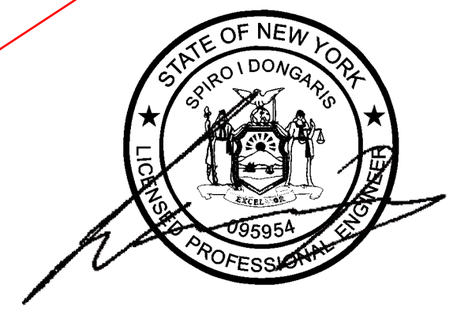
| SVP-4 | | |
|---|---|---|
| **Compound** | **Result** | **Q** |
| **VOCs** | ug/m3 | |
| **Dilution Factor** | 39.6 | |
| 1,2,4-Trimethylbenzene | 7.8 | J |
| 2-Butanone | 180 | D |
| 2-Hexanone | 35 | D |
| Acetone | 110 | D |
| Chloroform | 24 | D |
| Chloromethane | 3.3 | J |
| o-Xylene | 6.9 | J |
| p- & m- Xylenes | 14.0 | J |
| p-Ethyltoluene | 7.8 | J |
| Propylene | 19 | D |
| Tetrachloroethene | 10,000 | D |
| Toluene | 64 | D |
| Trichloroethene | 91 | D |

| SVP-3 | | |
|---|---|---|
| **Compound** | **Result** | **Q** |
| **VOCs** | ug/m3 | |
| **Dilution Factor** | 229 | |
| 1,2,4-Trimethylbenzene | 7.9 | D |
| 2-Butanone | 620 | D |
| 2-Hexanone | 96 | D |
| Acetone | 290 | D |
| Chloroform | 61 | D |
| Isopropanol | 13 | D |
| Methylene chloride | 11 | J |
| o-Xylene | 6.9 | J |
| p- & m- Xylenes | 15 | D |
| p-Ethyltoluene | 7.9 | J |
| Propylene | 16 | D |
| Tetrachloroethene | 18,000 | D |
| Toluene | 71 | D |
| Trichloroethene | 520 | D |




| SVP-5 | | |
|---|---|---|
| **Compound** | **Result** | **Q** |
| **VOCs** | ug/m3 | |
| **Dilution Factor** | 29.9 | |
| 1,1,1-Trichloroethane | 17 | D |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113) | 160 | D |
| 1,2,4-Trimethylbenzene | 7.3 | D |
| 1,3,5-Trimethylbenzene | 85 | D |
| 2-Butanone | 510 | D |
| 2-Hexanone | 190.0 | D |
| Acetone | 220.0 | D |
| Carbon disulfide | 5.1 | D |
| Ethyl Benzene | 12.0 | D |
| Isopropanol | 7.3 | J |
| n-Heptane | 6.1 | J |
| o-Xylene | 66 | D |
| p- & m- Xylenes | 22 | D |
| p-Ethyltoluene | 43 | D |
| Propylene | 18 | D |
| Tetrachloroethene | 6,000 | D |
| Toluene | 140 | D |
| Trichloroethene | 100 | D |
| Trichlorofluoromethane (Freon 11) | 13 | D |

| SVP-1 | | |
|---|---|---|
| **Compound** | **Result** | **Q** |
| **VOCs** | ug/m3 | |
| **Dilution Factor** | 16.02 | |
| 1,2,4-Trimethylbenzene | 7.9 | J |
| 2-Butanone | 300 | D |
| 2-Hexanone | 37 | D |
| Acetone | 150 | D |
| Chloroform | 26 | D |
| Dichlorodifluoromethane | 9 | D |
| Ethyl Benzene | 7 | J |
| Isopropanol | 16 | D |
| o-Xylene | 7 | J |
| p- & m- Xylenes | 17 | D |
| Propylene | 24 | D |
| Tetrachloroethene | 5,300 | D |
| Toluene | 1,300 | D |
| Trichloroethene | 230 | D |




LEGEND:
- Site Boundary
- Geophysical Anomaly
- Soil Vapor Probe (RI)
- Ambient Air Sample (RI)

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Environmental Engineering Consultants
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ASTORIA, NEW YORK 11106
TEL: (718) 784 - 7490
FAX: (718) 784 - 4085

**Q is the Qualifier Column with definitions as follows:**
D=result is from an analysis that required a dilution
J=analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated

| | |
|---|---|
| Date: | JANUARY 17, 2022 |
| Drawn by: | EVAN GREENBERG, EIT |
| Checked by: | KENNETH P. WENZ JR., PG, LEP |
| Drawing Scale: | AS SHOWN |
| Project No.: | 21-134-0741 |

Site: 29-05 38TH AVENUE
LONG ISLAND CITY, NY 11101
SITE MANAGEMENT PLAN

Figure: 7

Title: SOIL VAPOR SAMPLE RESULTS

1. CAST IRON PIPING FROM CEILING TO SVE BLOWER INLET
2. SVE ENCLOSURE (BLOWER, KNOCKOUT DRUM, MUFFLER
3. PVC PIPING TO CARBON TREATMENT DRUMS
4. GAC TREATMENT DRUMS
5. CAST IRON RISER FROM TREATMENT DRUMS TO CEILING
6. CAST IRON PIPING ALONG CEILING TO ROOF DISCHARGE

SEE ENV-6 FOR CONFIGURATION, ENV-7 FOR DETAILS

4" CAST IRON RISER TO ROOF DISCHARGE (ABOVE)

3" CAST IRON PIPE OVERHEAD ALONG CEILING. CONNECT TO EXISTING 4" CAST IRON PIPING SYSTEM

Indoor Air Sample Location - Storage Room

4" PVC EXTRACTION WELL TO CAST IRON RISER PIPE TO CEILING

OVERHEAD 4" SCHEDULE 40 CAST IRON PIPING ALONG CELLAR CEILING

OVERHEAD 4" SCHEDULE 40 CAST IRON PIPING ALONG CELLAR CEILING. SEE ENV-7, DETAIL 4

VAPOR MONITORING POINT (TYP). SEE ENV-7, DETAIL 6 FOR CONSTRUCTION DETAILS.

4" PVC EXTRACTION WELL TO SUB-SLAB EXTENSION PIPING (4" SCHEDULE 40 SOLID PVC)

4" PVC EXTRACTION WELL TO SUB-SLAB EXTENSION PIPING (4" SCHEDULE 40 SOLID PVC)

Indoor Air Sample Location - Garage

Indoor Air Sample Location - Tenant Gym Room

MP-1 MP-2 MP-3 MP-4 MP-5 MP-6 MP-7 MP-8 MP-9 MP-10 MP-11 MP-12 MP-13

EW-1 EW-2 EW-3 EW-4 EW-5 EW-6

| Location | Vacuum (-Inches Water Column) |
|---|---|
| SVE Blower | 17 |
| EW-1 | 8 |
| EW-2 | 10 |
| EW-3 | 8 |
| EW-4 | 11 |
| EW-5 | 9.5 |
| EW-6 (SSDS) | 5 |
| MP-1 | 0.14 |
| MP-2 | 0.26 |
| MP-3 | 0.47 |
| MP-4 | 0.35 |
| MP-5 | 0.45 |
| MP-6 | 0.45 |
| MP-7 | 0.42 |
| MP-8 | 0.2 |
| MP-9 (SSDS) | 0.32 |
| MP-10 (SSDS) | 0.39 |
| MP-11 (SSDS) | 0.23 |
| MP-12 (SSDS) | 0.2 |
| MP-13 (SSDS) | 0.17 |

OR EXTRACTION SYSTEM CELLAR PLAN

(ARCH D)

38TH AVENUE

Scale

=10 Feet

= 50 Feet

STATE OF NEW YORK
SPIRO I DONGARIS
LICENSED PROFESSIONAL ENGINEER
095954

LEGEND
- 4" Schedule 40 Cast Iron Riser Pipe
- 4" Schedule 40 PVC Pipe with Pre-Packed Extraction Well Mesh Screen
- 4" Schedule 40 Cast Iron Riser Pipe connected to Sub-Slab PVC Well Screen
- Overhead 4" Schedule 40 Cast Iron Pipe Along Cellar Ceiling
- 4" Schedule 40 PVC Pipe for Off-Set Extraction Well
- 1" PVC Vapor Monitoring Point with Stainless Steel Cap, Flush Mount to Cellar Floor (MP-1 through MP-8)
- SVE Sub-Slab Monitoring Point (MP-9 through MP-13)
- SVE ENCLOSURE
- GAC TREATMENT DRUMS
- 3" Schedule 40 Cast Iron Pipe to Ceiling, Set into Gravel Layer beneath shallower Slab Area in Upper Cellar, wrapped with Geotextile Fabric
- Overhead 3" Schedule 40 Cast Iron Pipe Along Cellar Ceiling
- Shallower Slab Area in Upper Cellar


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ASTORIA, NY 11106
TEL: (718) 784 - 7490
FAX: (718) 784 - 4085


Notes:
Indoor Air Samples to be collected from Garage, near MP-3, Tenant Gym Room, near MP-6, and Storage Room, near MP-12.

| | |
|---|---|
| Date: | FEBRUARY 20, 2025 |
| Drawn by: | EVAN GREENBERG, EIT |
| Checked by: | SPIRO DONGARIS, PE |
| Drawing Scale: | AS SHOWN |
| Project No.: | 21-134-0741 |

Site: 29-05 38TH AVENUE

SITE MANAGEMENT PLAN

Figure: 8

Title: SOIL VAPOR EXTRACTION SYSTEM LAYOUT

# APPENDIX A – ENVIRONMENTAL EASEMENT

**NYC DEPARTMENT OF FINANCE**
**OFFICE OF THE CITY REGISTER**

This page is part of the instrument. The City Register will rely on the information provided by you on this page for purposes of indexing this instrument. The information on this page will control for indexing purposes in the event of any conflict with the rest of the document.

2024052200758001003E95EA

**RECORDING AND ENDORSEMENT COVER PAGE** PAGE 1 OF 10

**Document ID: 2024052200758001** Document Date: 05-13-2024 Preparation Date: 05-29-2024
Document Type: EASEMENT
Document Page Count: 9

| PRESENTER: | RETURN TO: |
|---|---|
| WINESTATE MANAGEMENT CO.,INC.<br>2301 41ST AVENUE<br>LONG ISLAND CITY, NY 11101<br>646-533-2801<br>REOBUDDY@GMAIL.COM | WINESTATE MANAGEMENT CO.,INC.<br>2301 41ST AVENUE<br>LONG ISLAND CITY, NY 11101<br>646-533-2801<br>REOBUDDY@GMAIL.COM |

**PROPERTY DATA**

| Borough | Block | Lot | Unit | Address |
|---|---|---|---|---|
| QUEENS | 371 | 38 | Entire Lot | 37-42 30TH STREET |

**Property Type:** OTHER

**CROSS REFERENCE DATA**

CRFN_____ *or* DocumentID_____ *or* _____ Year____ Reel____ Page_____ *or* File Number_____

**PARTIES**

| GRANTOR/SELLER: | GRANTEE/BUYER: |
|---|---|
| FH 2BRO BUILDER CORP.<br>3742 30TH ST<br>LONG ISLAND CITY, NY 11101-2614 | N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION<br>625 BROADWAY<br>ALBANY, NY 12233 |

**FEES AND TAXES**

| Mortgage : | | |
|---|---|---|
| Mortgage Amount: | $ | 0.00 |
| Taxable Mortgage Amount: | $ | 0.00 |
| Exemption: | | |
| TAXES: County (Basic): | $ | 0.00 |
| City (Additional): | $ | 0.00 |
| Spec (Additional): | $ | 0.00 |
| TASF: | $ | 0.00 |
| MTA: | $ | 0.00 |
| NYCTA: | $ | 0.00 |
| Additional MRT: | $ | 0.00 |
| TOTAL: | $ | 0.00 |
| Recording Fee: | $ | 82.00 |
| Affidavit Fee: | $ | 0.00 |

| | |
|---|---|
| Filing Fee: | $ 100.00 |
| NYC Real Property Transfer Tax: | $ 0.00 |
| NYS Real Estate Transfer Tax: | $ 0.00 |

**RECORDED OR FILED IN THE OFFICE OF THE CITY REGISTER OF THE CITY OF NEW YORK**
Recorded/Filed 05-29-2024 14:28
City Register File No.(CRFN): **2024000136165**

*City Register Official Signature*

## ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

**THIS INDENTURE** made this 13th day of May, 2024, between Owner, FH 2BRO Builder Corp., having an office at 37-42 30th Street, Long Island City, NY 11101 (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

**WHEREAS,** the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

**WHEREAS,** the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

**WHEREAS,** the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

**WHEREAS,** Grantor, is the owner of real property located at the address of 37-42 30th Street, in the City of New York, County of Queens and State of New York, known and designated on the tax map of the New York City Department of Finance as tax map parcel number: Block 371 Lot 38, being the same as that property conveyed to Grantor by deed dated October 15, 2020, and recorded in the City Register of the City of New York as CRFN # 2020000311067. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 0.243 +/- acres, and is hereinafter more fully described in the Land Title Survey dated August 30, 2023 prepared by Anastasia I. Parsatoon L.S., Land Surveying, P.C., which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; and

**WHEREAS,** the Department accepts this Environmental Easement in order to ensure the protection of public health and the environment and to achieve the requirements for remediation established for the Controlled Property until such time as this Environmental Easement is

extinguished pursuant to ECL Article 71, Title 36; and

**NOW THEREFORE,** in consideration of the mutual covenants contained herein and the terms and conditions of Brownfield Cleanup Agreement Index Number: C241250-04-21, as amended by Amendment #1 on October 19, 2023, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement").

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:

**Restricted Residential as described in 6 NYCRR Part 375-1.8(g)(2)(ii), Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)**

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;

(4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health and Mental Hygiene to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;

(5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(6) Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in the SMP;

(7) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;

(8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;

(9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP;

(10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.

B. The Controlled Property shall not be used for Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

**This property is subject to an Environmental Easement held by the New York State Department of Environmental Conservation**

**pursuant to Title 36 of Article 71 of the Environmental Conservation Law.**

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved by the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5) the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

| | |
|---|---|
| Parties shall address correspondence to: | Site Number: C241250<br>Office of General Counsel<br>NYSDEC<br>625 Broadway<br>Albany New York 12233-5500 |
| With a copy to: | Site Control Section<br>Division of Environmental Remediation<br>NYSDEC<br>625 Broadway<br>Albany, NY 12233 |

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and

communicating notices and responses to requests for approval.

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

11. Consistency with the SMP. To the extent there is any conflict or inconsistency between the terms of this Environmental Easement and the SMP, regarding matters specifically addressed by the SMP, the terms of the SMP will control.

**Remainder of Page Intentionally Left Blank**

**IN WITNESS WHEREOF,** Grantor has caused this instrument to be signed in its name.

FH 2BRO Builder Corp.:

By: _____

Print Name: Jack Fang

Title: President Date: 5/3/2024

**Grantor's Acknowledgment**

STATE OF NEW YORK )
) ss:
COUNTY OF QUEENS )

On the 3rd day of May, in the year 20 24, before me, the undersigned, personally appeared Jack Fang, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public - State of New York

LU YUN YING
Notary Public, State of New York
Registration No. 01LU6425776
Qualified In Queens County
Commission Expires November 29, 2025

SEAL

**THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK,** Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: _____
Andrew O. Guglielmi, Director
Division of Environmental Remediation

**Grantee's Acknowledgment**

STATE OF NEW YORK )
) ss:
COUNTY OF ALBANY )

On the 13 day of May, in the year 2024, before me, the undersigned, personally appeared Andrew O. Guglielmi, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public - State of New York

Cheryl A. Salem
Notary Public State of New York
Registration No. 01SA0002177
Qualified In Albany County
My Commission Expires March 3, 2027

SEAL

## SCHEDULE "A" PROPERTY DESCRIPTION

ENVIRONMENTAL EASEMENT DESCRIPTION

ALL that certain plot, piece or parcel of land, situate, lying and being in the Borough and County of Queens, City and State of New York, bounded and described as follows:

BEGINNING at the corner formed by the intersection of the southeasterly side of Old Ridge Road, with the northeasterly side of Freeman Avenue, now 38th Avenue;

RUNNING THENCE northeasterly along the southeasterly side of Old Ridge Road, 71.24 feet (Tax Map 73.18 feet);

THENCE southeasterly and parallel with 38th Avenue, 143.30 feet to the northwesterly side of Lockwood Street, now 30th Street;

THENCE southwesterly along the northwesterly side of Lockwood Street 70.33 feet to the northeasterly side of 38th Avenue; and

THENCE northwesterly along the northeasterly side of 38th Avenue 159.45 feet to the corner aforesaid to the point or place of BEGINNING.

CONTAINING WITHIN SAID BOUNDS 0.243 ACRES OR 10,627.9 SQUARE FEET



https://a836-acris.nyc.gov/DS/DocumentSearch/DocumentImageView?doc_id=2024052200758001

**SENDER: COMPLETE THIS SECTION**

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

The city Clerk, Clerk of the council
Executive office
141 worth Street
N4, N4 10013

9590 9402 8119 2349 4815 03

2. Article Number *(Transfer from service label)*

9589 0710 5270 1402 9442 72

**COMPLETE THIS SECTION ON DELIVERY**

A. Signature

X

☐ Agent
☐ Addressee

B. Received by *(Printed Name)*

C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☒ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ ed Mail
- ☐ ed Mail Restricted Delivery $500)
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☒ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2020 PSN 7530-02-000-9053 Domestic Return Receipt

CONNELL FOLEY
A TRADITION OF LEGAL EXCELLENCE SINCE 1938

Connell Foley LLP
56 Livingston Avenue
Roseland, NJ 07068
P 973.535.0500 F 973.535.9217

**Cristina Diaz Salcedo, Esq.**
Associate
Direct Dial 212.542.3773
CSalcedo@connellfoley.com

May 29, 2024

The City Clerk, Clerk of the Council
Executive Office
141 Worth Street,
New York, NY 10013

**Re: Notice to Municipality of Recorded Environmental Easement ("Environmental Easement")**
**Site: 29-05 38th Avenue Long Island City, NY 11101**

Dear Sir or Madam:

Attached please find a copy of an Environmental Easement granted to the New York State Department of Environmental Conservation ("Department" or "DEC") on May 13, 2024 by FH 2BRO Builder Corp. for property at 37-42 30th Street Long Island City, New York 11101 Tax Map No. Block 371, Lot 38, DEC Site No: C241250.

This Environmental Easement restricts future use of the above-referenced property to restricted residential, commercial and industrial uses. Any on-site activity must be done in accordance with the Environmental Easement and the Site Management Plan which is incorporated into the Environmental Easement. Department approval is also required prior to any groundwater use.

Article 71, Section 71-3607 of the New York State Environmental Conservation Law requires that:

1. Whenever the department is granted an environmental easement, it shall provide each affected local government with a copy of such easement and shall also provide a copy of any documents modifying or terminating such environmental easement.

2. Whenever an affected local government receives an application for a building permit or any other application affecting land use or development of land that is subject to an environmental easement and that may relate to or impact such easement, the affected local government shall notify the department and refer such application to the department. The department shall evaluate whether the application is consistent with the environmental easement and shall notify the affected local government of its

determination in a timely fashion, considering the time frame for the local government's review of the application. The affected local government shall not approve the application until it receives approval from the department.

An electronic version of every environmental easement that has been accepted by the Department is available to the public at: http://www.dec.ny.gov/chemical/36045.html. Please forward this notice to your building and/or planning departments, as applicable, to ensure your compliance with these provisions of New York State Environmental Conservation Law. If you have any questions or comments regarding this matter, please do not hesitate to contact me.

Sincerely,

Cristina Diaz Salcedo, Esq.

# APPENDIX B – LIST OF SITE CONTACTS

## APPENDIX B – LIST OF SITE CONTACTS

| Contact | Name | Phone/Email Address |
|---|---|---|
| Site Owner/Remedial Party | Jack Fang, FH2BRO Builder Corp. | (646) 533-2801, Reobuddy@gmail.com |
| Qualified Environmental Professional | Ken Wenz, Athenica Environmental Engineering, PLLC | (718) 784-7490, Kwenz@Athenica.com |
| Remedial Engineer | Spiro Dongaris PE, Athenica Environmental Engineering, PLLC | (718) 784-7490, Sdongaris@Athenica.com |
| NYSDEC DER Project Manager | Javier Perez-Maldonado | (518) 402-8172, Javier.perez-maldonado@dec.ny.gov |
| NYSDEC DER Project Manager's Supervisor | William Bennett | (518) 402-9543 William.bennett@dec.ny.gov |
| NYSDEC Site Control | Kelly Lewandowski | (718) 402-9569, kelly.lewandowski@dec.ny.gov |
| NYSDOH Project Manager | Michele Dolan | (518) 402-7860, michele.dolan@health.ny.gov |
| Remedial Party Attorney | George Duke, Connell Foley LLP | (212) 307-3700, Gduke@connellfoley.com |

# APPENDIX C – MONITORING WELL BORING & CONSTRUCTION LOGS

ATHENICA ENVIRONMENTAL SERVICES, INC.
Environmental Consultants

JOB NAME: 29-05 38th Avenue

WELL NUMBER: **MW-1**

ADDRESS: 29-05 38th Avenue, LIC, NY

DRILLING METHOD: Direct Push

INSTALLATION DATE: 09/25/2023

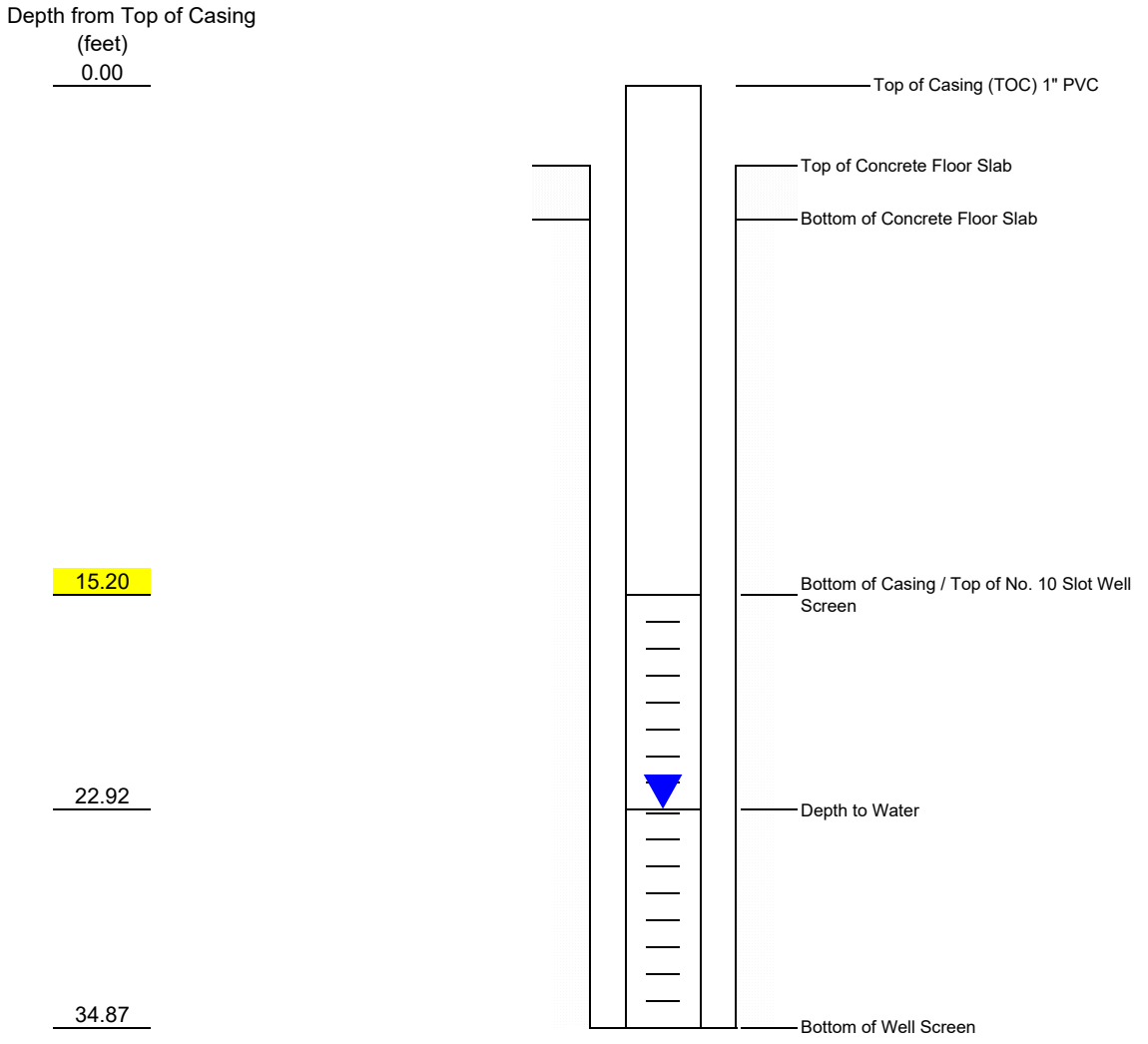
DRILLER: Pine Environmental Services

GAUGING DATE: 09/28/2023

HEIGHT OF STICK-UP: N/A

DEPTH TO WATER: 22.92 feet

DEPTH TO PRODUCT: N/A




NOT TO SCALE

ATHENICA ENVIRONMENTAL SERVICES, INC.
Environmental Consultants

JOB NAME: 29-05 38th Avenue

WELL NUMBER: **MW-2**

ADDRESS: 29-05 38th Avenue, LIC, NY

DRILLING METHOD: Hollow Stem Augurs

INSTALLATION DATE: 07/27/2023

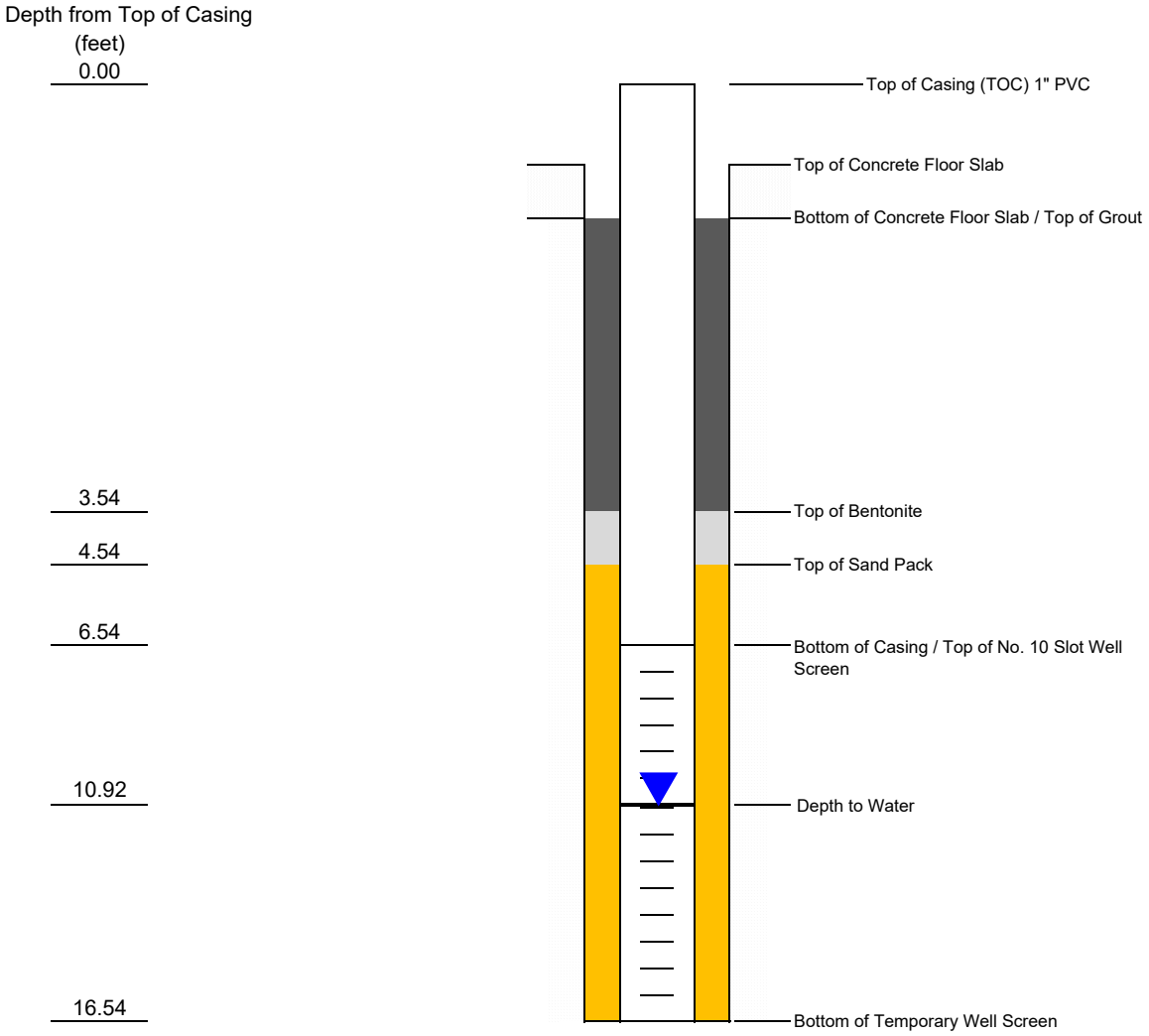
DRILLER: Pine Environmental Services

HEIGHT OF STICK-UP: N/A

GAUGING DATE: 07/28/2023

DEPTH TO WATER: 16.54 feet

DEPTH TO PRODUCT: N/A




NOT TO SCALE

ATHENICA ENVIRONMENTAL SERVICES, INC.
Environmental Consultants

JOB NAME: 29-05 38th Avenue

WELL NUMBER: **MW-3**

ADDRESS: 29-05 38th Avenue, LIC, NY

DRILLING METHOD: Hollow Stem Augurs

INSTALLATION DATE: 07/26/2023

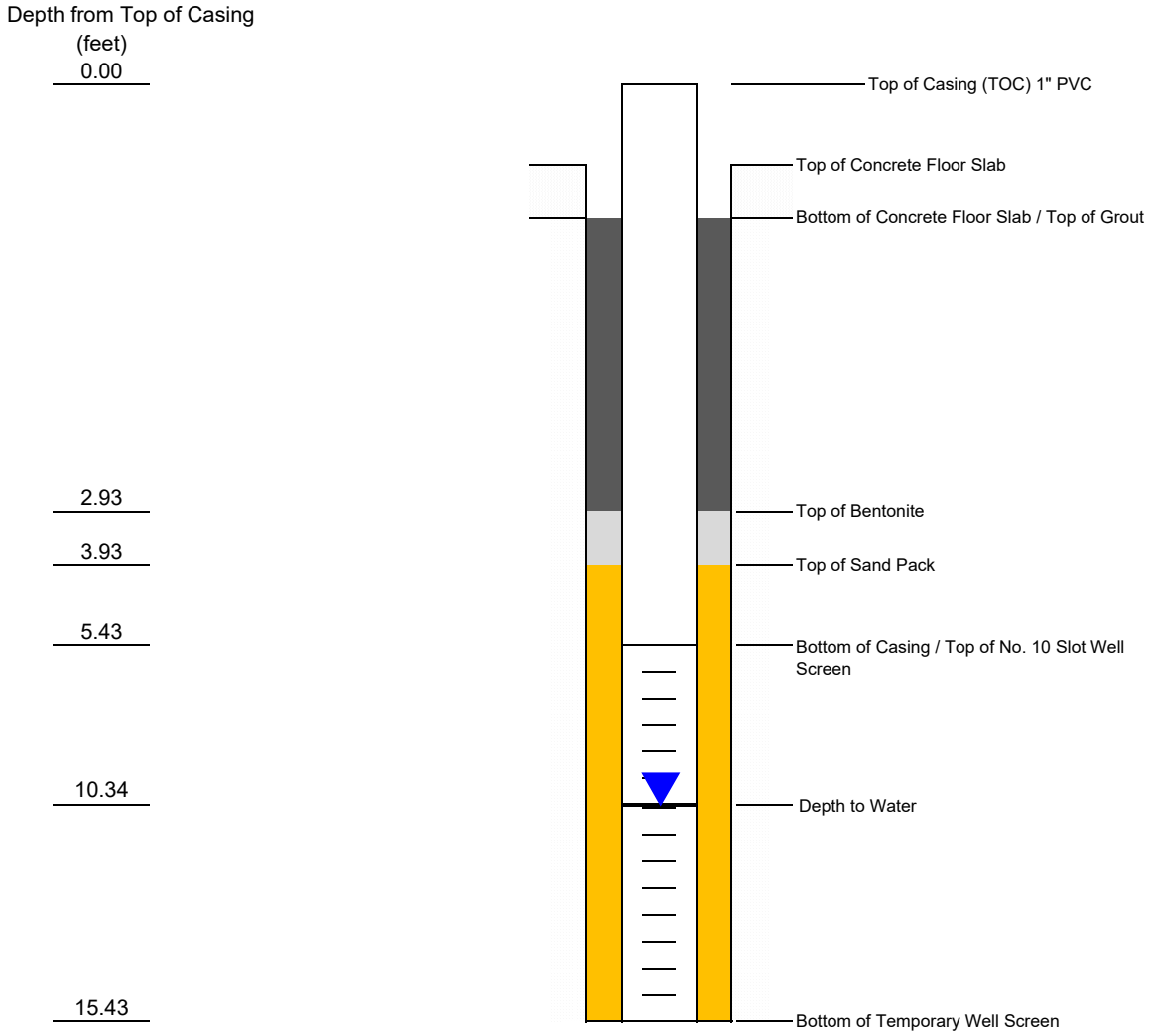
DRILLER: Pine Environmental Services

HEIGHT OF STICK-UP: N/A

GAUGING DATE: 07/28/2023

DEPTH TO WATER: 15.43 feet

DEPTH TO PRODUCT: N/A




NOT TO SCALE

## APPENDIX D – EXCAVATION WORK PLAN (EWP)

### 1-1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination or breach or alter the site's cover system, the site owner or their representative will notify the NYSDEC contacts listed in the table below. Table 1 includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information.

**Table 1: Notifications***

| **Name** | **Contact Information** | **Required Notification**** |
|---|---|---|
| Javier Perez-Maldonado | (518) 402-8172, javier.perez-maldonado@dec.ny.gov | All Notifications |
| William Bennett | (518) 402-9543, william.bennett@dec.ny.gov | All Notifications |
| Kelly Lewandowski | (518) 402-9569, kelly.lewandowski@dec.ny.gov | Notifications 1 and 8 |
| Michele Dolan | (518) 402-7860 michele.dolan@health.ny.gov | Notifications 4, 6, and 7 |

* Note: Notifications are subject to change and will be updated as necessary.

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated, any modifications of truck routes, and any work that may impact an engineering control;

- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;

- A schedule for the work, detailing the start and completion of all intrusive work, and submittals (e.g., reports) to the NYSDEC documenting the completed intrusive work;

- A summary of the applicable components of this EWP;

- A statement that the work will be performed in compliance with this EWP, 29 CFR 1910.120 and 29 CFR 1926 Subpart P;

- Identification of disposal facilities for potential waste streams; and

- Identification of sources of any anticipated backfill, along with the required request to import form and all supporting documentation including, but not limited to, chemical testing results.

The NYSDEC project manager will review the notification and may impose additional requirements for the excavation that are not listed in this EWP. The alteration, restoration and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application professional seals and alterations.

## 1-2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g. photoionization detector) soil screening will be performed during all excavations into known or potentially contaminated material (remaining contamination) or a breach of the cover system. A qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State will perform the screening. Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil.

## 1-3 SOIL STAGING METHODS

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC.

## 1-4 MATERIALS EXCAVATION AND LOAD-OUT

A qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site. A site utility stakeout will be completed for all utilities prior to any ground intrusive activities at the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements). Trucks transporting contaminated soil must have either tight-fitting opaque covers that are secured on the sides and/or back, or opaque covers that are locked on all sides.

A truck wash will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the site until the activities performed under this section are

complete. Truck wash waters will be collected and disposed of off-site in an appropriate manner.

Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials. Material accumulated from the street cleaning and egress cleaning activities will be disposed off-site at a permitted landfill facility in accordance with all applicable local, State, and Federal regulations.

## 1-5 MATERIALS TRANSPORT OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the site will be secured with either tight-fitting opaque covers that are secured on the sides and/or back, or opaque covers that are locked on all sides. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport. See enclosed Truck Route Figure.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project site.

Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Google Maps

29-5 38th Ave, Long Island City, NY 11101 to Clean Earth, 24 Middlesex Ave, Carteret, NJ 07008

Drive 32.0 miles, 1 hr 46 min




Map data ©2022 Google 2 mi

29-5 38th Ave
Long Island City, NY 11101

⚠ This route has tolls.

**Take 39th St and 43rd Ave to I-278 W**

1. Head southeast on 38th Ave toward 30th St
   ℹ Pass by 7-Eleven (on the right in 0.3 mi)

0.3 mi

2. Turn left onto Northern Blvd

0.2 mi

3. Turn right onto 39th St

0.5 mi

4. Turn left onto 43rd Ave

0.2 mi

5. Turn right onto 43rd St

1.0 mi

**Continue on I-278 W to Carteret. Take exit 12 from I-95 S**

44 min (27.3 mi)

6. Merge onto I-278 W

9.2 mi

7. Keep right at the fork to stay on I-278 W, follow signs for Verrazano Brg/Staten Island
   ⚠ Toll road

8. Keep right at the fork to continue on Verrazzano-Narrows Bridge, follow signs for I-278/Verrazano Bridge
   ⚠ Toll road

9. Verrazzano-Narrows Bridge turns slightly right and becomes I-278 W
   ⚠ Toll road
   ℹ Entering New Jersey

10. Use the left 2 lanes to take exit 3 A for I-95 S
    ⚠ Toll road

0.8 mi

11. Keep left at the fork and merge onto I-95 S
    ⚠ Toll road

3.1 mi

12. Take exit 12 toward Carteret Rahway
    ⚠ Toll road

0.8 mi

**Continue on Peter J Sica Industrial Hwy to your destination**

13. Keep left to continue on Peter J Sica Industrial Hwy

1.9 mi

14. Continue onto Middlesex Ave

0.5 mi

15. Turn left
    ℹ Destination will be on the right

0.2 mi

Clean Earth
24 Middlesex Ave, Carteret, NJ 07008

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

ATLANTIC ENVIRONMENTAL ENGINEERING PLLC
Environmental Engineering Consultants
45-09 GREENPOIN
LONG ISLAND CITY, NY 11104
TEL: (718) 784 - 7490
FAX: (718) 784 - 4085

Note: Route Map assumes Clean Earth of Carteret. Other New Jersey facilities accessible by similar route.
Source: NYCDOT Truck Route Map

| | |
|---|---|
| Date: | AUGUST 30, 2022 |
| Drawn by: | EVAN GREENBERG, EIT |
| Checked by: | KENNETH P. WENZ JR., PG, LEP |
| Drawing Scale: | AS SHOWN |
| Project No.: | 21-134-0741 |

Site: 29-05 38TH AVENUE
LONG ISLAND CITY, NY 11101
SITE MANAGEMENT PLAN

Figure: 1

Title: Proposed Truck Route Map

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

## 1-6 MATERIALS DISPOSAL OFF-SITE

All material excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed off-site in a permitted facility in accordance with all local, State and Federal regulations. If disposal of material from this site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC project manager. Unregulated off-site management of materials from this site will not occur without formal NYSDEC project manager approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, (e.g. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C&D debris recovery facility). Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include, but will not be limited to: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled consistent with 6 NYCRR Parts 360, 361, 362, 363, 364 and 365. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State C&D debris recovery facility (6 NYCRR Subpart 360-15 registered or permitted facility).

## 1-7 MATERIALS REUSE ON-SITE

The qualified environmental professional, as defined in 6 NYCRR Part 375, will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material (i.e. contaminated) does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within the cover system or within landscaping berms. Contaminated on-site material may

only be used beneath the site cover as backfill for subsurface utility lines with prior approval from the DEC project manager.

Proposed materials for reuse on-site must be sampled for full suite analytical parameters including per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. The sampling frequency will be in accordance with DER-10 Table 5.4(e)10 unless prior approval is obtained from the NYSDEC project manager for modification of the sampling frequency. The analytical results of soil/fill material testing must meet the site use criteria presented in NYSDEC DER-10 Appendix 5 – Allowable Constituent Levels for Imported Fill or Soil for all constituents listed, and the NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (April 2023) guidance values. Approvals for modifications to the analytical parameters must be obtained from the NYSDEC project manager prior to the sampling event.

Soil/fill material for reuse on-site will be segregated and staged as described in Sections X-2 and X-3 of this EWP. The anticipated size and location of stockpiles will be provided in the 15-day notification to the NYSDEC project manager. Stockpile locations will be based on the location of site excavation activities and proximity to nearby site features. Material reuse on-site will comply with requirements of NYSDEC DER-10 Section 5.4(e)4. Any modifications to the requirements of DER-10 Section 5.4(e)4 must be approved by the NYSDEC project manager.

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the site will not be reused on-site.

## 1-8 FLUIDS MANAGEMENT

All liquids to be removed from the site, including but not limited to, excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be handled, transported and disposed off-site at a permitted facility in accordance with applicable local, State, and Federal regulations. Dewatering,

purge and development fluids will not be recharged back to the land surface or subsurface of the site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a SPDES permit.

## 1-9 COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities the cover system will be restored in a manner that complies with the RAWP. The existing cover system is comprised of a minimum of concrete covered sidewalks and concrete building. The demarcation layer, consisting of orange snow fencing material, white geotextile or equivalent material, etc., will be replaced to provide a visual reference to the top of the remaining contamination zone, the zone that requires adherence to special conditions for disturbance of remaining contaminated soils defined in this SMP. If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt), this will constitute a modification of the cover element of the remedy and the upper surface of the remaining contamination. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in an updated SMP. The alteration, restoration and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application professional seals and alterations.

## 1-10 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the site will be approved by the qualified environmental professional, as defined in 6 NYCRR Part 375, and will be in compliance with provisions in this SMP prior to receipt at the site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review.

Material from industrial sites, spill sites, other environmental remediation sites, or potentially contaminated sites will not be imported to the site.

All imported soils will meet the backfill and cover soil quality standards established in 6 NYCRR 375-6.7(d) and DER-10 Appendix 5 for restricted residential use. Soils that meet 'general' fill requirements under 6 NYCRR Part 360.13, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC project manager. Soil material will be sampled for the full suite of analytical parameters, including PFAS and 1, 4-dioxane. Solid waste will not be imported onto the site.

Trucks entering the site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

## 1-11 STORMWATER POLLUTION PREVENTION

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

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

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

## 1-12 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition. The NYSDEC project manager will be promptly notified of the discovery.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes [TAL metals, TCL volatiles and semi-volatiles (including 1,4-dioxane), TCL pesticides and PCBs, and PFAS], unless the site history and previous sampling results provide sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC project manager for approval prior to sampling. Any tanks will be closed as per NYSDEC regulations and guidance.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone within two hours to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the Periodic Review Report.

## 1-13 COMMUNITY AIR MONITORING PLAN

Air sampling locations will be placed at locations upwind and downwind of the work area at the perimeter of the Site. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

## 1-14 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-site. Specific odor control methods to be used on a routine basis will include water suppression or odor suppression foam. If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted and the source of odors will be

identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the remedial party's Remediation Engineer, and any measures that are implemented will be discussed in the Periodic Review Report.

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

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

## 1-15 DUST CONTROL PLAN

Particulate monitoring must be conducted according to the Community Air Monitoring Plan (CAMP) provided in Section [X]-13. If particulate levels at the site exceed the thresholds listed in the CAMP or if airborne dust is observed on the site or leaving the site, the dust suppression techniques listed below will be employed. The remedial party will also take measures listed below to prevent dust production on the site.

A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved using a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.

- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
    - On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

## 1-16 OTHER NUISANCES

A plan for rodent control will be developed and utilized by the contractor prior to and during site clearing and site grubbing, and during all remedial work.

A plan will be developed and utilized by the contractor for all remedial work to ensure compliance with local noise control ordinances.

# APPENDIX E
# SOIL VAPOR EXTRACTION SYSTEM AS-BUILTS

**GENERAL NOTES:**

1. "SITE" REFERS TO THE SUBJECT PROPERTY AT 37-42 30TH STREET, LONG ISLAND CITY, NEW YORK 11101, QUEENS BLOCK 3371, LOT 38, ALTERNATIVELY IDENTIFIED AS THE "29-05 38TH AVENUE BCP SITE".
2. DRAWINGS NOT TO BE USED FOR STRUCTURAL, ARCHITECTURAL, OR OTHER REFERENCE EXCEPT FOR SOIL VAPOR EXTRACTION (SVE) SYSTEM.

**SUMMARY OF WORK:**

1. DRAWINGS OUTLINE THE DESIGN SPECIFICATIONS FOR A SVE SYSTEM DESIGNED AND INSTALLED TO REMEDIATE CONTAMINATED SOIL VAPOR BENEATH THE SITE.
2. DETAILED SCHEMATICS ILLUSTRATE THE SVE SYSTEM LAYOUT, COMPONENTS, AND SPECIFICATIONS, AS INSTALLED.

**CONSTRUCTION NOTES:**

1. ALL CONCRETE SLABS THAT COME IN CONTACT WITH THE GROUND ARE LAID OVER A GAS PERMEABLE MATERIAL MADE UP OF A MINIMUM OF 6" THICKNESS OF $\frac{3}{4}$" SIZE GRAVEL OR CRUSHED STONE.
2. 20 MIL STEGO WRAP VAPOR BARRIER MATERIAL HAS BEEN INSTALLED BENEATH CELLAR SLAB, UNDER ELEVATOR PIT AND BEHIND INTERIOR WALLS TO GRADE. ALL PERFORATIONS WERE SEALED WITH APPROVED STEGO TAPE OR STEGO MASTIC MATERIAL IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
3. ALL OPENINGS, GAPS AND JOINTS IN FLOOR, AND WALL ASSEMBLIES HAVE BEEN FILLED OR CLOSED WITH MATERIALS THAT PROVIDE A PERMANENT AIRTIGHT SEAL.
4. WARNING LABELS HAVE BEEN INSTALLED ON VERTICAL SVE SYSTEM PIPING WHERE EXPOSED. SEE DETAIL IN DRAWING ENV-7.
5. REFER TO DRAWINGS ENV-1 THROUGH ENV-7 FOR ADDITIONAL SVE SYSTEM REQUIREMENTS.

RISER AND ROOF NOTES:

1. DISCHARGE EXHAUST ON THE ROOF MUST REMAIN AT LEAST 10 FEET AWAY FROM ANY OPERABLE WINDOW OR AIR INTAKE FOR ANY BUILDING, OR OCCUPIABLE SPACE. FENCING HAS BEEN INSTALLED TO PREVENT UNAUTHORIZED ACCESS.
2. RISER PIPING HAS BEEN INSTALLED IN ACCORDANCE WITH THE NEW YORK CITY MECHANICAL AND PLUMBING CODE, INCLUDING, BUT NOT LIMITED TO, THOSE REQUIREMENTS FOR:
   - PROTECTION OF SYSTEM COMPONENTS
   - STRUCTURAL SAFETY
   - PIPING SUPPORT
   - JOINTS
   - RISER LOCATION
   - FIRE PROTECTION

COMPONENTS:

1. THE SVE SYSTEM BLOWER IS AN AMETEK 5 HORSEPOWER REGENERATIVE BLOWER, POWERED BY THREE-PHASE 230 VOLT POWER SUPPLY.
2. ALARM UNIT IS RADONAWAY CHECKPOINT II.
3. VACUUM GAUGES ARE SERIES 2000 MAGNEHELIC GAUGES.
4. FLOW SENSORS ARE DWYER DS-300 WITH DWYER 2SQRT DIFFERENTIAL PRESSURE GAUGES.

LEGEND

- 4" Schedule 40 Cast Iron Riser Pipe
- EW-X — 4" Schedule 40 PVC Pipe with Pre-Packed Extraction Well Mesh Screen
- EW-X — 4" Schedule 40 Cast Iron Riser Pipe connected to Sub-Slab PVC Well Screen
- Overhead 4" Schedule 40 Cast Iron Pipe Along Cellar Ceiling
- Sub-Surface 4" Schedule 40 PVC Pipe for Off-Set Extraction Well
- MP-X — 1" PVC Vapor Monitoring Point with Stainless Steel Cap, Flush Mount to Cellar Floor
- MP-X — SVE Sub-Slab Monitoring Point (MP-9 through MP-13)
- SVE ENCLOSURE
- GAC TREATMENT DRUMS
- EW-6 — 3" Schedule 40 Cast Iron Pipe to Ceiling, Set into Gravel Layer beneath shallower Slab Area in Upper Cellar, wrapped with Geotextile Fabric
- Overhead 3" Schedule 40 Cast Iron Pipe Along Cellar Ceiling
- Shallower Slab Area in Upper Cellar

| DRAWING LIST | |
|---|---|
| **SHEET NO.** | **SHEET TITLE** |
| ENV-1 | GENERAL NOTES |
| ENV-2 | SVE SYSTEM CELLAR PLAN |
| ENV-3 | SVE SYSTEM FIRST FLOOR PLAN |
| ENV-4 | SVE SYSTEM SECOND FLOOR PLAN |
| ENV-5 | SVE SYSTEM THIRD FLOOR PLAN |
| ENV-6 | SVE SYSTEM PIPING AND INSTRUMENTATION DIAGRAM |
| ENV-7 | SVE SYSTEM DETAILS |




1 ENV-1 SITE LOCATION
SCALE: 1" = 80'-0" (ARCH D)

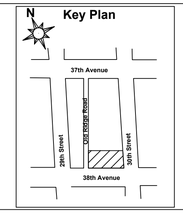
RESERVED FOR PLAN EXAMINER

General Notes

| No. | Revision/Issue | Date |
|---|---|---|
| | | |
| | | |
| 2 | AS BUILT | 2/20/25 |
| 1 | AS BUILT | 11/26/24 |


ATHENICA ENVIRONMENTAL ENGINEERING PLLC
Environmental Engineering Consultants
31-33 31ST STREET, 2ND FLOOR
ASTORIA, NEW YORK 11106


Key Plan

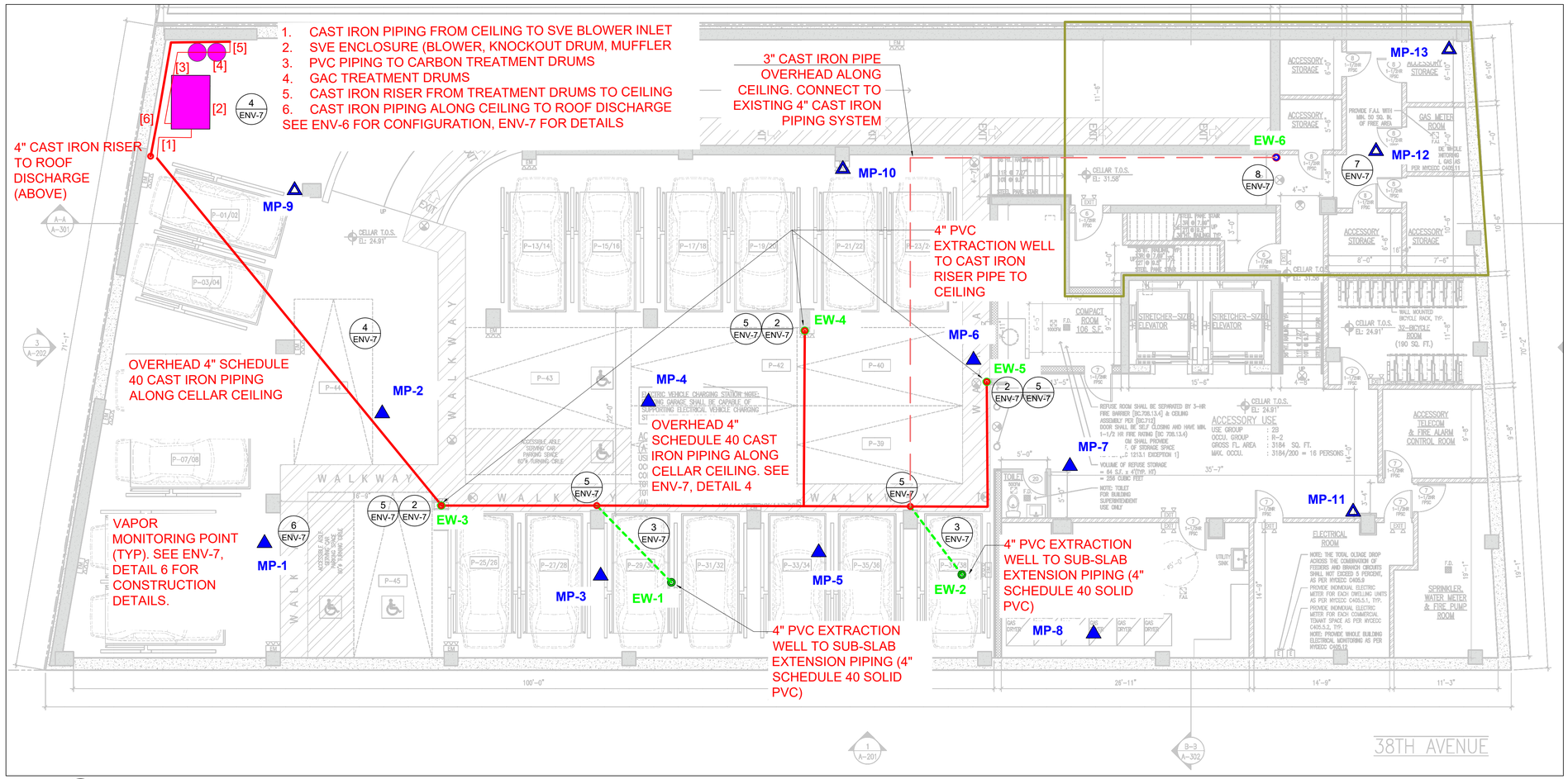



Drawn By: Evan Greenberg, E.I.T.
Checked By: Spiro Dongaris, P.E.
29-05 38th Avenue BCP Site
Address: 37-42 30th Street Long Island City New York 11101
Drawing Title: GENERAL NOTES
Drawing No.: ENV-1
Date: 2/20/24
Project No. 21-134-0741
Prepared for: FH2BRO Builder Corp.
Scale N/A

Certification

STATE OF NEW YORK
SPIRO I DONGARIS
095954
LICENSED PROFESSIONAL ENGINEER

Athenica Environmental Engineering, PLLC




1 ENV-2 SOIL VAPOR EXTRACTION SYSTEM CELLAR PLAN

SCALE: 5/32" = 1'-0" (ARCH D)

Scale

=10 Feet

= 50 Feet

LEGEND

- 4" Schedule 40 Cast Iron Riser Pipe
- EW-X 4" Schedule 40 PVC Pipe with Pre-Packed Extraction Well Mesh Screen
- EW-X 4" Schedule 40 Cast Iron Riser Pipe connected to Sub-Slab PVC Well Screen
- Overhead 4" Schedule 40 Cast Iron Pipe Along Cellar Ceiling
- 4" Schedule 40 PVC Pipe for Off-Set Extraction Well
- MP-X 1" PVC Vapor Monitoring Point with Stainless Steel Cap, Flush Mount to Cellar Floor (MP-1 through MP-8)
- MP-X SVE Sub-Slab Monitoring Point (MP-9 through MP-13)
- SVE ENCLOSURE
- GAC TREATMENT DRUMS
- EW-6 3" Schedule 40 Cast Iron Pipe to Ceiling, Set into Gravel Layer beneath shallower Slab Area in Upper Cellar, wrapped with Geotextile Fabric
- Overhead 3" Schedule 40 Cast Iron Pipe Along Cellar Ceiling
- Shallower Slab Area in Upper Cellar

RESERVED FOR PLAN EXAMINER

**General Notes**

Adapted from MEI Architect PLLC: *CELLAR FLOOR PLAN*, A-101.00, Drawn by S.M, 9/26/2020

VMP-2, VMP-3, VMP-6, and VMP-8 removed following SVE Pilot Testing. Monitoring Points renumbered to MP-1 through MP-8.

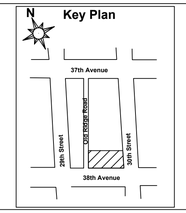
MP-9 through MP-11 added in November 2024 to assess SSDS vacuum at building extremities.

SSDS Extraction Well EW-6 and Monitoring points MP-12 and MP-13, installed in January 2025 to ensure the SVE system also provides full sub-slab depressurization over the entire footprint of the Site (in particular the upper slab area).

| No. | Revision/Issue | Date |
|---|---|---|
| | | |
| | | |
| 2 | AS BUILT | 2/20/25 |
| 1 | AS BUILT | 11/26/24 |

ATHENICA ENVIRONMENTAL ENGINEERING PLLC
Environmental Engineering Consultants
31-33 31ST STREET, 2ND FLOOR
ASTORIA, NEW YORK 11106

Key Plan




Drawn By: Evan Greenberg, E.I.T.

Checked By: Spiro Dongaris, P.E.

29-05 38th Avenue BCP Site

Address:
37-42 30th Street
Long Island City
New York 11101

Drawing Title: **SVE SYSTEM CELLAR PLAN**

Drawing No.: ENV-2

Date: 2/20/24

Project No.: 21-134-0741

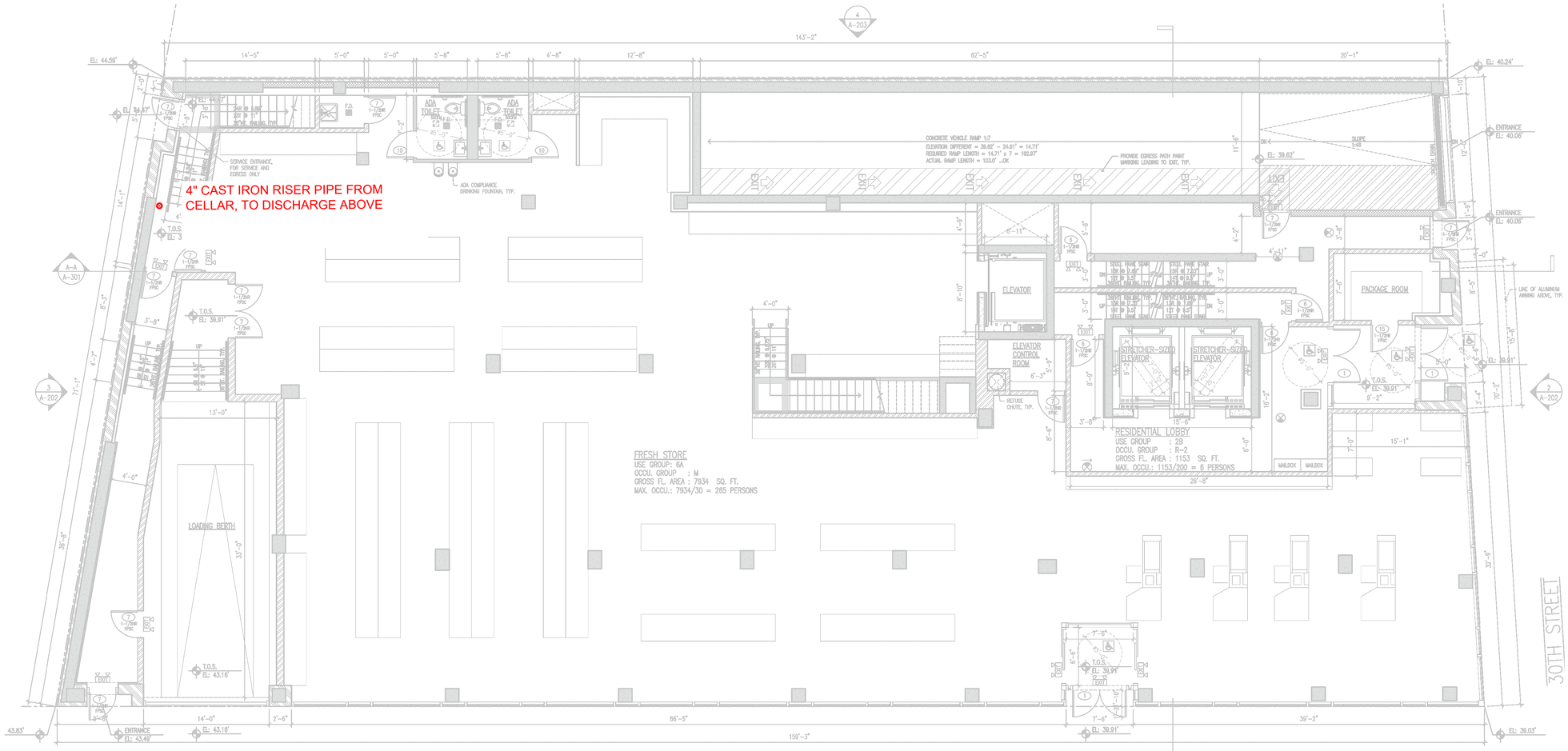
Prepared for: FH2BRO Builder Corp.

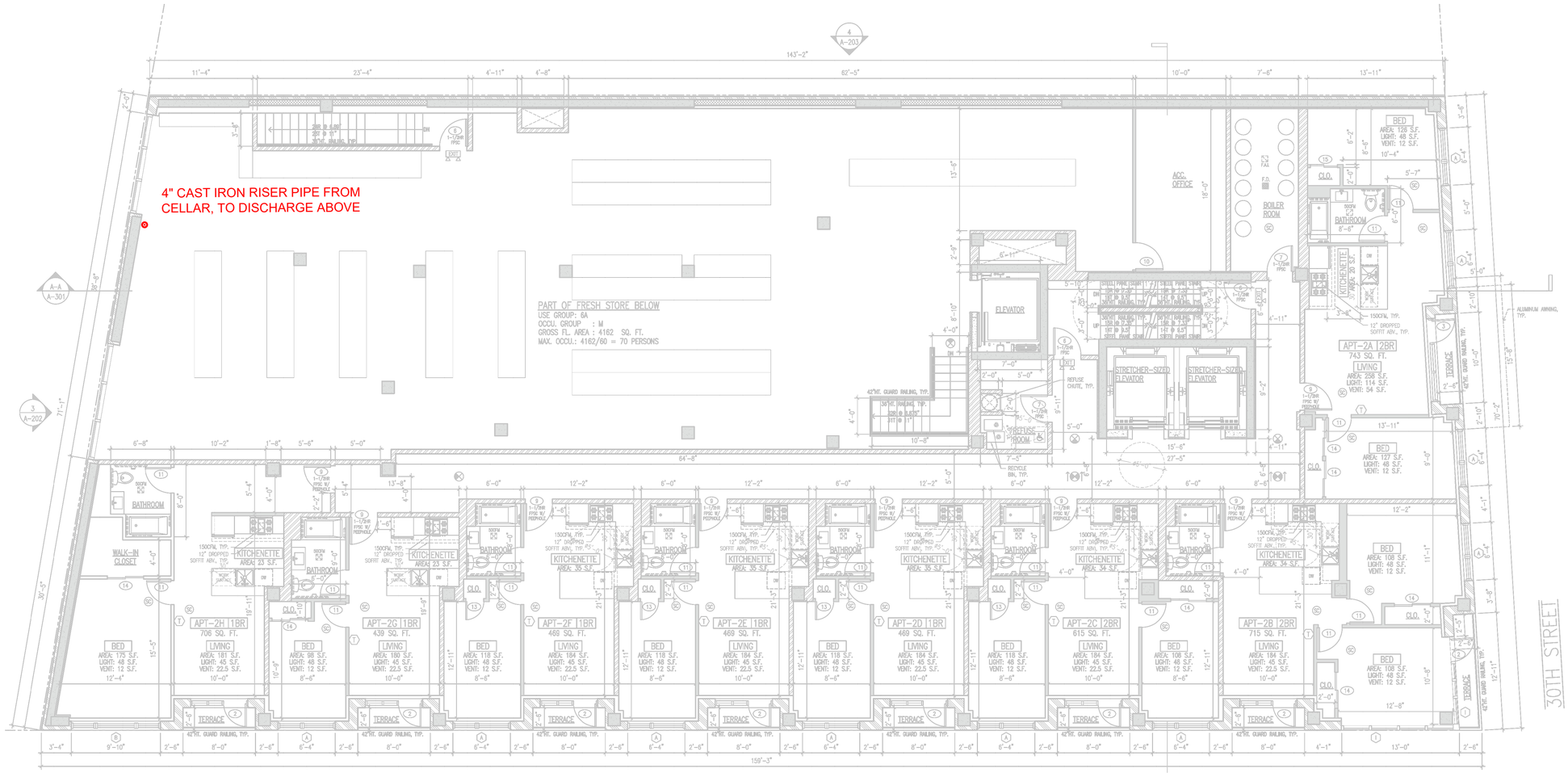
Scale: 5/32" = 1'-0" (ARCH D)

Certification




Athenica Environmental Engineering, PLLC


4" CAST IRON RISER PIPE FROM CELLAR, TO DISCHARGE ABOVE
FRESH STORE
USE GROUP: 6A
OCCU. GROUP : M
GROSS FL. AREA : 7934 SQ. FT.
MAX. OCCU.: 7934/30 = 265 PERSONS
RESIDENTIAL LOBBY
USE GROUP : 29
OCCU. GROUP : R-2
GROSS FL. AREA : 1153 SQ. FT.
MAX. OCCU.: 1153/200 = 6 PERSONS
ELEVATOR
ELEVATOR CONTROL ROOM
STRETCHER-SIZED ELEVATOR
STRETCHER-SIZED ELEVATOR
PACKAGE ROOM
LOADING BERTH
ADA TOILET
ADA TOILET
SERVICE ENTRANCE, FOR SERVICE AND EGRESS ONLY
ADA COMPLIANCE DRINKING FOUNTAIN, TYP.
CONCRETE VEHICLE RAMP 1:7
ELEVATION DIFFERENT = 39.62' - 24.91' = 14.71'
REQUIRED RAMP LENGTH = 14.71' x 7 = 102.97'
ACTUAL RAMP LENGTH = 103.0' ..OK
PROVIDE EGRESS PATH PAINT MARKING LEADING TO EXIT, TYP.
REFUSE CHUTE, TYP.
MAILBOX
MAILBOX
ENTRANCE EL: 40.08'
ENTRANCE EL: 40.08'
ENTRANCE EL: 43.49'
LINE OF ALUMINUM AWNING ABOVE, TYP.
30TH STREET
EL: 44.56'
EL: 44.17'
EL: 39.67'
EL: 40.24'
EL: 39.62'
EL: 39.91'
EL: 39.91'
EL: 39.91'
EL: 43.16'
EL: 43.16'
EL: 39.03'
T.O.S. EL: 3
T.O.S. EL: 39.91
T.O.S. EL: 43.16'
T.O.S. EL: 39.91'
T.O.S. EL: 39.91'
A-A A-301
3 A-202
7 A-202
4 A-203
14'-5"
5'-0"
5'-0"
5'-8"
5'-8"
4'-8"
12'-8"
62'-5"
20'-1"
143'-2"
13'-0"
4'-0"
14'-0"
2'-6"
86'-5"
39'-2"
159'-3"
43.83'
28'-8"
15'-6"
15'-1"
9'-2"
7'-0"
7'-6"
7'-6"
6'-6"
6'-6"
6'-8"
6'-8"
6'-3"
6'-0"
4'-0"
8'-11"
8'-10"
4'-2"
4'-11"
7'-8"
7'-0"
6'-0"
5'-8"
3'-8"
3'-4"
3'-0"
2'-10"
2'-0"
1'-6"
1'-0"
35'-8"
32'-8"
71'-1"
14'-1"
8'-5"
4'-2"
3'-8"
9'-8"
4'-0"
33'-0"
UP
DN
EXIT
SLOPE 1:48
SLOPE 1:20
SLOPE 1:48
SLOPE 1:20
SLOPE 1:48
SLOPE 1:20




1 ENV-4 SOIL VAPOR EXTRACTION SYSTEM SECOND FLOOR PLAN

SCALE: 5/32" = 1'-0" (ARCH D)

| Scale |
|---|
| =10 Feet |
| = 50 Feet |

LEGEND

4" Schedule 40 Cast Iron Riser Pipe

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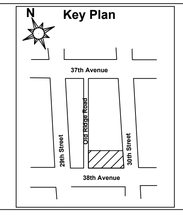
## General Notes

Adapted from MEI Architect PLLC: *SECOND FLOOR PLAN*, A-103.00, Drawn by S.M, 9/26/2020

| No. | Revision/Issue | Date |
|---|---|---|
| | | |
| | | |
| 2 | AS BUILT | 2/20/25 |
| 1 | AS BUILT | 11/26/24 |


ATHENICA ENVIRONMENTAL ENGINEERING PLLC
Environmental Engineering Consultants
31-33 31ST STREET, 2ND FLOOR
ASTORIA, NEW YORK 11106


Key Plan




Drawn By: Evan Greenberg, E.I.T.

Checked By: Spiro Dongaris, P.E.

29-05 38th Avenue
BCP Site

Address:
37-42 30th Street
Long Island City
New York 11101

Drawing Title:
**SVE SYSTEM SECOND FLOOR PLAN**

Drawing No.:
ENV-4

Date:
2/20/24

Project No.
21-134-0741

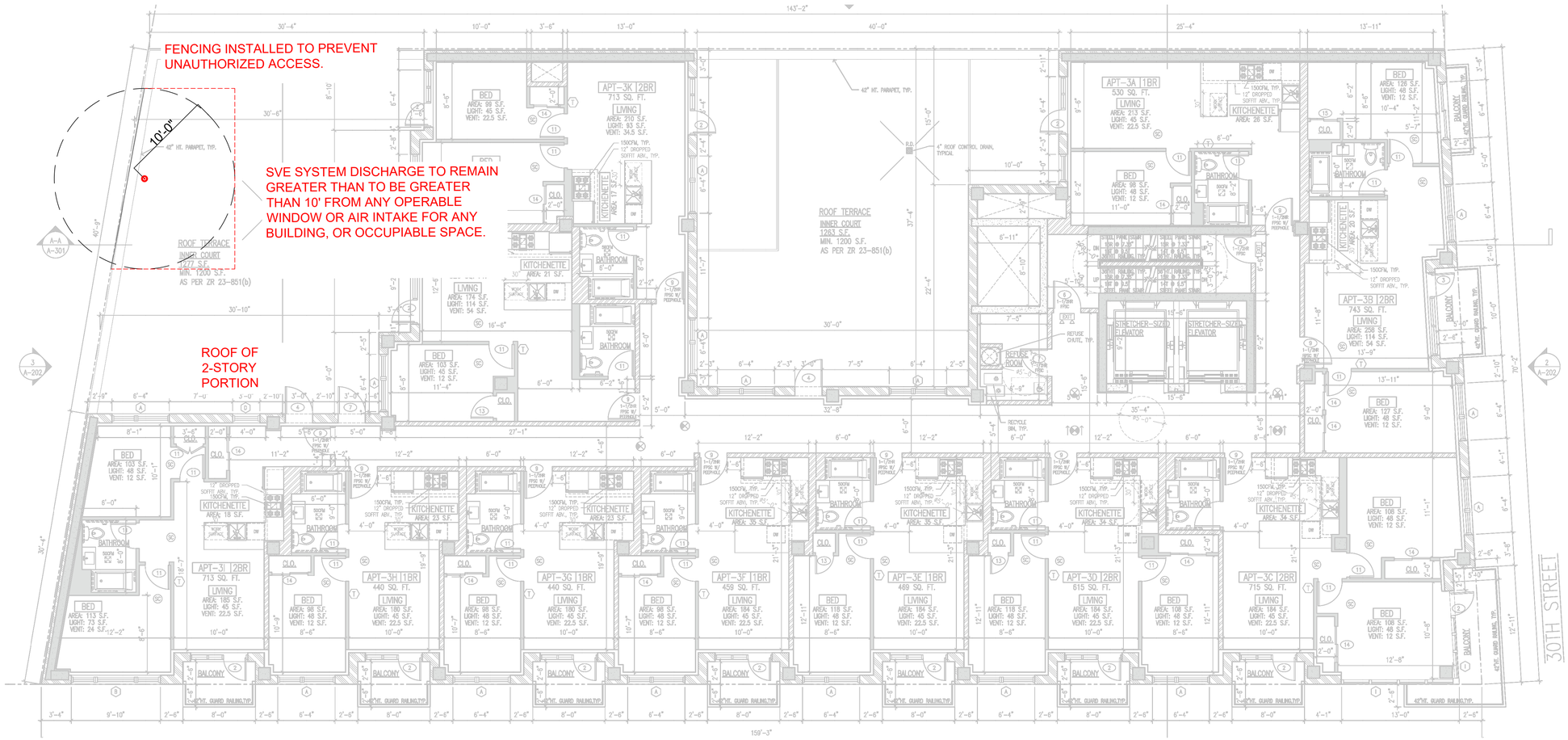
Prepared for:
FH2BRO Builder Corp.

Scale
5/32" = 1'-0" (ARCH D)

Certification

STATE OF NEW YORK
SPIRO I DONGARIS
095954
LICENSED PROFESSIONAL ENGINEER

Athenica Environmental Engineering, PLLC




1 ENV-5 SOIL VAPOR EXTRACTION SYSTEM THIRD FLOOR PLAN

SCALE: 5/32" = 1'-0" (ARCH D)

| Scale |
|---|
| =10 Feet |
| = 50 Feet |

LEGEND

4" Schedule 40 Cast Iron Riser Pipe

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Athenica Environmental Engineering, PLLC

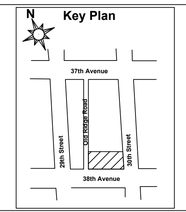
**General Notes**

Adapted from MEI Architect PLLC: *THIRD FLOOR PLAN*, A-104.00, Drawn by S.M, 9/26/2020

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ATHENICA ENVIRONMENTAL ENGINEERING PLLC
Environmental Engineering Consultants
31-33 31ST STREET, 2ND FLOOR
ASTORIA, NEW YORK 11106

**Key Plan**




Drawn By: Evan Greenberg, E.I.T.

Checked By: Spiro Dongaris, P.E.

29-05 38th Avenue
BCP Site

Address:
37-42 30th Street
Long Island City
New York 11101

Drawing Title:
**SVE SYSTEM THIRD FLOOR PLAN**

Drawing No.:
ENV-5

Date:
2/20/24

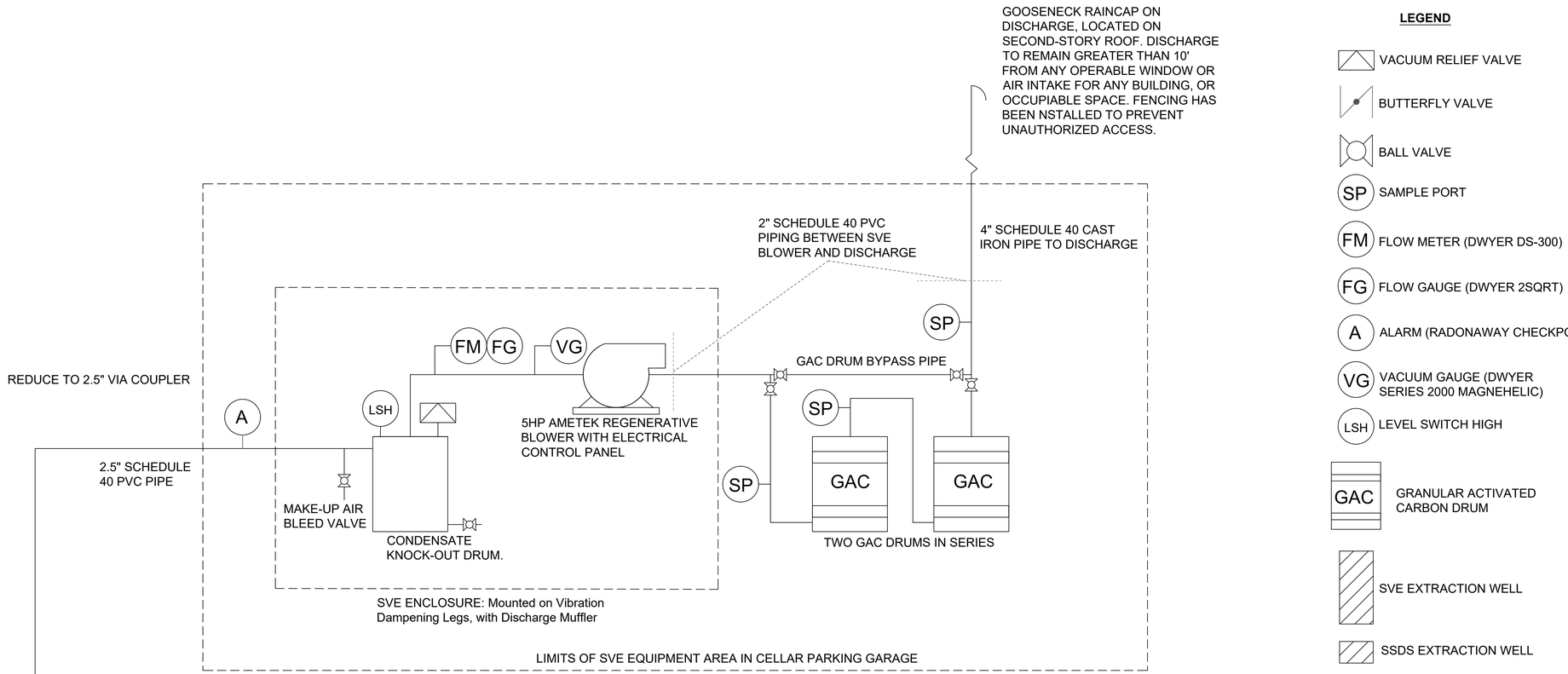
Project No.
21-134-0741

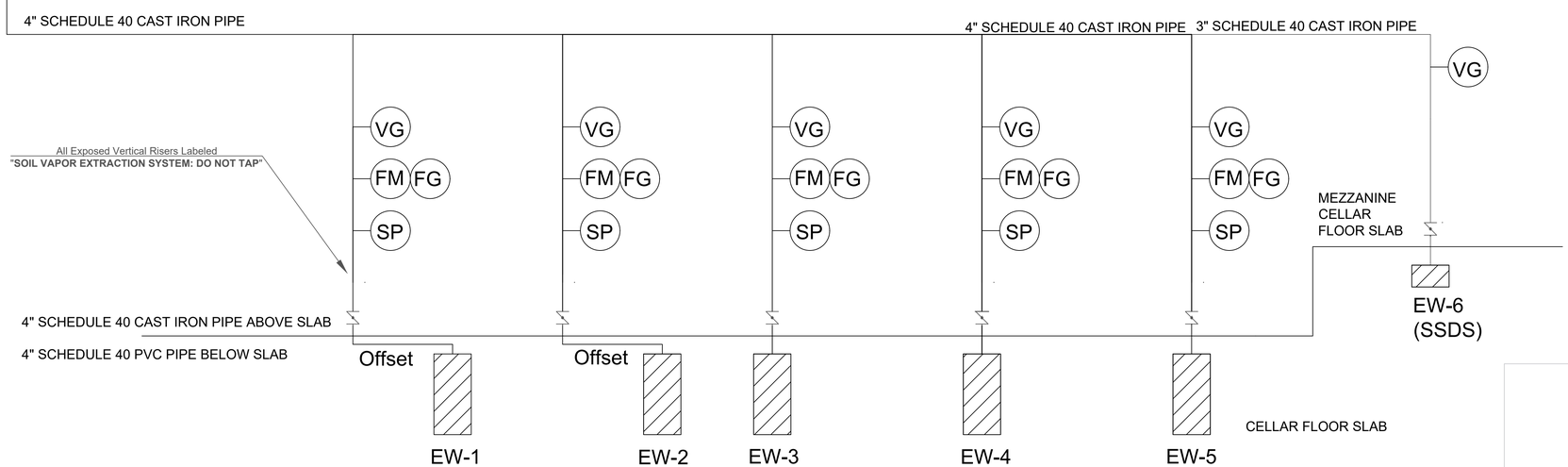
Prepared for:
FH2BRO Builder Corp.

Scale
5/32" = 1'-0" (ARCH D)

Certification






1 ENV-6 SOIL VAPOR EXTRACTION SYSTEM PIPING AND INSTRUMENTATION DIAGRAM
SCALE: N.T.S.

**LEGEND**

- VACUUM RELIEF VALVE
- BUTTERFLY VALVE
- BALL VALVE
- SP — SAMPLE PORT
- FM — FLOW METER (DWYER DS-300)
- FG — FLOW GAUGE (DWYER 2SQRT)
- A — ALARM (RADONAWAY CHECKPOINT II)
- VG — VACUUM GAUGE (DWYER SERIES 2000 MAGNEHELIC)
- LSH — LEVEL SWITCH HIGH
- GAC — GRANULAR ACTIVATED CARBON DRUM
- SVE EXTRACTION WELL
- SSDS EXTRACTION WELL

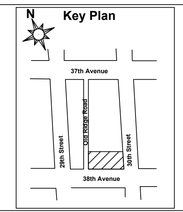
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Environmental Engineering Consultants
31-33 31ST STREET, 2ND FLOOR
ASTORIA, NEW YORK 11106

Key Plan

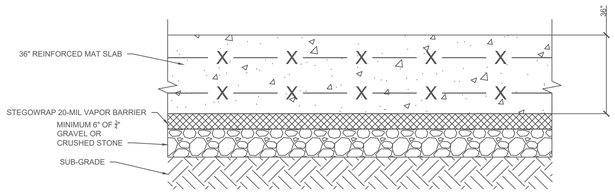



Drawn By: Evan Greenberg, E.I.T.
Checked By: Spiro Dongaris, P.E.
29-05 38th Avenue BCP Site
Address: 37-42 30th Street Long Island City New York 11101
Drawing Title: SVE SYSTEM PIPING AND INSTRUMENTATION DIAGRAM
Drawing No.: ENV-6
Date: 2/20/24
Project No.: 21-134-0741
Prepared for: FH2BRO Builder Corp.
Scale: N.T.S.

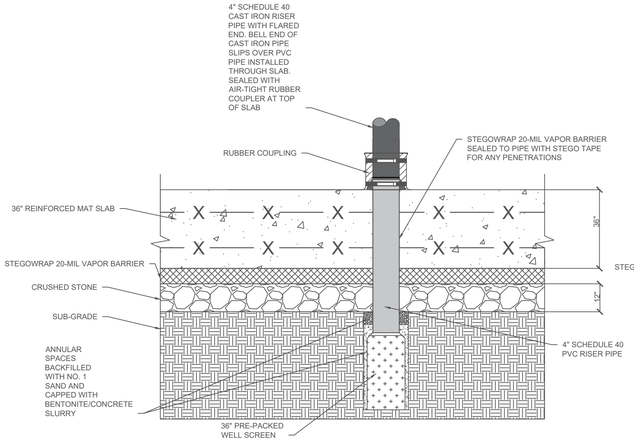
Certification

STATE OF NEW YORK SPIRO I DONGARIS 095954 LICENSED PROFESSIONAL ENGINEER

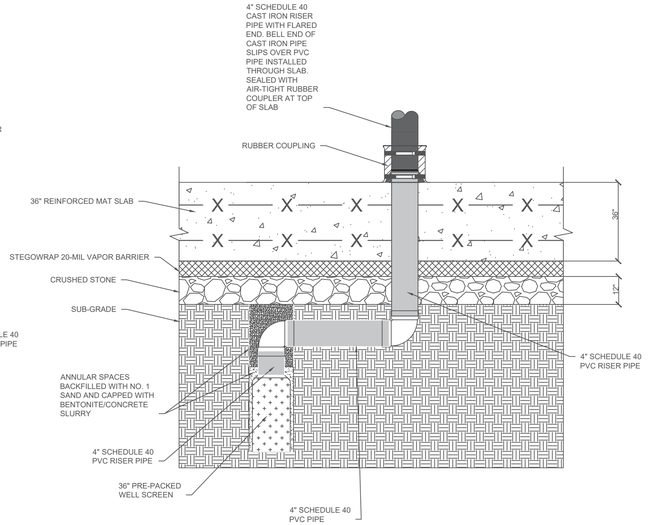
Athenica Environmental Engineering, PLLC



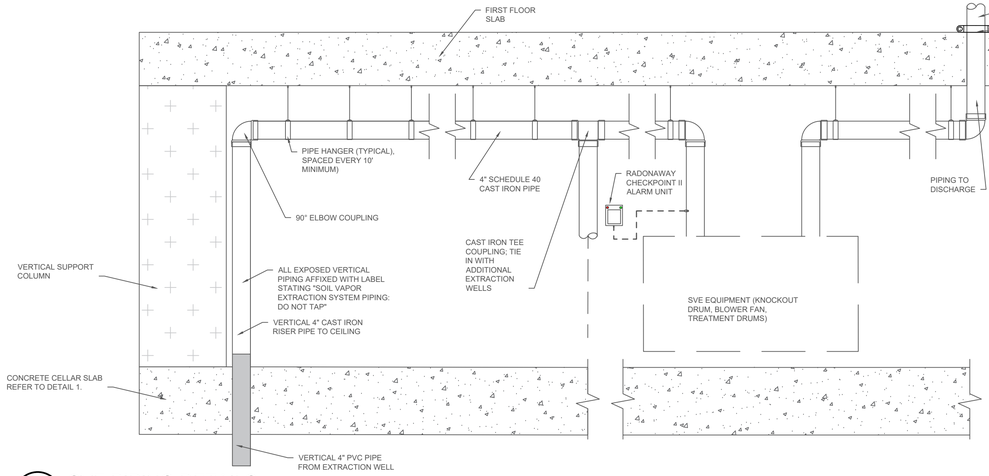

1 ENV-7 **TYPICAL SLAB DETAILS**
SCALE: N.T.S.



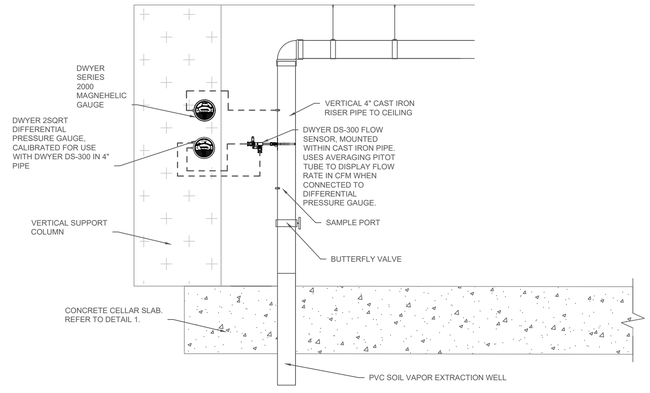

2 ENV-7 **SOIL VAPOR EXTRACTION WELL DETAILS**
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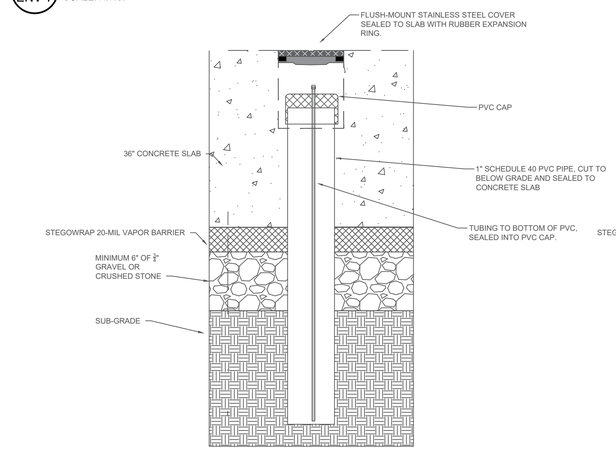

3 ENV-7 **OFFSET SOIL VAPOR EXTRACTION WELL DETAILS**
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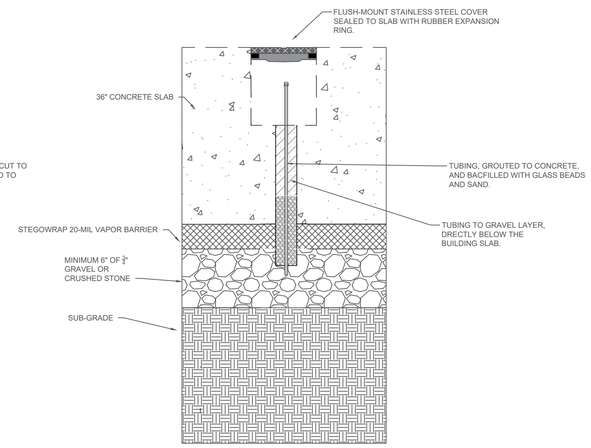

4 ENV-7 **SVE PIPING DETAILS**
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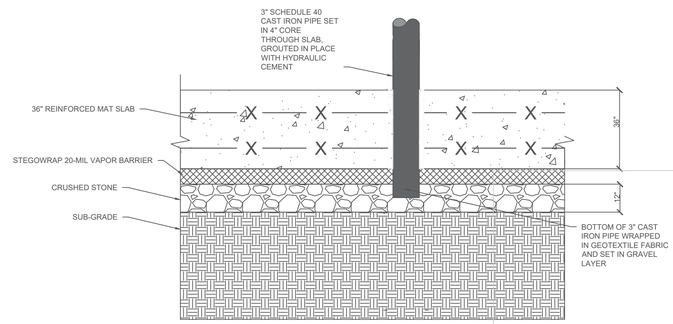

5 ENV-7 **RISER PIPE AND SVE EQUIPMENT DETAILS**
SCALE: N.T.S.




6 ENV-7 **SVE MONITORING POINT DETAILS**
SCALE: N.T.S.




7 ENV-7 **SUB-SLAB MONITORING POINT DETAILS**
SCALE: N.T.S.




8 ENV-7 **SSDS EXTRACTION WELL DETAILS**
SCALE: N.T.S.

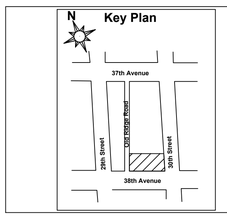
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ATHENICA ENVIRONMENTAL ENGINEERING PLLC
Environmental Engineering Consultants
31-33 31ST STREET, 2ND FLOOR
ASTORIA, NEW YORK 11106


Drawn By: Evan Greenberg, E.I.T.

Checked By: Spiro Dongaris, P.E.

29-05 38th Avenue BCP Site

Drawing Title: SVE SYSTEM DETAILS

Address: 37-42 30th Street Long Island City New York 11101

Drawing No.: ENV-7

Date: 2/20/24

Project No. 21-134-0741

Prepared for: FH2BRO Builder Corp.

Scale N.T.S.

Certification

STATE OF NEW YORK · SPIRO I DONGARIS · LICENSED PROFESSIONAL ENGINEER · 095954



# APPENDIX F – QUALITY ASSURANCE PROJECT PLAN

# QUALITY ASSURANCE PROJECT PLAN

## 29-05 38th Avenue
## Long Island City, New York 11101

**Site Number C241250**

Prepared on Behalf of:

FH 2BRO Builder Corp.
40-39 27th Street
Long Island City, New York 11101

Prepared By:

Athenica Environmental Engineering PLLC
45-09 Greenpoint Avenue
Long Island City, New York 11104

August 2022

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## 1.0 INTRODUCTION

This Construction Quality Assurance Plan (CQAP) presents the organization, objectives, planned activities, and quality assurance/quality control (QA/QC) procedures associated with the Remedial Action Work Plan (RAWP) for the property located at 29-05 38th Avenue in the Long Island City section of Queens, New York (the "Site"). The Site has been designated by the NYSDEC as Site Number C241250. Investigation and remediation (if warranted) at the Site will be conducted under the New York State Brownfield Cleanup Program (BCP).

### 1.1 Construction Activities

The CQAP for the remedial construction activities presents the QA/QC requirements for the following project tasks anticipated during construction.

- In-Situ treatment of PCE-contaminated groundwater,
- Soil Erosion and Sediment Control Measures;
- Excavation of contaminated soils,
- Traffic Control, and
- Site Development

### 1.2 Material Sampling

The CQAP presents specific protocols for required field testing, material handling and storage, chain-of-custody, laboratory analysis, and data handling and management and is based on guidance provided by the United States Environmental Protection Agency (EPA) and the New York State Department of Environmental Conservation (NYSDEC). The data generated by the analysis of samples generally will be utilized to evaluate the completeness of remedial actions and to document remaining contaminant levels after remediation.

## 2.0 PROJECT ORGANIZATION AND RESPONSIBLITIES

The Site Owner and NYSDEC Brownfield Cleanup Program Volunteer is FH 2BRO Builder Corp. (the "Volunteer"). The Contractor to complete the excavation and development activities is All State 12. Athenica Environmental Engineering, PLLC (/or Athenica) is the environmental consultant and remedial engineer for the Volunteer. Athenica will coordinate and manage, in conjunction with the Volunteer and/or their designee, site sampling and analytical program, material testing, data reduction, QA/QC data validation, analysis and report. Athenica will direct the sampling activities, and coordinate laboratory and remediation activities.

The project organization and key personnel for Athenica are listed below.

| | |
|---|---|
| Principal-In-Charge/Project Director: | Spiro Dongaris, P.E. |
| Program Manager: | Kenneth Wenz, P.G. |
| Quality Control Officer: | William Silveri, C |

Athenica's Principal-in-Charge and Project Director for this project will be Spiro Dongaris, a New York State-licensed Professional Engineer with more than 30 years of technical and management experience in the environmental engineering and consulting field. Mr. Dongaris has worked extensively with state and local agencies on numerous site investigation and remediation projects throughout New York City and the surrounding area, including Brownfield Sites. He has extensive knowledge and experience in environmental engineering, site assessments and construction management, in cost estimating and negotiating of bids, and oversees all aspects of the firm's work in these areas. As Principal of Athenica, he is responsible for the firm's overall commitment of resources to a project and its successful completion. In addition, he also oversees work in industrial hygiene, public safety and occupational health, and engineering design.

Mr. Dongaris will provide overall project administration and will be responsible for all top management decisions and overall oversight. In addition, as a New York State-licensed Professional Engineer, he will also serve as the Professional Engineer for this contract, actively participating in designing remediation systems and preparing design documents/drawings. As Professional Engineer, Mr. Dongaris will sign and seal design documents, as required by law.

Kenneth Wenz, Jr., Senior Project Manager at Athenica, will serve as the Project Manager for this project. Mr. Wenz has more than 34 years of experience in the environmental field, including both consulting and regulatory positions, and is a Licensed Professional Geologist in New York, a Registered Professional Geologist in Pennsylvania, a Licensed Environmental Professional in Connecticut, and a Certified Professional Geologist. He has managed and implemented numerous investigation and remediation projects in New York City, New York State, New Jersey, Connecticut, Pennsylvania, Illinois, and Vermont, which have included Brownfield projects, federal and state Superfund investigation and remediation programs, state and local programs (e.g., NJ ISRA, CT RSR, NYCOER, etc.), petroleum spills, and property transfers (Phase I/II/III ESAs), as well as soil, soil vapor, sediment, and water assessment and remediation programs for numerous commercial, industrial, and government clients. His experience includes scoping, conducting,

managing, and providing data assessment and technical review of deliverables for hundreds of Phase I ESAs, Phase II ESAs, and remediation projects. As such, he has substantial experience with all phases of environmental investigation/remediation, and with implementing such programs in compliance with all applicable environmental regulations.

As Project Manager, he will be responsible for the overall technical performance, budget management, and schedule execution for the program, and will serve as liaison on behalf of the Volunteer with regulatory personnel and stakeholders, as needed. Mr. Wenz will also provide project evaluation, technical input, and review of project deliverables, to ensure that all work meets all applicable project requirements as well as our exacting quality standards and will oversee all project staff and validate scopes of work to ensure that all project deliverables are provided on time.

William Silveri will serve as the Quality Control Officer for this contract. Mr. Silveri has over 30 years of experience in the environmental consulting field, and is a Licensed Professional Geologist in New York and a Certified Hazardous Materials Manager. He has managed and conducted numerous environmental investigation and remediation projects in the New York City area, which has included substantial experience in report preparation, data review and assessment, and technical review of project deliverables (reports, specifications, etc.) prepared by others. As Quality Control Officer, he will be responsible for detailed technical review and evaluation of laboratory data, as well as providing quality control review of project deliverables, to ensure that all work plans, reports, specifications, etc. meet the quality and technical standards of Athenica

In addition, Athenica will utilize subcontractors for drilling, ISCO injections, laboratory services, and data validation, as described in the RAWP. Once determined, the names of the selected subcontractors will be provided to the NYSDEC.

York Analytical Laboratories (York), Inc. of Stratford, Connecticut, a NYSDOH ELAP-approved laboratory, will perform the required analysis of the RAWP and will include the following analysis of soil and groundwater samples:

- Volatile Organic Compounds (VOCs) by USEPA Method 8260C.

## 3.0 QUALITY ASSURANCE OBJECTIVES

This section establishes the QA objectives for measurements that are critical to the project. The QA objectives are developed for relevant data quality indicators and include the following:

- Method detection limit (MDL),
- Reporting limit (RL),
- Precision, accuracy, completeness,
- Representativeness,
- Comparability, and
- Sensitivity.

The above data quality objectives (DQOs) are based on project requirements and ensure: (1) that the data generated during the project are of known quality and (2) that the quality is acceptable to achieve the project's technical objectives.

Quantitation Limits are laboratory-specific and reflect those values achievable by the laboratory performing the analyses. However, 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 analytical methods to be used at this site will provide a level of data quality and can be used to evaluate potential impacts to soil, soil vapor, and groundwater compared to New York State Standards, Criteria and Guidance values, and for purposes of risk assessment.

The overall QA objective is to develop and implement procedures for field sampling, chain-of-custody, laboratory analysis, and reporting that 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 instruments calibration, laboratory analysis, reporting of data, internal quality control, and corrective action are described in other sections of the QAPP.

The DQOs for soil samples for this project include minimum RLs specified within the 2005 NYSDEC ASP, as well as restricted residential use criteria listed in 6 New York Codes, Rules and Regulations (NYCRR) Part 375.

The data quality objectives for analysis of soil and groundwater samples are summarized in Tables 1 and 2.

### 3.1 Required Quantification Limit

The required quantification limit is the quantitative analytical level for individual analytes needed to make decisions relative to the objectives of the project. Quantitative limits may be expressed as the MDL or some quantitative level defined in terms relative to the program. It should be noted that there is some ambiguity in the definitions and use of terms that define quantification limits. The MDL presented herein is a well-defined and accepted entity, although attainable only under ideal laboratory conditions.

**Method Detection Limit**: The MDL is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. MDL is determined from analysis of a sample in a given matrix type containing the analyte.

**Practical Quantitation Limit:** The practical quantitation limit (PQL) (also referred to as the RL) is the concentration in the sample that corresponds to the lowest concentration standard of the calibration curve.

### 3.2 Accuracy

The laboratory objective for accuracy is to equal or exceed the accuracy demonstrated for the applied analytical method on similar samples. Percent Recovery Criteria, published by the NYSDEC as part of the ASP, and those determined from laboratory performance data are used to evaluate accuracy in matrix (sample) spike and blank spike quality control samples. A matrix spike and blank spike will be performed once for every sample delivery group (SDG) as specified in the ASP-CLP. Other method-specific laboratory QC samples (such as laboratory control samples and continuing calibration standards) may also be used in the assessment of analytical accuracy. Sample (matrix) spike recovery is calculated as:

%R = (SSR-SR)/SA x 100,
where:
SSR = Spiked Sample Result
SR = Sample Result, and
SA = Spike Added

### 3.3 Precision

Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a quantitative measure of the variability of a group of measurements compared to their average value. The overall precision of measurement data is a mixture of sampling and analytical factors. Analytical precision is easier to control and quantify than sampling precision; there are more historical data related to individual method performance and the "universe" is not limited to the samples received in the laboratory. In contrast, sampling precision is unique to each site or project. Overall system (sampling plus analytical) precision will be determined by analysis of field duplicate samples. Analytical results from laboratory duplicate samples will provide data on measurement (analytical) precision. The laboratory objective for precision is to equal or exceed the precision demonstrated for the applied analytical methods on similar samples. Precision is evaluated by the analyses of laboratory and field duplicates. Field duplicates will be collected at a frequency of one per 10 environmental samples of each type.

Relative Percent Difference (RPD) criteria are used to evaluate precision between duplicates, using the equation below:

RPD = 100 x [2(X1 - X2) / (X1 + X2)]
where:
X1 and X2 are reported concentrations for each duplicate sample and subtracted differences represent absolute values.

Criteria for evaluation of laboratory duplicates are specified in the applicable methods. The objective for field duplicate precision is < 50% RPD for all matrices. Precision is not calculable where the analyte is not detected in one or both of the sample and duplicate. The absolute difference between the results (X1 - X2) may be a more appropriate measure of analytical precision where the reported concentrations are low (i.e., less than five times the RL).

Data quality objectives (DQOs) for measurement data in terms of sensitivity precision, accuracy, representativeness, comparability, and completeness are established so that the data collected are sufficient and of adequate quality for their intended use. Data collected and analyzed in conformance with the DQO process described in this QAPP will be used in assessing the uncertainty associated with decisions related to this site.

### 3.4 Completeness

The goal of completeness is to generate the maximum amount possible of valid data. The highest degree of completeness would be to find all deliverables flawless, valid, and acceptable. The lowest level of completeness is excessive failure to meet established acceptance criteria and consequent rejection of data. The completeness goal is 95 percent useable data. However, it is acknowledged that this goal may not be fully achievable; for example, individual analytes may be rejected within an otherwise acceptable analysis; or some sampling locations may not be accessible. The impact of rejected or unusable data will be determined on a case-by-case basis. If the study can be completed without the missing datum or data, no further action would be necessary. However, loss of critical data may require re-sampling or reanalysis.

### 3.5 Representativeness

The representativeness of data is only as good as the representativeness of the samples collected. Sampling and handling procedures, and laboratory practices are designed to provide a standard set of performance-driven criteria to provide data of the same quality as other analyses of similar matrices using the same methods under similar conditions.

Representativeness is assessed qualitatively (there are no equations or numerical criteria for this data quality indicator).

## 3.6 Comparability

Comparability of analytical data among laboratories becomes more accurate and reliable when all labs follow the same procedure and share information for program enhancement. Some of these procedures include:

- Instrument standards traceable to National Institute of Standards and Technology (NIST), USEPA, or the New York State Department of Health or Environmental Conservation;
- Using standard methodologies;
- Reporting results for similar matrices in consistent units;
- Applying appropriate levels of quality control within the context of the laboratory quality assurance program; and,
- Participation in inter-laboratory studies to document laboratory performance.

By using traceable standards and standard methods, the analytical results can be compared to other labs operating similarly. The QA Program documents internal performance. Periodic laboratory proficiency studies are instituted as a means of monitoring intra-laboratory performance. Comparability is assessed qualitatively (there are no equations or numerical criteria for this data quality indicator).

## 3.7 Sensitivity

Sensitivity criteria are established so that reporting limits are adequate to verify the absence of a non-detected analyte at the applicable threshold concentration (e.g., regulatory limits or guidance values). Laboratory reporting limits will be reviewed prior to sample collection to verify that limits are appropriate for the specific analytes and matrices.

## 4.0 SAMPLING PLAN

Sampling for the Site will include confirmatory end-point soil sampling and performance monitoring and post-treatment groundwater sampling. Grab sampling using appropriate hand-held dedicated sampling equipment will be the preferred method for collection of end-point samples. Low-flow groundwater sampling methods will be utilized for collection of groundwater samples for laboratory analysis.

### 4.1 Excavated Soil Field Screening/Sampling

Excavation for the Site will be managed as an 8-cell grid, where each cell has an approximate footprint of 1,325 square feet. Each proposed cell will be excavated and stockpiled in 4-foot intervals to a final depth of 15 feet bgs. For stockpiles where chemicals of concern and/or petroleum contamination are identified during field screening, a grab sample will be collected at a frequency of one sample per very 100 cubic yards for analysis for volatile organic compounds (VOCs).

### 4.2 Confirmatory End-Point Soil Sample Collection

Confirmatory end-point soil samples will be collected from the excavation bottom in accordance with NYSDEC DER-10 Section 5.4(a). One (1) bottom sample will be collected for every 900 square feet of excavation bottom. End-point soil samples will be collected and submitted for laboratory analysis for VOCs only in accordance with the RAWP.

### 4.3 Performance Groundwater Sample Collection

During ISCO injections, groundwater quality will be evaluated at temporary groundwater monitoring wells to evaluate the performance of the ISCO remediation. For this purpose, field test kits provided by the manufacturer of the ISCO products and appropriate field instrumentation will be utilized. The field test kits will provide accurate quantitative measurements of persulfate in the groundwater. Appropriate field instrumentation will consist of a measuring pH, temperature, oxidation-reduction potential (ORP), and dissolved oxygen utilizing a Horiba Flow Cell equipped with appropriate monitors to measure these parameters. The field test kits are described in more detail in Appendix A.

### 4.4 Post-Treatment Groundwater Sample Collection

Representative groundwater samples will be collected from both temporary and permanent groundwater monitoring wells after well development, as described in the RIWP, utilizing dedicated sampling equipment. The groundwater sampling will follow USEPA's low-flow (minimal draw down) procedures that are summarized below and described in more detail in Appendix B.

The low-flow sampling procedure was designed to facilitate collection of groundwater samples that reflect total mobile organic and inorganic contaminant levels in the groundwater, with minimal physical and chemical alterations caused by the sampling event.

The low-flow groundwater sampling procedure will include the following general steps:

1. An appropriate, dedicated sampling pump will be selected for use at the Site;
2. The pump intake will be placed at least 2 feet above the bottom of the well screen;
3. Prior to purging, the depth to groundwater will be measured utilizing a groundwater interface meter and recorded on a well purging purge form;
4. Groundwater will be purged at a flow rate that causes the groundwater level to be lowered (i.e., drawdown) by no more than 0.3 feet;
5. During purging, depth to groundwater will be periodically measured to allow adjustment of the groundwater flow rate to minimize any drawdown;
6. After the water level in the monitoring well has stabilized, purged water will be conveyed to a flow-through cell to allow for monitoring of the following indicator field parameters, including turbidity, temperature, specific conductance, pH, Oxidation/Reduction Potential (ORP), and dissolved oxygen (DO);
7. During the well purging, the above indicator parameters will be measured at least every 5 minutes;
8. Purging will cease after stabilization of these indicator parameters. Stabilization is considered to be achieved when three consecutive readings are within the following limits:
    - Turbidity = less than 5 NTUs or 10 percent for values greater than 5 NTUs.
    - DO = less than 0.5 mg/L or 10 percent for values greater than 0.5 mg/L.
    - Specific Conductance = 3 percent of prior reading.
    - Temperature = 3 percent of prior reading.
    - ORP = plus or minus 10 millivolts of prior reading.
9. After stabilization of indicator parameters, the tubing from the pump will be disconnected from the flow-through-cell, and representative groundwater samples will be collected directly from the pump's tubing;
10. After completion of purging, samples will be collected using the same equipment (i.e., pump and tubing) that were utilized for purging.

### 4.4 Sample Handling

As noted above and in the RAWP, all soil and groundwater samples will be collected using new, dedicated sampling equipment. As a result, field decontamination of equipment will not be conducted as part of this site characterization. Representative soil samples will be collected directly from the acetate sleeve of the direct-push boring or dedicated hand-held sampling equipment. For VOC analysis, a discrete soil sample will be collected from the desired sampling depth utilizing a dedicated Encore™ sampler or Terra Core sampling kit that includes a dedicate

sample plunger. Representative groundwater samples will be collected from temporary or permanent groundwater monitoring wells after well development, utilizing dedicated sampling equipment. The groundwater sampling will follow USEPA's low-flow (minimal draw down) procedures that are summarized below and described in more detail in Appendix B.

### 4.4.1 Sample Identification/Labeling

Immediately upon collection, each sample will be labeled with an adhesive label. This sample label contains the authoritative information for the sample, including the Site name, date and time of sampling, sampler's initials, tests to be performed, preservative (if applicable), and a unique sample identifier. The unique identifier for each sample will include, at a minimum, the sample location and (where applicable) sample horizon (e.g., S-1 12-14', WC-3S, SV-2). This information will also be included on the chain of custody forms that will accompany the samples to the laboratory.

### 4.4.2 Sample Containers and Preservation

The analytical laboratory will supply appropriate sample containers for the media that will be sampled during this program. The containers will be pre-preserved, where appropriate. Table 3 provides a summary of the sample preservation and containerization requirements.

Soil samples submitted for VOC analysis will be collected by utilizing Encore™ samplers or field-preserved using methanol (i.e., Terra Core sampling kits). Groundwater samples submitted for VOC analysis will be preserved to a pH of ≤ 2 with hydrochloric acid (HCl. The laboratory will provide all required Encore™ samplers or Terra Core sampling kits, -and preserved 40-mL VOC vials. All soil and groundwater samples will also be preserved by cooling to $4^{o}$ C.

### 4.4.3 Equipment Decontamination

Non-dedicated sampling equipment will be decontaminated between each use in the following manner:

- Wash and scrub with non-phosphate detergent (e.g., Alconox) and potable water solution, and
- Rinse with potable water.

## 4.5 Field Quality Assurance

Field quality assurance/quality control samples associated with the generation of environmental data typically include field (equipment rinsate) blanks; field duplicates; and trip blanks. The sampling frequency of these field-related QA/QC samples are discussed below and summarized in Table 4.

### 4.5.1 Equipment (Rinsate) Blanks

The purpose of an equipment blank is to determine if contaminants have been introduced through contact with sampling equipment. As dedicated sampling equipment will be utilized, no use of equipment blanks is anticipated.

### 4.5.2 Field Duplicate Samples

The purpose of duplicates is to evaluate precision. Duplicates will be collected at a frequency of 1 per 20 samples of soil or groundwater and will be analyzed for the same parameters as the environmental sample. A field duplicate sample is a co-located sample or a sample that is divided into two from the same sampling location and depth.

### 4.5.3 Trip Blanks

The purpose of a trip blank is to identify any VOC-related contamination that occurred during transportation of the samples. The trip blank travels along with empty glassware from the lab to the Site and returns from the Site with the collected sampled. A trip blank will be submitted to the laboratory at a frequency of one sample per each groundwater sampling event and will be analyzed for VOCs.

## 4.6 Laboratory Quality Assurance

Method-required laboratory quality assurance includes an instrument performance check; calibration check; and method blank analysis for each group of 20 or fewer samples. In addition, internal standards are added to every sample (environmental samples and laboratory QA/QC samples). Laboratories typically perform additional QC, such as spikes, laboratory duplicates, and laboratory control samples. The frequency of these analyses is specified in the laboratory's analytical SOP for the method and is discussed below and summarized in Table 4.

### 4.6.1 Instrument Performance Check

The instrument performance check verifies the operation of the GC/MS and verifies that it mees tuning and mass spectral abundance criteria prior to sample data acquisitions.

### 4.6.2 Calibration Checks

An initial five-point calibration check must be performed after the instrument performance check but prior to the analysis of blanks and samples. Concentrations of the calibration standards should be selected to span the concentration range of interest. One of the concentrations of the initial calibration must be the same as the daily calibration check.

On a daily basis, a single-point calibration check must be analyzed (with each group of 20 or fewer samples). The percent difference (%D) for each compound in the daily calibration check should

be within ±30 percent of the response determined in the initial calibration in order to proceed with sample analysis. If the %D criteria are not met, a new five-point calibration should be performed.

### 4.6.3 Method Blanks

Method blanks are used to assess the background variability of the method and to assess the introduction of contamination to the samples by the method, technique, or instrument as the sample is prepared and analyzed in the laboratory.

The method blank should not contain any target analytic at a concentration greater than its quantitation level (reporting limit; typically, three times the MDL) or its action level, whichever is more stringent. Method blanks are analyzed at a frequency of one for every 20 samples analyzed, or every analytical batch, whichever is more frequent.

### 4.6.4 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Site-specific MS/MSD samples will be submitted at a rate of one per 20 samples, for soil and groundwater samples collected during this sampling program.

### 4.6.5 Internal Standards

Internal standards (IS) are added to every sample analyzed for VOCs (in any matrix). Sample-specific IS recovery should be 40 percent or less of the mean response in the most recent valid calibration.

## 5.0 CONSTRUCTION QUALITY CONTROL

All Contractor QA/QC procedures will adhere to industry standards and will follow generally accepted practices as well as complying with applicable ASTM standards.

### 5.1 Mobilization

Preparation of the Site for remedial activities will involve the setup of temporary support facilities (i.e., electrical power, water, telephone service, security, etc.) and the following mobilization and Site preparation activities:

- Identification and mark out of all aboveground and underground utilities;
- De-energizing, turning off and disconnecting existing subsurface utility services known to be present in the work area (e.g., water, gas, electric, and sewer);
- Mobilization of remediation equipment and materials;
- Traffic control measures;
- Work zone demarcation;
- Installation of erosion control devices;
- Installation of perimeter air monitoring system;
- Removal of concrete at or below the surface of the Site;
- Installation of temporary facilities; and
- Installation of decontamination facilities.

### 5.2 Decontamination Plan

The objective of the decontamination plan at the Site is to provide the procedures and equipment necessary to decontaminate personnel and equipment and prevent cross-contamination from the excavation area to public areas (i.e., highways, roads, support zones, vehicles, etc.). If impacted materials are encountered, the decontamination procedures for personnel and equipment are outlined below.

The Contractor will establish decontamination areas for the following:

- Personnel decontamination
- Equipment decontamination
- Vehicle decontamination

#### 5.2.1 Personnel Decontamination

A personnel decontamination station where employees can drop equipment and remove personal protective equipment (PPE) will be set up by the Contractor. It will be equipped with trash

bag(s), or cans for containing disposable PPE and discarded materials. Once personnel have decontaminated at this station and taken off their PPE, they will proceed to an area where they will wash themselves, as necessary, wherever they have potentially been exposed to any contaminants (e.g., hands, face, etc.).

The following specific decontamination procedure will be used as necessary by Athenica personnel or subcontractor personnel wearing PPE from Level D through Level C.

- ***Step 1*** – Equipment drop (respirator, tools, monitoring equipment, etc.). Decontaminate as appropriate (per Athenica's field representative's instructions).
- ***Step 2*** – Boot wash/rinse (wash with non-foaming detergent, rinse with fresh water spray). Remove boots. If inner and outer gloves are worn, wash outer gloves, remove and save for later use, or remove and discard outer gloves and place in trash bag/can provided in the decontamination area.
- ***Step 3*** – Hard hat removal; wash if visibly contaminated (use same wash as in Step 2).
- ***Step 4*** – If Tyvek® (or equivalent) suit was worn and is visibly contaminated, remove and place in trash bag/can provided in the decontamination area or decontaminate (wash) and store for reuse. Contaminated washable coveralls should be removed and bagged for washing.
- ***Step 5*** – Respirator and/or eye protection removal (as applicable). Wash (per Step 2) to remove visible contamination.
- ***Step 6*** – Remove outer gloves.
- ***Step 7*** – Wash potentially exposed skin (use water and soap at indoor sink).
- ***Step 8*** – Disinfect respirator per manufacturer's recommendations.

Contaminated PPE (gloves, suits, etc.) will be decontaminated and stored for reuse or placed in plastic bags (or other appropriate containers) and disposed of in an approved facility.

Decontamination wastewater and used cleaning fluids will be collected and disposed of in accordance with applicable state and federal regulations.

### 5.2.2 Heavy Equipment Decontamination

Heavy equipment decontamination will be performed by the Contractor within the limits of the Site in accordance with the contract specifications. No heavy equipment will be permitted to leave the Site unless it has been decontaminated.

Wastewater from the heavy equipment and personnel decontamination areas will be collected and disposed of in accordance with applicable state and federal regulations. The Contractor will be responsible for ultimate disposal of waste generated by decontamination.

### 5.2.3 Vehicle Decontamination

Trucks transporting soil off-site for ultimate disposal will enter the Site as described in the RAWP. Care will be exercised when loading trucks not to spill material on the outside of the trucks. Before exiting the Site, the trucks will be visually inspected (i.e., box sidewalls, box tailgate, tires, etc.), cleaned and decontaminated as necessary prior to being allowed to leave the Site. In addition, trucks will be required to be tarped prior to departing the Site. All collected soil and decontamination fluids will be collected and managed in accordance with the RAWP.

### 5.2.4 Decontamination Equipment Requirements

The following equipment, if required, should be in sufficient supply to implement decontamination procedures:

- Buckets
- Alconox™ detergent concentrate
- Hand pump sprayers
- Long handled soft bristle brushes
- Large sponges
- Cleaning wipes for respirators
- Bench or stool(s)
- Methanol and/or Nitric Acid
- Liquid detergent and paper towels
- Plastic trash bags

The Contractor performing decontamination procedures is responsible for verifying that the above materials, as required for their operation, are in sufficient supply.

## 5.3 Soil and Erosion Control Measures

Soil erosion and sediment control measures for management of storm water will be installed in accordance with the New York Guidelines for Urban Erosion and Sediment Control. Erosion and sediment control measures which will be limited to hay bales, will be installed around the entire perimeter of the remedial construction area and inspected daily and after any significant storm events to ensure that they are operating appropriately. Discharge locations will be inspected to determine whether erosion control measures are effective in preventing significant impacts to receptors. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the hay bale check functional.

Selected erosion and sediment control measures will be installed prior to ground disturbance and maintained through the duration of construction to minimize the discharge of pollutants and

prevent a violation of the water quality standards in conformance with the *New York Standards and Specifications for Erosion and Sediment Control* (November 2016). The erosion and sediment controls will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control. Details of standard erosion and sediment control measures were included as a component of the Proposed Development Plan Design submittal to New York City Department of Buildings (NYCDOB).

During remedial construction, erosion and sediment control measures will be inspected and maintained on a daily basis. Accumulated sediment will be removed from the erosion and sediment controls as needed. Sediment that originates from the excavated area will be added to the stockpile for off-site disposal. Construction activities shall be carried out so as to minimize erosion and silting in accordance with Soil Erosion and Sediment Control Requirements, and requirements of local and state authorities having jurisdiction.

## 5.4 Support and Protection of Existing Utilities

The Volunteer and its contractors are solely responsible for the identification of utilities that might be affected by work under the RAWP and implementation of all required, appropriate, or necessary health and safety measures during performance of work under the RAWP. The Volunteer and its contractors are solely responsible for safe execution of all invasive and other work performed under the RAWP. The Volunteer and its contractors must obtain any local, state, or federal permits or approvals pertinent to such work that may be required to perform work under the RAWP.

The Contractor will protect and support all identified Site features. In addition, the Contractor will repair any damage to protected structures and features during the remedial construction operations in accordance with applicable regulations and as approved by the Volunteer and/or Athenica.

## 5.5 Groundwater Treatment by In-Situ Chemical Oxidation

The remediation of PCE-contaminated groundwater consists of In-Situ Chemical Oxidation (ISCO) and is planned for an approximately 5,000-square-foot area at the southwest portion of the Site and at a depth from 25 to 27 feet bgs (the "Treatment Zone") . The scope of ISCO will include the use of chemical oxidants (potassium and sodium persulfate) that will be injected at 30 locations within the Treatment Zone. Direct push drilling unit, along with appropriate pumps and hosing, will be utilized for injection of the chemical oxidants into the Treatment Zone. It is anticipated that ISCO will occur prior to start of general construction activities. Further details on construction activities and associated QA/QC requirements will be provided to the NYSDEC under separate cover.

## 5.6 Excavation of Source Material

The remediation includes excavation and off-Site disposal of on-site soils in the upper 15 feet bgs across the entire site and of any contaminant source area(s) that may be found extending deeper

than 15 feet bgs. Approximately 6,000 cubic yards (CY) of contaminated soil will be removed for remediation. If any UST and associated piping or other structures are encountered during excavation, these will be removed and disposed of off-Site.

The Contractor is to verify quantities in the field of the actual in-place compacted volume of the excavation. Actual volumes will be based on field surveys by a Professional Surveyor licensed in the State of New York. This surveyor will prepare and submit a field survey and tabulation of the actual volume for review and approval by the Volunteer and Athenica.

Daily Activity Reports will be prepared and maintained on-site for compilation and record management by Athenica. Daily reports will be submitted to NYSDEC and NYSDOH Project Managers at minimum, once a week with the previous weeks' reports. Each Daily Report will include narratives discussing any problems encountered during the subject week, as well as a progress summary (i.e., material excavation volumes, material loading, air monitoring summary, etc.).

# 6.0 FIELD DOCUMENTATION AND CHAIN-OF-CUSTODY

## 6.1 Sample Collection Documentation

### 6.1.1 Field Notes

Field team members will maintain bound logbooks to document all field activities. Field logbooks will provide the means for recording field observations and data collection activities conducted during the investigation. Logbooks will be supported by (but not replaced by) standardized forms, including, but not limited to boring logs, groundwater sampling logs, and equipment calibration sheets.

### 6.1.2 Chain-of-Custody and Shipping

Chain-of-Custody forms will be utilized to document the path of sample containers from the Site to the laboratory. Sample/bottle tracking sheets or the Chain-of-Custody will be used to document the custody of the samples within the laboratory from sample receipt though completion of analysis. The project manager will notify the laboratory of upcoming field sampling events and the subsequent transfer of samples. This notification will include information concerning the number and type of samples and the anticipated date of arrival. Sample shipping containers (e.g., coolers) will be provided by the laboratory for shipping samples. All sample containers within each shipping will be individually labeled with an adhesive identification label provided by the laboratory.

In the event that collected samples require shipping (as opposed to sample pick-up by the laboratory or delivery to the laboratory by Athenica personnel), each sample shipping container will be sealed with two adhesive custody seals. The custody seals will be initialed by a member of the field sampling team.

## 6.2 Laboratory Custody Procedures

After accepting the custody of the shipping containers, the laboratory will document the receipt of the shipping containers by signing the COC records. The laboratory will perform the following tasks:

- 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 COC records;
- Compare samples received against those listed on the COC;

- 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 COC forms;
- Sign and date the COC 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 Athenica data manager;
- 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 completed COC, air bills, and any additional documentation will be placed in the project file.

## 7.0 CALIBRATION PROCEDURES

Field instruments will be calibrated according to the manufacturer's specifications. As previously discussed in Section 4.0, calibration procedures for laboratory instruments will consist of initial calibrations and as needed, continuing calibrations. Detailed descriptions of the calibration procedures for specific laboratory instruments are included in the laboratory's quality assurance plan.

Air monitoring instruments will be calibrated to a known reference gas standard and ambient air outside the work zone. Calibration will be completed daily. If concentrations of VOCs are encountered above the reference gas standard, the soil screening photoionization detector (PID) may be calibrated or re-checked against the reference gas standard. All 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, and the readings. The following equipment may be used during soil sampling activities.

End-Point Soil Sampling Activities:

- RAE Systems MiniRAE 3000 (PID) with 11.7 eV lamp or equivalent.
- MIE pDR 1200 with cyclone and pump [particulate monitor] or equivalent.

## 8.0 SAMPLE PREPARATON AND ANALYTICAL PROCEDURES

Soil and groundwater sampling will be completed in the manner specified in the RAWP. **Tables 1 and 2** provides a summary of the analytical methods for the analysis of collected soil and groundwater samples.

## 9.0 QUALITY MANAGEMENT

A senior Athenica representative will serve as the Quality Assurance and Quality Control Officer (QA/QC) for the project. This individual will no have direct project responsibility but will independently monitor the implementation of the RIWP. The primary duties of the QA/QC officer will be:

- Monitor the project in accordance with the requirement of this QAPP and the RIWP;
- Review the project to ensure that the overall data quality objectives are attained;
- Record any deviations and inform the Project Manager (PM) of any such deviations;
- Meet with the PM, as needed, to discuss compliance with the QAPP;
- Advise the PM of findings and recommend changes on methods to improve quality; and
- Verify that outside services meet the data objectives of the QAPP.

## 10.0 DATA REDUCTION, VALIDATION, AND REPORTING

Data validation activities will include the manual check of laboratory data tables and reduced data summary tables. A cycle of markup, revision, and trace checking shall be performed and a check by the PM will ensure data quality.

Conclusions and/or recommendations will be reviewed by one or more qualified peers of the professional who developed them to ensure their accuracy on the basis of acquired data and conducted analyses.

The guidance followed to perform quality data validation, and the methods and procedures outlined herein and elsewhere in the field sampling plan and remedial investigation work plan, pertain to initiating and performing data validation, as well as reviewing data validation performed by others (if applicable). An outline of the data validation process is presented here, followed by a description of data validation review summaries.

### 10.1 Laboratory Data Reporting and Reduction

The laboratory will meet the applicable documentation, data reduction, and reporting protocols as specified in the NYSDEC ASP Category B deliverable requirements.

In addition to the hard copy of the data report, the Electronic Data Deliverable (EDD) will be provided to NYSDEC in format pursuant to DER-10 requirements. The EDD will be generated, to the extent possible, directly from the laboratory's electronic files or information management system, to minimize possible transcription errors resulting from the manual transcription of data.

### 10.2 Data Validation

A subcontractor to Athenica will review and validate the soil, data. The data validator will be independent of the laboratory and independent of Athenica. Data validation will be performed by following guidelines established in the specific USEPA Region 2 SOPs.

Where necessary and appropriate, supplemental validation criteria may be derived from the USEPA Functional Guidelines (USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, USEPA 540/R-99/008; October 1999, and National Functional Guidelines for Inorganic Data Review, USEPA 540/R-04-004; October 2004), as appropriate.

Validation reports will consist of text results of the review and marked up copies of Form I (results with qualifiers applied by the validator). Validation will consist of target and non-target compounds with corresponding method blank data, spike and surrogate recoveries, sample data, and a final note of validation decision or qualification, along with any pertinent footnote references. Qualifiers applied to the data will be documented in the report text. The results of the

data validation will be presented in a data Usability Summary Report (DUSR) prepared by the validation subcontractor.

### 10.3 Data Usability

Subsequent to review of the items evaluated in the subcontractor's DUSRs, Athenica will then prepare a brief summary of the data usability. This summary, which will be provided as part of the RIR, encompassed both quantitative and qualitative aspects of the data usability.

The quantitative aspect is a summary of the data quality as expressed by qualifiers applied to the data; the percent rejected, qualified (i.e., estimated), missing, and fully acceptable data are reported. As appropriate, this quantitative summary is broken down by matrix, laboratory, or analytical fraction or method.

The qualitative element of the data usability summary is the QA officer's translation and summary of the validation reports into a discussion useful to data users. The qualitative aspect will discuss the significance of the qualifications applied to the data, especially in terms of those most relevant to the intended use of the data. The usability report will also indicate whether there is a suspected bias (high or low) in qualified data and will also provide a subjective overall assessment of the data quality.

### 10.4 Field Data

Field data collected during the field activity will be presented in tabular form with any necessary supporting text. Unless activities resulted in significant unexpected results, field data comments can be added as footnotes to the tables.

## 11.0 DOCUMENT CONTROL

Project documents will be maintained in a secure area of Athenica's office at 45-09 Greenpoint Avenue in Long Island City, Queens, New York. Access to these files will be limited to the PM, the Principal-in-Charge and those designated by the PM.

A system is established to ensure that only the latest authorized documents are employed to execute the work. This includes marking all previous versions "void" or "superseded" and/or sending communication to team members indicating the document is no longer valid and the new document should be used. The Quality Assurance Officer (QAO) or designee will periodically conduct review the document retention practices to ensure the new documents are being used.

The Principal-in-Charge, Project Manager, and/or QAO will be responsible for reviewing all documents for conformance.

Records of project activities will be maintained at Athenica's Office will be available for review, upon request.

## 12.0 CORRECTIVE ACTION

If unacceptable conditions are identified as a result of audits or field observations, the PM, Field Team Leader, and QAO will document the condition and initiate corrective procedures. The specific condition or problem will be identified, its cause will be determined, and appropriate action will be implemented.

The entire sampling program will be under the direction of the PM and QAO. The emphasis in this program is on preventing problems by identifying potential errors, discrepancies, and gaps in the data collection, laboratory analysis, and 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 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 Work Plan. Corrective actions are likely to be immediate in nature and most often will be implemented by the contracted laboratory analyst or the PM. The corrective action will usually involve recalculation, reanalysis, or repeating a sample run.

## 13.0 QUALITY RECORDS AND DOCUMENTATION

Project Quality Records, which provide evidence of conformance to the requirements of this document, will be kept in Athenica's corporate office. Records will be stored electronically in the project file, which will be maintained in a suitable environment to prevent damage, deterioration, or loss. The PM, in consultation with the QA/QC Officer, is responsible for identifying the records to be retained and establishing protection and controlled-retrieval procedures for such documents, including applicable retention times and ultimate disposal method(s).

## 14.0 TRAINING

Athenica will employ only qualified and experienced personnel to execute any task of the scope of work. Junior staff will have role solely for supporting implementation of a project task. The PM is responsible for verifying that each employee assigned to the project has read and understands the requirements of this document and is familiar with its procedures/instructions. Training will consist of in-house technical and non-technical seminars given by qualified and experienced senior staff members. In addition, specific meetings will be designed and held to review quality of work and address any corrective measures needed to correct any non-conforming activities that are identified. Project staff will be required to attend any meetings that are held.

## 15.0 QUALITY MANAGEMENT

A senior Athenica representative will serve as the Quality Assurance and Quality Control Officer (QA/QC) for the project. This individual will no have direct project responsibility but will independently monitor the implementation of the RAWP. The primary duties of the QA/QC officer will be:

- Monitor the project in accordance with the requirement of this CQAPP and the RAWP;
- Review the project to ensure that the overall data quality objectives are attained;
- Record any deviations and inform the Project Manager (PM) of any such deviations;
- Meet with the PM, as needed, to discuss compliance with the CQAPP;
- Advise the PM of findings and recommend changes on methods to improve quality; and
- Verify that outside services meet the data objectives of the CQAPP.

# TABLES

**Table 1**
**Chemical Parameters and Data Quality Levels**
**For Soil Samples – 29-05 38th Street, Long Island City, Queens, NY**

| Parameter | DQL[1 and 2] |
|---|---|
| **Target Compound List (TCL) Volatile Organic Compounds (mg/Kg)** | |
| 1,1,1,-2 Tetrachloroethane | NS |
| 1,1,1-Trichloroethane | 0.68 |
| 1,1,2,2-Tetrachloroethane | NS |
| 1,1-,2-Trichloro-1,2,2-triuoroethane (freon 113) | NS |
| 1,1,2-Trichloroethane | NS |
| 1,1-Dichloroethane | 0.27 |
| 1,1-Dichloroethylene | 0.33 |
| 1,2,3-Trichlorobenzene | NS |
| 1,2,3-Trichloropropane | NS |
| 1,2,4-Trichlorobenzene | NS |
| 1,2,4-Trimethylbenzene | 3.6 |
| 1,2-Dibromo-3-chloropropane | NS |
| 1,2-Dibromoethane | NS |
| 1,2-Dichlorobenzene | 1.1 |
| 1,2-Dichloroethane | 0.02 |
| 1,2-Dichloropropane | NS |
| 1,3,5-Trimethylbenzene | 8.4 |
| 1,3-Dichlorobenzene | 2.4 |
| 1,4-Dichlorobenzene | 1.8 |
| 1,4-Dioxane | 0.1 |
| 2-Butanone | 0.12 |
| 2-Hexanone | NS |
| 4-Methyl-2-pentanone | NS |
| Acetone | 0.05 |
| Acrolein | NS |
| Acrylonitrile | NS |
| Benzene | 0.06 |
| Bromochloromethane | NS |
| Bromodichloromethane | NS |
| Bromoform | NS |
| Bromomethane | NS |
| Carbon disulfide | NS |
| Carbon tetrachloride | 0.76 |
| Chlorobenzene | 1.1 |
| Chloroethane | NS |
| Chloroform | 0.25 |
| Chloromethane | NS |

**Table 1**
**Chemical Parameters and Data Quality Levels**
**For Soil Samples – 29-05 38th Street, Long Island City, Queens, NY**

| Parameter | DQL[1 and 2] |
|---|---|
| cis-1,2-Dichloroethylene | 0.25 |
| cis-1,3-Dichloropropylene | NS |
| Cyclohexane | NS |
| Dibromochloromethane | NS |
| Dibromomethane | NS |
| Dichlorodifluoromethane | NS |
| Ethyl Benzene | 1.0 |
| Hexachlorobutadiene | NS |
| Isopropylbenzene | NS |
| Methyl acetate | NS |
| Methyl tert-butyl ether (MTBE) | 0.93 |
| Methylcyclohexane | NS |
| Methylene chloride | 0.05 |
| n-Butylbenzene | 12 |
| n-Propylbenzene | 3.9 |
| o-Xylene | NS |
| p- & m- Xylenes | NS |
| p-Isopropyltoluene | NS |
| sec-Butylbenzene | 11 |
| Styrene | NS |
| tert-Butyl alcohol (TBA) | NS |
| tert-Butylbenzene | 5.9 |
| Tetrachloroethylene | 1.3 |
| Toluene | 0.7 |
| trans-1,2-Dichloroethylene | 0.19 |
| trans-1,3-Dichloropropylene | NS |
| trans-1,4-dichloro-2-butene | NS |
| Trichloroethylene | 0.47 |
| Trichlorofluoromethane | NS |
| Vinyl Chloride | 0.02 |
| Xylenes, Total | 0.26 |

**DQL=Data Quality Level**
**[1] DQLs for TCL VOCs are based on NYSDEC Part 375 Unrestricted Use Soil Cleanup Objective.**
**NS=No standard**

**Table 2**
**Chemical Parameters and Data Quality Levels**
**For Groundwater Samples – 29-05 38th Street, Long Island City, Queens, NY**

| Parameter | DQL[1] |
|---|---|
| **Target Compound List (TCL) Volatile Organic Compounds (µg/L)** | |
| 1,1,1,-2 Tetrachloroethane | 5.0 |
| 1,1,1-Trichloroethane | 5.0 |
| 1,1,2,2-Tetrachloroethane | 5.0 |
| 1,1-,2-Trichloro-1,2,2-triuoroethane (freon 113) | 5.0 |
| 1,1,2-Trichloroethane | 1.0 |
| 1,1-Dichloroethane | 5.0 |
| 1,1-Dichloroethylene | 5.0 |
| 1,2,3-Trichlorobenzene | 5.0 |
| 1,2,3-Trichloropropane | 0.04 |
| 1,2,4-Trichlorobenzene | 5.0 |
| 1,2,4-Trimethylbenzene | 5.0 |
| 1,2-Dibromo-3-chloropropane | 0.04 |
| 1,2-Dibromoethane | 0.0006 |
| 1,2-Dichlorobenzene | 3.0 |
| 1,2-Dichloroethane | 0.6 |
| 1,2-Dichloropropane | 1.0 |
| 1,3,5-Trimethylbenzene | 5.0 |
| 1,3-Dichlorobenzene | 3.0 |
| 1,4-Dichlorobenzene | 3.0 |
| 1,4-Dioxane | NS |
| 2-Butanone | 50.0 |
| 2-Hexanone | 50.0 |
| 4-Methyl-2-pentanone | NS |
| Acetone | 50.0 |
| Acrolein | NS |
| Acrylonitrile | NS |
| Benzene | 1.0 |
| Bromochloromethane | 5.0 |
| Bromodichloromethane | 50.0 |
| Bromoform | 50.0 |
| Bromomethane | 5.0 |
| Carbon disulfide | NS |
| Carbon tetrachloride | 5.0 |
| Chlorobenzene | 5.0 |
| Chloroethane | 5.0 |
| Chloroform | 7.0 |
| Chloromethane | 5.0 |
| cis-1,2-Dichloroethylene | 5.0 |
| cis-1,3-Dichloropropylene | 0.4 |

**Table 2**
**Chemical Parameters and Data Quality Levels**
**For Groundwater Samples – 29-05 38th Street, Long Island City, Queens, NY**

| Parameter | DQL[1] |
|---|---|
| Cyclohexane | NS |
| Dibromochloromethane | 50.0 |
| Dibromomethane | NS |
| Dichlorodifluoromethane | 5.0 |
| Ethyl Benzene | 5.0 |
| Hexachlorobutadiene | 0.5 |
| Isopropylbenzene | 5.0 |
| Methyl acetate | NS |
| Methyl tert-butyl ether (MTBE) | 10.0 |
| Methylcyclohexane | 5.0 |
| Methylene chloride | 5.0 |
| n-Butylbenzene | 5.0 |
| n-Propylbenzene | 5.0 |
| o-Xylene | 5.0 |
| p- & m- Xylenes | 5.0 |
| p-Isopropyltoluene | 5.0 |
| sec-Butylbenzene | 5.0 |
| Styrene | 5.0 |
| tert-Butyl alcohol (TBA) | NS |
| tert-Butylbenzene | 5.0 |
| Tetrachloroethylene | 5.0 |
| Toluene | 5.0 |
| trans-1,2-Dichloroethylene | 5.0 |
| trans-1,3-Dichloropropylene | 0.4 |
| trans-1,4-dichloro-2-butene | NS |
| Trichloroethylene | 5.0 |
| Trichlorofluoromethane | 5.0 |
| Vinyl Chloride | 2.0 |
| Xylenes, Total | 5.0 |

**RL= Reporting Limit**
**DQL=Data Quality Level**
**[1] DQL for TCL VOCs are based on NYSDEC TOGS Standards and Guidance Values for Class GA Groundwater**
**NS=No standard**

**Table 3**
**Analytical Parameters, Methods, Preservation and Container Requirements**
**29-05 38th Street, Long Island City, Queens, NY**

| Sample Matrix | Analytical Parameter | Sample Type | No. of Samples | USEPA Analytical Method | Sample Preservation | Holding Time | Sample Container |
|---|---|---|---|---|---|---|---|
| **Soil** | TCL VOCs | Grab | TBD | USEPA Method 8260 | Cool to 4° C Encore Sampler or Terra Core Kit | 48 Hours (14 days after frozen) | (3) 5-gram Encore Sampler/ (1) Terra Core kit |
| Groundwater | TCL VOCs | Grab | TBD | USEPA Method 8260 | pH<2 with HCl; Cool to 4° C; no headspace | 14 days | (3) 40 mL VOA vials |

**TBD = To Be Determined**

**Table 4**
**QA/QC Sampling Summary**
**29-05 38th Street, Long Island City, Queens, NY**

| Matrix/Analysis | Analytical Method | Field Duplicate | Equipment Blank | Trip Blank | Matrix Spike | Matrix Spike Duplicate |
|---|---|---|---|---|---|---|
| Soil TCL VOCs | EPA Method 8260 | 1 per 20 samples | - | - | 1 per 20 samples | 1 per 20 samples |
| Groundwater TCL VOCs | EPA Method 8260 | 1 per 20 samples - | - | 1 per day of sampling | 1 per 20 samples | 1 per 20 samples |

# APPENDIX A

Klozur® Field Test Kits, Technical Data Sheet

# Klozur® Field Test Kits

Technical Data Sheet

## Introduction

Klozur® Field Test kits provide an accurate quantitative measurement of remaining persulfate in the groundwater at a remediation site. There are two test kits available, depending on which activation method is used.

| | Klozur Persulfate Activator Chemistries | Activator Examples | Primary Titration Chemistry |
|---|---|---|---|
| Kit "K" | High pH | Klozur® Caustic, sodium hydroxide, lime, Klozur® CR, Percarbonate | Permanganate back-titration of ferrous ammonium sulfate |
| | Iron | Iron Sulfate, $FeSO_4$ | |
| | Heat | Steam, hot water | |
| Kit "C" | Chelated iron | Dissolvine® E-FE-13, iron EDTA, FeEDTA, iron citrate | Cerric sulfate titration to a Ferroin end-point |
| | Hydrogen peroxide* | Hydrogen peroxide* | |

*Please contact PeroxyChem for more information



## Kit Contents

Each kit contains materials for measuring ten (10) aqueous measurements of persulfate concentration.

| Item | Kit "K" | Kit "C" |
|---|---|---|
| 15 mL plastic vials | 10 | 10 |
| filters | 11 | 11 |
| Plastic syringes | 11 | 11 |
| Plastic pipettes | 35 | 35 |
| Centrifuge tubes containing Ferrous ammonium sulfate | 10 | 10 |
| Sulfuric acid (6N) 2 ml vials | 10 | 10 |
| Potassium Permangnate (0.1 N) 20 mL bottle | 5 | Not applicable |
| Ceric Sulfate solution (0.1N) 20 mL bottle | Not applicable | 5 |
| Ferroin Indicator 2 mL vial | Not applicable | 1 |

## Specifications

| | |
|---|---|
| Measurement Range: | 1 g / L to 100 g / L |
| Accuracy: | Range 1 – 50 g / L +/- 1 g / L |
| | Range 50 – 100 g / L +/- 2 g / L |
| Shelf Life: | one year |
| Storage: | cool, dry conditions |
| Operating Ranges: | |
| | Water temperature: 5 – 50 °C |
| | pH ≤ 12 |
| | Fe(II): 0-500 mg/L |

**Prior to working with Klozur Field Test Kit consult the Safety Data Sheet and to understand proper safety, handling, storage and disposal procedures.**

This information contained herein is, to our knowledge, true and accurate. Because conditions of use are beyond our control, we make no warranty or representation, expressed or implied, except that the products discussed herein conform to the chemical descriptions shown on their labels. Nothing contained herein should be construed as permission or recommendation to infringe any patent. No agent, representative or employee of this company is authorized to vary any of the terms of this notice.

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# APPENDIX B

## USEPA Region I
## Low-Flow Groundwater Sampling Procedure

# U.S. ENVIRONMENTAL PROTECTION AGENCY
# REGION I

# LOW STRESS (low flow) PURGING AND SAMPLING PROCEDURE FOR THE COLLECTION OF GROUNDWATER SAMPLES FROM MONITORING WELLS

Quality Assurance Unit
U.S. Environmental Protection Agency – Region 1
11 Technology Drive
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Prepared by: Charles Porfert 1/19/10
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(Gerard Sotolongo, Quality Assurance Unit) Date

## Revision Page

| Date | Rev # | Summary of changes | Sections |
|---|---|---|---|
| 7/30/96 | 2 | Finalized | |
| 01/19/10 | 3 | Updated | All sections |
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## USE OF TERMS

Equipment blank: The equipment blank shall include the pump and the pump's tubing. If tubing is dedicated to the well, the equipment blank needs only to include the pump in subsequent sampling rounds. If the pump and tubing are dedicated to the well, the equipment blank is collected prior to its placement in the well. If the pump and tubing will be used to sample multiple wells, the equipment blank is normally collected after sampling from contaminated wells and not after background wells.

Field duplicates: Field duplicates are collected to determine precision of the sampling procedure. For this procedure, collect duplicate for each analyte group in consecutive order (VOC original, VOC duplicate, SVOC original, SVOC duplicate, etc.).

Indicator field parameters: This SOP uses field measurements of turbidity, dissolved oxygen, specific conductance, temperature, pH, and oxidation/reduction potential (ORP) as indicators of when purging operations are sufficient and sample collection may begin.

Matrix Spike/Matrix Spike Duplicates: Used by the laboratory in its quality assurance program. Consult the laboratory for the sample volume to be collected.

Poteniometric Surface: The level to which water rises in a tightly cased well constructed in a confined aquifer. In an unconfined aquifer, the potentiometric surface is the water table.

QAPP: Quality Assurance Project Plan

SAP: Sampling and Analysis Plan

SOP: Standard operating procedure

Stabilization: A condition that is achieved when all indicator field parameter measurements are sufficiently stable (as described in the "Monitoring Indicator Field Parameters" section) to allow sample collection to begin.

Temperature blank: A temperature blank is added to each sample cooler. The blank is measured upon receipt at the laboratory to assess whether the samples were properly cooled during transit.

Trip blank (VOCs): Trip blank is a sample of analyte-free water taken to the sampling site and returned to the laboratory. The trip blanks (one pair) are added to each sample cooler that contains VOC samples.

## SCOPE & APPLICATION

The goal of this groundwater sampling procedure is to collect water samples that reflect the total mobile organic and inorganic loads (dissolved and colloidal sized fractions) transported through the subsurface under ambient flow conditions, with minimal physical and chemical alterations from sampling operations. This standard operating procedure (SOP) for collecting groundwater samples will help ensure that the project's data quality objectives (DQOs) are met under certain low-flow conditions.

The SOP emphasizes the need to minimize hydraulic stress at the well-aquifer interface by maintaining low water-level drawdowns, and by using low pumping rates during purging and sampling operations. Indicator field parameters (e.g., dissolved oxygen, pH, etc.) are monitored during purging in order to determine when sample collection may begin. Samples properly collected using this SOP are suitable for analysis of groundwater contaminants (volatile and semi-volatile organic analytes, dissolved gases, pesticides, PCBs, metals and other inorganics), or naturally occurring analytes. This SOP is based on Puls, and Barcelona (1996).

This procedure is designed for monitoring wells with an inside diameter (1.5-inches or greater) that can accommodate a positive lift pump with a screen length or open interval ten feet or less and with a water level above the top of the screen or open interval (Hereafter, the "screen or open interval" will be referred to only as "screen interval"). This SOP is not applicable to other well-sampling conditions.

While the use of dedicated sampling equipment is not mandatory, dedicated pumps and tubing can reduce sampling costs significantly by streamlining sampling activities and thereby reducing the overall field costs.

The goal of this procedure is to emphasize the need for consistency in deploying and operating equipment while purging and sampling monitoring wells during each sampling event. This will help to minimize sampling variability.

This procedure describes a general framework for groundwater sampling. Other site specific information (hydrogeological context, conceptual site model (CSM), DQOs, etc.) coupled with systematic planning must be added to the procedure in order to develop an appropriate site specific SAP/QAPP. In addition, the site specific SAP/QAPP must identify the specific equipment that will be used to collect the groundwater samples.

This procedure does not address the collection of water or free product samples from wells containing free phase LNAPLs and/or DNAPLs (light or dense non-aqueous phase

liquids). For this type of situation, the reader may wish to check: Cohen, and Mercer (1993) or other pertinent documents.

This SOP is to be used when collecting groundwater samples from monitoring wells at all Superfund, Federal Facility and RCRA sites in Region 1 under the conditions described herein. Request for modification of this SOP, in order to better address specific situations at individual wells, must include adequate technical justification for proposed changes. All changes and modifications must be approved and included in a revised SAP/QAPP before implementation in field.

## BACKGROUND FOR IMPLEMENTATION

It is expected that the monitoring well screen has been properly located (both laterally and vertically) to intercept existing contaminant plume(s) or along flow paths of potential contaminant migration. Problems with inappropriate monitoring well placement or faulty/improper well installation cannot be overcome by even the best water sampling procedures. This SOP presumes that the analytes of interest are moving (or will potentially move) primarily through the more permeable zones intercepted by the screen interval.

Proper well construction, development, and operation and maintenance cannot be overemphasized. The use of installation techniques that are appropriate to the hydrogeologic setting of the site often prevent "problem well" situations from occurring. During well development, or redevelopment, tests should be conducted to determine the hydraulic characteristics of the monitoring well. The data can then be used to set the purging/sampling rate, and provide a baseline for evaluating changes in well performance and the potential need for well rehabilitation. Note: if this installation data or well history (construction and sampling) is not available or discoverable, for all wells to be sampled, efforts to build a sampling history should commence with the next sampling event.

The pump intake should be located within the screen interval and at a depth that will remain under water at all times. It is recommended that the intake depth and pumping rate remain the same for all sampling events. The mid-point or the lowest historical midpoint of the saturated screen length is often used as the location of the pump intake. For new wells, or for wells without pump intake depth information, the site's SAP/QAPP must provide clear reasons and instructions on how the pump intake depth(s) will be selected, and reason(s) for the depth(s) selected. If the depths to top and bottom of the well screen are not known, the SAP/QAPP will need to describe how the sampling depth will be determined and how the data can be used.

Stabilization of indicator field parameters is used to indicate that conditions are suitable for sampling to begin. Achievement of turbidity levels of less than 5 NTU, and stable drawdowns of less than 0.3 feet, while desirable, are not mandatory. Sample collection

may still take place provided the indicator field parameter criteria in this procedure are met. If after 2 hours of purging indicator field parameters have not stabilized, one of three optional courses of action may be taken: a) continue purging until stabilization is achieved, b) discontinue purging, do not collect any samples, and record in log book that stabilization could not be achieved (documentation must describe attempts to achieve stabilization), c) discontinue purging, collect samples and provide full explanation of attempts to achieve stabilization (note: there is a risk that the analytical data obtained, especially metals and strongly hydrophobic organic analytes, may reflect a sampling bias and therefore, the data may not meet the data quality objectives of the sampling event).

It is recommended that low-flow sampling be conducted when the air temperature is above 32°F (0°C). If the procedure is used below 32°F, special precautions will need to be taken to prevent the groundwater from freezing in the equipment. Because sampling during freezing temperatures may adversely impact the data quality objectives, the need for water sample collection during months when these conditions are likely to occur should be evaluated during site planning and special sampling measures may need to be developed. Ice formation in the flow-through-cell will cause the monitoring probes to act erratically. A transparent flow-through-cell needs to be used to observe if ice is forming in the cell. If ice starts to form on the other pieces of the sampling equipment, additional problems may occur.

## HEALTH & SAFETY

When working on-site, comply with all applicable OSHA requirements and the site's health/safety procedures. All proper personal protection clothing and equipment are to be worn. Some samples may contain biological and chemical hazards. These samples should be handled with suitable protection to skin, eyes, etc.

## CAUTIONS

The following cautions need to be considered when planning to collect groundwater samples when the below conditions occur.

If the groundwater degasses during purging of the monitoring well, dissolved gases and VOCs will be lost. When this happens, the groundwater data for dissolved gases (e.g., methane, ethene, ethane, dissolved oxygen, etc.) and VOCs will need to be qualified. Some conditions that can promote degassing are the use of a vacuum pump (e.g., peristaltic pumps), changes in aperture along the sampling tubing, and squeezing/pinching the pump's tubing which results in a pressure change.

When collecting the samples for dissolved gases and VOCs analyses, avoid aerating the groundwater in the pump's tubing. This can cause loss of the dissolved gases and VOCs in

the groundwater. Having the pump's tubing completely filled prior to sampling will avoid this problem when using a centrifugal pump or peristaltic pump.

Direct sun light and hot ambient air temperatures may cause the groundwater in the tubing and flow-through-cell to heat up. This may cause the groundwater to degas which will result in loss of VOCs and dissolved gases. When sampling under these conditions, the sampler will need to shade the equipment from the sunlight (e.g., umbrella, tent, etc.). If possible, sampling on hot days, or during the hottest time of the day, should be avoided. The tubing exiting the monitoring well should be kept as short as possible to avoid the sun light or ambient air from heating up the groundwater.

Thermal currents in the monitoring well may cause vertical mixing of water in the well bore. When the air temperature is colder than the groundwater temperature, it can cool the top of the water column. Colder water which is denser than warm water sinks to the bottom of the well and the warmer water at the bottom of the well rises, setting up a convention cell. "During low-flow sampling, the pumped water may be a mixture of convecting water from within the well casing and aquifer water moving inward through the screen. This mixing of water during low-flow sampling can substantially increase equilibration times, can cause false stabilization of indicator parameters, can give false indication of redox state, and can provide biological data that are not representative of the aquifer conditions" (Vroblesky 2007).

Failure to calibrate or perform proper maintenance on the sampling equipment and measurement instruments (e.g., dissolved oxygen meter, etc.) can result in faulty data being collected.

Interferences may result from using contaminated equipment, cleaning materials, sample containers, or uncontrolled ambient/surrounding air conditions (e.g., truck/vehicle exhaust nearby).

Cross contamination problems can be eliminated or minimized through the use of dedicated sampling equipment and/or proper planning to avoid ambient air interferences. Note that the use of dedicated sampling equipment can also significantly reduce the time needed to complete each sampling event, will promote consistency in the sampling, and may reduce sampling bias by having the pump's intake at a constant depth.

Clean and decontaminate all sampling equipment prior to use. All sampling equipment needs to be routinely checked to be free from contaminants and equipment blanks collected to ensure that the equipment is free of contaminants. Check the previous equipment blank data for the site (if they exist) to determine if the previous cleaning procedure removed the contaminants. If contaminants were detected and they are a concern, then a more vigorous cleaning procedure will be needed.

## PERSONNEL QUALIFICATIONS

All field samplers working at sites containing hazardous waste must meet the requirements of the OSHA regulations. OSHA regulations may require the sampler to take the 40 hour OSHA health and safety training course and a refresher course prior to engaging in any field activities, depending upon the site and field conditions.

The field samplers must be trained prior to the use of the sampling equipment, field instruments, and procedures. Training is to be conducted by an experienced sampler before initiating any sampling procedure.

The entire sampling team needs to read, and be familiar with, the site Health and Safety Plan, all relevant SOPs, and SAP/QAPP (and the most recent amendments) before going onsite for the sampling event. It is recommended that the field sampling leader attest to the understanding of these site documents and that it is recorded.

## EQUIPMENT AND SUPPLIES

### A. Informational materials for sampling event

A copy of the current Health and Safety Plan, SAP/QAPP, monitoring well construction data, location map(s), field data from last sampling event, manuals for sampling, and the monitoring instruments' operation, maintenance, and calibration manuals should be brought to the site.

### B. Well keys.

### C. Extraction device

Adjustable rate, submersible pumps (e.g., centrifugal, bladder, etc.) which are constructed of stainless steel or Teflon are preferred. Note: if extraction devices constructed of other materials are to be used, adequate information must be provided to show that the substituted materials do not leach contaminants nor cause interferences to the analytical procedures to be used. Acceptance of these materials must be obtained before the sampling event.

If bladder pumps are selected for the collection of VOCs and dissolved gases, the pump setting should be set so that one pulse will deliver a water volume that is sufficient to fill a 40 mL VOC vial. This is not mandatory, but is considered a "best practice". For the proper operation, the bladder pump will need a minimum amount of water above the pump; consult the manufacturer for the recommended submergence. The pump's recommended submergence value should be determined during the planning stage, since it may influence well construction and placement of dedicated pumps where water-level fluctuations are significant.

Adjustable rate, peristaltic pumps (suction) are to be used with caution when collecting samples for VOCs and dissolved gases (e.g., methane, carbon dioxide, etc.) analyses. Additional information on the use of peristaltic pumps can be found in Appendix A. If peristaltic pumps are used, the inside diameter of the rotor head tubing needs to match the inside diameter of the tubing installed in the monitoring well.

Inertial pumping devices (motor driven or manual) are not recommended. These devices frequently cause greater disturbance during purging and sampling, and are less easily controlled than submersible pumps (potentially increasing turbidity and sampling variability, etc.). This can lead to sampling results that are adversely affected by purging and sampling operations, and a higher degree of data variability.

**D. Tubing**

Teflon or Teflon-lined polyethylene tubing are preferred when sampling is to include VOCs, SVOCs, pesticides, PCBs and inorganics. Note: if tubing constructed of other materials is to be used, adequate information must be provided to show that the substituted materials do not leach contaminants nor cause interferences to the analytical procedures to be used. Acceptance of these materials must be obtained before the sampling event.

PVC, polypropylene or polyethylene tubing may be used when collecting samples for metal and other inorganics analyses.

The use of 1/4 inch or 3/8 inch (inside diameter) tubing is recommended. This will help ensure that the tubing remains liquid filled when operating at very low pumping rates when using centrifugal and peristaltic pumps.

Silastic tubing should be used for the section around the rotor head of a peristaltic pump. It should be less than a foot in length. The inside diameter of the tubing used at the pump rotor head must be the same as the inside diameter of tubing placed in the well. A tubing connector is used to connect the pump rotor head tubing to the well tubing. Alternatively, the two pieces of tubing can be connected to each other by placing the one end of the tubing inside the end of the other tubing. The tubing must not be reused.

**E. The water level measuring device**

Electronic "tape", pressure transducer, water level sounder/level indicator, etc. should be capable of measuring to 0.01 foot accuracy. Recording pressure transducers, mounted above the pump, are especially helpful in tracking water levels during pumping operations, but their use must include check measurements with a water level "tape" at the start and end of each sampling event.

**F. Flow measurement supplies**

Graduated cylinder (size according to flow rate) and stopwatch usually will suffice.

Large graduated bucket used to record total water purged from the well.

**G. Interface probe**

To be used to check on the presence of free phase liquids (LNAPL, or DNAPL) before purging begins (as needed).

**H. Power source (generator, nitrogen tank, battery, etc.)**

When a gasoline generator is used, locate it downwind and at least 30 feet from the well so that the exhaust fumes do not contaminate samples.

**I. Indicator field parameter monitoring instruments**

Use of a multi-parameter instrument capable of measuring pH, oxidation/reduction potential (ORP), dissolved oxygen (DO), specific conductance, temperature, and coupled with a flow-through-cell is required when measuring all indicator field parameters, except turbidity. Turbidity is collected using a separate instrument. Record equipment/instrument identification (manufacturer, and model number).

Transparent, small volume flow-through-cells (e.g., 250 mLs or less) are preferred. This allows observation of air bubbles and sediment buildup in the cell, which can interfere with the operation of the monitoring instrument probes, to be easily detected. A small volume cell facilitates rapid turnover of water in the cell between measurements of the indicator field parameters.

It is recommended to use a flow-through-cell and monitoring probes from the same manufacturer and model to avoid incompatibility between the probes and flow-through-cell.

Turbidity samples are collected before the flow-through-cell. A "T" connector coupled with a valve is connected between the pump's tubing and flow-through-cell. When a turbidity measurement is required, the valve is opened to allow the groundwater to flow into a container. The valve is closed and the container sample is then placed in the turbidimeter.

Standards are necessary to perform field calibration of instruments. A minimum of two standards are needed to bracket the instrument measurement range for all parameters except ORP which use a Zobell solution as a standard. For dissolved oxygen, a wet sponge used for the 100% saturation and a zero dissolved oxygen solution are used for the calibration.

Barometer (used in the calibration of the Dissolved Oxygen probe) and the conversion formula to convert the barometric pressure into the units of measure used by the Dissolved Oxygen meter are needed.

**J. Decontamination supplies**

Includes (for example) non-phosphate detergent, distilled/deionized water, isopropyl alcohol, etc.

**K. Record keeping supplies**

Logbook(s), well purging forms, chain-of-custody forms, field instrument calibration forms, etc.

**L. Sample bottles**

**M. Sample preservation supplies (as required by the analytical methods)**

**N. Sample tags or labels**

**O. PID or FID instrument**

If appropriate, to detect VOCs for health and safety purposes, and provide qualitative field evaluations.

**P. Miscellaneous Equipment**

Equipment to keep the sampling apparatus shaded in the summer (e.g., umbrella) and from freezing in the winter. If the pump's tubing is allowed to heat up in the warm weather, the cold groundwater may degas as it is warmed in the tubing.

## EQUIPMENT/INSTRUMENT CALIBRATION

Prior to the sampling event, perform maintenance checks on the equipment and instruments according to the manufacturer's manual and/or applicable SOP. This will ensure that the equipment/instruments are working properly before they are used in the field.

Prior to sampling, the monitoring instruments must be calibrated and the calibration documented. The instruments are calibrated using U.S Environmental Protection Agency Region 1 *Calibration of Field Instruments (temperature, pH, dissolved oxygen, conductivity/specific conductance, oxidation/reduction [ORP], and turbidity),* January 19, 2010, or latest version or from one of the methods listed in 40CFR136, 40CFR141 and SW-846.

The instruments shall be calibrated at the beginning of each day. If the field measurement falls outside the calibration range, the instrument must be re-calibrated so that all measurements fall within the calibration range. At the end of each day, a calibration check is performed to verify that instruments remained in calibration throughout the day. This check is performed while the instrument is in measurement mode, not calibration mode. If the field instruments are being used to monitor the natural attenuation parameters, then a calibration check at mid-day is highly recommended to ensure that the instruments did not drift out of calibration. Note: during the day if the instrument reads zero or a negative number for dissolved oxygen, pH, specific conductance, or turbidity (negative value only), this indicates that the instrument drifted out of calibration or the instrument is malfunctioning. If this situation occurs the data from this instrument will need to be qualified or rejected.

## PRELIMINARY SITE ACTIVITIES (as applicable)

Check the well for security (damage, evidence of tampering, missing lock, etc.) and record pertinent observations (include photograph as warranted).

If needed lay out sheet of clean polyethylene for monitoring and sampling equipment, unless equipment is elevated above the ground (e.g., on a table, etc.).

Remove well cap and if appropriate measure VOCs at the rim of the well with a PID or FID instrument and record reading in field logbook or on the well purge form.

If the well casing does not have an established reference point (usually a V-cut or indelible mark in the well casing), make one. Describe its location and record the date of the mark in the logbook (consider a photographic record as well). All water level measurements must be recorded relative to this reference point (and the altitude of this point should be determined using techniques that are appropriate to site's DQOs.

If water-table or potentiometric surface map(s) are to be constructed for the sampling event, perform synoptic water level measurement round (in the shortest possible time) before any purging and sampling activities begin. If possible, measure water level depth (to 0.01 ft.) and total well depth (to 0.1 ft.) the day before sampling begins, in order to allow for re-settlement of any particulates in the water column. This is especially important for those wells that have not been recently sampled because sediment buildup in the well may require the well to be redeveloped. If measurement of total well depth is not made the day before, it should be measured after sampling of the well is complete. All measurements must be taken from the established referenced point. Care should be taken to minimize water column disturbance.

Check newly constructed wells for the presence of LNAPLs or DNAPLs before the initial sampling round. If none are encountered, subsequent check measurements with an interface probe may not be necessary unless analytical data or field analysis signal a worsening situation. This SOP cannot be used in the presence of LNAPLs or DNAPLs. If NAPLs are present, the project team must decide upon an alternate sampling method. All project modifications must be approved and documented prior to implementation.

If available check intake depth and drawdown information from previous sampling event(s) for each well. Duplicate, to the extent practicable, the intake depth and extraction rate (use final pump dial setting information) from previous event(s). If changes are made in the intake depth or extraction rate(s) used during previous sampling event(s), for either portable or dedicated extraction devices, record new values, and explain reasons for the changes in the field logbook.

## PURGING AND SAMPLING PROCEDURE

Purging and sampling wells in order of increasing chemical concentrations (known or anticipated) are preferred.

The use of dedicated pumps is recommended to minimize artificial mobilization and entrainment of particulates each time the well is sampled. Note that the use of dedicated sampling equipment can also significantly reduce the time needed to complete each

sampling event, will promote consistency in the sampling, and may reduce sampling bias by having the pump's intake at a constant depth.

**A. Initial Water Level**

Measure the water level in the well before installing the pump if a non-dedicated pump is being used. The initial water level is recorded on the purge form or in the field logbook.

**B. Install Pump**

Lower pump, safety cable, tubing and electrical lines slowly (to minimize disturbance) into the well to the appropriate depth (may not be the mid-point of the screen/open interval). The Sampling and Analysis Plan/Quality Assurance Project Plan should specify the sampling depth (used previously), or provide criteria for selection of intake depth for each new well. If possible keep the pump intake at least two feet above the bottom of the well, to minimize mobilization of particulates present in the bottom of the well.

Pump tubing lengths, above the top of well casing should be kept as short as possible to minimize heating the groundwater in the tubing by exposure to sun light and ambient air temperatures. Heating may cause the groundwater to degas, which is unacceptable for the collection of samples for VOC and dissolved gases analyses.

**C. Measure Water Level**

Before starting pump, measure water level. Install recording pressure transducer, if used to track drawdowns, to initialize starting condition.

**D. Purge Well**

From the time the pump starts purging and until the time the samples are collected, the purged water is discharged into a graduated bucket to determine the total volume of groundwater purged. This information is recorded on the purge form or in the field logbook.

Start the pump at low speed and slowly increase the speed until discharge occurs. Check water level. Check equipment for water leaks and if present fix or replace the affected equipment. Try to match pumping rate used during previous sampling event(s). Otherwise, adjust pump speed until there is little or no water level drawdown. If the minimal drawdown that can be achieved exceeds 0.3 feet, but remains stable, continue purging.

Monitor and record the water level and pumping rate every five minutes (or as appropriate) during purging. Record any pumping rate adjustments (both time and flow rate). Pumping rates should, as needed, be reduced to the minimum capabilities of the pump to ensure stabilization of the water level. Adjustments are best made in the first fifteen minutes of pumping in order to help minimize purging time. During pump start-up, drawdown may exceed the 0.3 feet target and then "recover" somewhat as pump flow adjustments are made. Purge volume calculations should utilize stabilized drawdown value, not the initial drawdown. If the initial water level is above the top of the screen do not allow the water level to fall into the well screen. The final purge volume must be greater than the stabilized drawdown volume plus the pump's tubing volume. If the drawdown has exceeded 0.3 feet and stabilizes, calculate the volume of water between the initial water level and the stabilized water level. Add the volume of the water which occupies the pump's tubing to this calculation. This combined volume of water needs to be purged from the well after the water level has stabilized before samples are collected.

Avoid the use of constriction devices on the tubing to decrease the flow rate because the constrictor will cause a pressure difference in the water column. This will cause the groundwater to degas and result in a loss of VOCs and dissolved gasses in the groundwater samples.

Note: the flow rate used to achieve a stable pumping level should remain constant while monitoring the indicator parameters for stabilization and while collecting the samples.

Wells with low recharge rates may require the use of special pumps capable of attaining very low pumping rates (e.g., bladder, peristaltic), and/or the use of dedicated equipment. For new monitoring wells, or wells where the following situation has not occurred before, if the recovery rate to the well is less than 50 mL/min., or the well is being essentially dewatered during purging, the well should be sampled as soon as the water level has recovered sufficiently to collect the volume needed for all anticipated samples. The project manager or field team leader will need to make the decision when samples should be collected, how the sample is to be collected, and the reasons recorded on the purge form or in the field logbook. A water level measurement needs to be performed and recorded before samples are collected. If the project manager decides to collect the samples using the pump, it is best during this recovery period that the pump intake tubing not be removed, since this will aggravate any turbidity problems. Samples in this specific situation may be collected without stabilization of indicator field parameters. Note that field conditions and efforts to overcome problematic situations must be recorded in order to support field decisions to deviate from normal procedures described in this SOP. If this type of problematic situation persists in a well, then water sample collection should be changed to a passive or no-purge method, if consistent with the site's DQOs, or have a new well installed.

**E. Monitor Indicator Field Parameters**

After the water level has stabilized, connect the "T" connector with a valve and the flow-through-cell to monitor the indicator field parameters. If excessive turbidity is anticipated or encountered with the pump startup, the well may be purged for a while without connecting up the flow-through-cell, in order to minimize particulate buildup in the cell (This is a judgment call made by the sampler). Water level drawdown measurements should be made as usual. If possible, the pump may be installed the day before purging to allow particulates that were disturbed during pump insertion to settle.

During well purging, monitor indicator field parameters (turbidity, temperature, specific conductance, pH, ORP, DO) at a frequency of five minute intervals or greater. The pump's flow rate must be able to "turn over" at least one flow-through-cell volume between measurements (for a 250 mL flow-through-cell with a flow rate of 50 mLs/min., the monitoring frequency would be every five minutes; for a 500 mL flow-through-cell it would be every ten minutes). If the cell volume cannot be replaced in the five minute interval, then the time between measurements must be increased accordingly. Note: during the early phase of purging emphasis should be put on minimizing and stabilizing pumping stress, and recording those adjustments followed by stabilization of indicator parameters. Purging is considered complete and sampling may begin when all the above indicator field parameters have stabilized. Stabilization is considered to be achieved when three consecutive readings are within the following limits:

**Turbidity** (10% for values greater than 5 NTU; if three Turbidity values are less than 5 NTU, consider the values as stabilized),
**Dissolved Oxygen** (10% for values greater than 0.5 mg/L, if three Dissolved Oxygen values are less than 0.5 mg/L, consider the values as stabilized),
**Specific Conductance** (3%),
**Temperature** (3%),
**pH** (± 0.1 unit),
**Oxidation/Reduction Potential** (±10 millivolts).

All measurements, except turbidity, must be obtained using a flow-through-cell. Samples for turbidity measurements are obtained before water enters the flow-through-cell. Transparent flow-through-cells are preferred, because they allow field personnel to watch for particulate build-up within the cell. This build-up may affect indicator field parameter values measured within the cell. If the cell needs to be cleaned during purging operations, continue pumping and disconnect cell for cleaning, then reconnect after cleaning and continue monitoring activities. Record start and stop times and give a brief description of cleaning activities.

The flow-through-cell must be designed in a way that prevents gas bubble entrapment in the cell. Placing the flow-through-cell at a 45 degree angle with the port facing upward can help remove bubbles from the flow-through-cell (see Appendix B Low-Flow Setup Diagram). All during the measurement process, the flow-through-cell must remain free of any gas bubbles. Otherwise, the monitoring probes may act erratically. When the pump is turned off or cycling on/off (when using a bladder pump), water in the cell must not drain out. Monitoring probes must remain submerged in water at all times.

**F. Collect Water Samples**

When samples are collected for laboratory analyses, the pump's tubing is disconnected from the "T" connector with a valve and the flow-through-cell. The samples are collected directly from the pump's tubing. Samples must not be collected from the flow-through-cell or from the "T" connector with a valve.

VOC samples are normally collected first and directly into pre-preserved sample containers. However, this may not be the case for all sampling locations; the SAP/QAPP should list the order in which the samples are to be collected based on the project's objective(s). Fill all sample containers by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

If the pump's flow rate is too high to collect the VOC/dissolved gases samples, collect the other samples first. Lower the pump's flow rate to a reasonable rate and collect the VOC/dissolved gases samples and record the new flow rate.

During purging and sampling, the centrifugal/peristaltic pump tubing must remain filled with water to avoid aeration of the groundwater. It is recommended that 1/4 inch or 3/8 inch (inside diameter) tubing be used to help insure that the sample tubing remains water filled. If the pump tubing is not completely filled to the sampling point, use the following procedure to collect samples: collect non-VOC/dissolved gases samples first, then increase flow rate slightly until the water completely fills the tubing, collect the VOC/dissolved gases samples, and record new drawdown depth and flow rate.

For bladder pumps that will be used to collect VOC or dissolved gas samples, it is recommended that the pump be set to deliver long pulses of water so that one pulse will fill a 40 mL VOC vial.

Use pre-preserved sample containers or add preservative, as required by analytical methods, to the samples immediately after they are collected. Check the analytical methods (e.g. EPA SW-846, 40 CFR 136, water supply, etc.) for additional information on preservation.

If determination of filtered metal concentrations is a sampling objective, collect filtered water samples using the same low flow procedures. The use of an in-line filter (transparent housing preferred) is required, and the filter size (0.45 $\mu$m is commonly used) should be based on the sampling objective. Pre-rinse the filter with groundwater prior to sample collection. Make sure the filter is free of air bubbles before samples are collected. Preserve the filtered water sample immediately. Note: filtered water samples are not an acceptable substitute for unfiltered samples when the monitoring objective is to obtain chemical concentrations of total mobile contaminants in groundwater for human health or ecological risk calculations.

Label each sample as collected. Samples requiring cooling will be placed into a cooler with ice or refrigerant for delivery to the laboratory. Metal samples after acidification to a pH less than 2 do not need to be cooled.

**G. Post Sampling Activities**

If a recording pressure transducer is used to track drawdown, re-measure water level with tape.

After collection of samples, the pump tubing may be dedicated to the well for re-sampling (by hanging the tubing inside the well), decontaminated, or properly discarded.

Before securing the well, measure and record the well depth (to 0.1 ft.), if not measured the day before purging began. Note: measurement of total well depth annually is usually sufficient after the initial low stress sampling event. However, a greater frequency may be needed if the well has a "silting" problem or if confirmation of well identity is needed.

Secure the well.

**DECONTAMINATION**

Decontaminate sampling equipment prior to use in the first well and then following sampling of each well. Pumps should not be removed between purging and sampling operations. The pump, tubing, support cable and electrical wires which were in contact with the well should be decontaminated by one of the procedures listed below.

The use of dedicated pumps and tubing will reduce the amount of time spent on decontamination of the equipment. If dedicated pumps and tubing are used, only the initial sampling event will require decontamination of the pump and tubing.

Note if the previous equipment blank data showed that contaminant(s) were present after using the below procedure or the one described in the SAP/QAPP, a more vigorous procedure may be needed.

Procedure 1

Decontaminating solutions can be pumped from either buckets or short PVC casing sections through the pump and tubing. The pump may be disassembled and flushed with the decontaminating solutions. It is recommended that detergent and alcohol be used sparingly in the decontamination process and water flushing steps be extended to ensure that any sediment trapped in the pump is removed. The pump exterior and electrical wires must be rinsed with the decontaminating solutions, as well. The procedure is as follows:

Flush the equipment/pump with potable water.

Flush with non-phosphate detergent solution. If the solution is recycled, the solution must be changed periodically.

Flush with potable or distilled/deionized water to remove all of the detergent solution. If the water is recycled, the water must be changed periodically.

Optional - flush with isopropyl alcohol (pesticide grade; must be free of ketones {e.g., acetone}) or with methanol. This step may be required if the well is highly contaminated or if the equipment blank data from the previous sampling event show that the level of contaminants is significant.

Flush with distilled/deionized water. This step must remove all traces of alcohol (if used) from the equipment. The final water rinse must not be recycled.

Procedure 2

Steam clean the outside of the submersible pump.

Pump hot potable water from the steam cleaner through the inside of the pump. This can be accomplished by placing the pump inside a three or four inch diameter PVC pipe with end cap. Hot water from the steam cleaner jet will be directed inside the PVC pipe and the pump exterior will be cleaned. The hot water from the steam cleaner will then be pumped from the PVC pipe through the pump and collected into another container. Note: additives or solutions should not be added to the steam cleaner.

Pump non-phosphate detergent solution through the inside of the pump. If the solution is recycled, the solution must be changed periodically.

Pump potable water through the inside of the pump to remove all of the detergent solution. If the solution is recycled, the solution must be changed periodically.

Pump distilled/deionized water through the pump. The final water rinse must not be recycled.

## FIELD QUALITY CONTROL

Quality control samples are required to verify that the sample collection and handling process has not compromised the quality of the groundwater samples. All field quality control samples must be prepared the same as regular investigation samples with regard to sample volume, containers, and preservation. Quality control samples include field duplicates, equipment blanks, matrix spike/matrix spike duplicates, trip blanks (VOCs), and temperature blanks.

## FIELD LOGBOOK

A field log shall be kept to document all groundwater field monitoring activities (see Appendix C, example table), and record the following for each well:

Site name, municipality, state.

Well identifier, latitude-longitude or state grid coordinates.

Measuring point description (e.g., north side of PVC pipe).

Well depth, and measurement technique.

Well screen length.

Pump depth.

Static water level depth, date, time and measurement technique.

Presence and thickness of immiscible liquid (NAPL) layers and detection method.

Pumping rate, drawdown, indicator parameters values, calculated or measured total volume pumped, and clock time of each set of measurements.

Type of tubing used and its length.

Type of pump used.

Clock time of start and end of purging and sampling activity.

Types of sample bottles used and sample identification numbers.

Preservatives used.

Parameters requested for analyses.

Field observations during sampling event.

Name of sample collector(s).

Weather conditions, including approximate ambient air temperature.

QA/QC data for field instruments.

Any problems encountered should be highlighted.

Description of all sampling/monitoring equipment used, including trade names, model number, instrument identification number, diameters, material composition, etc.

## DATA REPORT

Data reports are to include laboratory analytical results, QA/QC information, field indicator parameters measured during purging, field instrument calibration information, and whatever other field logbook information is needed to allow for a full evaluation of data usability.

Note: the use of trade, product, or firm names in this sampling procedure is for descriptive purposes only and does not constitute endorsement by the U.S. EPA.

## REFERENCES

Cohen, R.M. and J.W. Mercer, 1993, *DNAPL Site Evaluation*; C.K. Smoley (CRC Press), Boca Raton, Florida.

Robert W. Puls and Michael J. Barcelona, *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures*, April 1996 (EPA/540/S-95/504).

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U.S. Environmental Protection Agency, 1987, *A Compendium of Superfund Field Operations Methods*; Washington, DC (EPA/540/P-87/001).

U.S Environmental Protection Agency, Region 1, *Calibration of Field Instruments (temperature, pH, dissolved oxygen, conductivity/specific conductance, oxidation/reduction [ORP], and turbidity),* January 19, 2010 or latest version.

U.S Environmental Protection Agency, EPA SW-846.

U.S Environmental Protection Agency, 40 CFR 136.

U.S Environmental Protection Agency, 40 CFR 141.

Vroblesky, Don A., Clifton C. Casey, and Mark A. Lowery, Summer 2007, Influence of Dissolved Oxygen Convection on Well Sampling, *Ground Water Monitoring & Remediation* 27, no. 3: 49-58.

# APPENDIX A
# PERISTALTIC PUMPS

Before selecting a peristaltic pump to collect groundwater samples for VOCs and/or dissolved gases (e.g., methane, carbon dioxide, etc.) consideration should be given to the following:

- The decision of whether or not to use a peristaltic pump is dependent on the intended use of the data.
- If the additional sampling error that may be introduced by this device is NOT of concern for the VOC/dissolved gases data's intended use, then this device may be acceptable.
- If minor differences in the groundwater concentrations could effect the decision, such as to continue or terminate groundwater cleanup or whether the cleanup goals have been reached, then this device should NOT be used for VOC/dissolved gases sampling. In these cases, centrifugal or bladder pumps are a better choice for more accurate results.

EPA and USGS have documented their concerns with the use of the peristaltic pumps to collect water sample in the below documents.

- "Suction Pumps are not recommended because they may cause degassing, pH modification, and loss of volatile compounds" *A Compendium of Superfund Field Operations Methods*, EPA/540/P-87/001, December 1987.
- "The agency does not recommend the use of peristaltic pumps to sample ground water particularly for volatile organic analytes" *RCRA Ground-Water Monitoring Draft Technical Guidance*, EPA Office of Solid Waste, November 1992.
- "The peristaltic pump is limited to shallow applications and can cause degassing resulting in alteration of pH, alkalinity, and volatiles loss", *Low-flow (Minimal drawdown) Ground-Water Sampling Procedures*, by Robert Puls & Michael Barcelona, April 1996, EPA/540/S-95/504.
- "Suction-lift pumps, such as peristaltic pumps, can operate at a very low pumping rate; however, using negative pressure to lift the sample can result in the loss of volatile analytes", USGS Book 9 Techniques of Water-Resources Investigation, Chapter A4. (Version 2.0, 9/2006).

# APPENDIX B

## SUMMARY OF SAMPLING INSTRUCTIONS

These instructions are for using an adjustable rate, submersible pump or a peristaltic pump with the pump's intake placed at the midpoint of a 10 foot or less well screen or an open interval. The water level in the monitoring well is above the top of the well screen or open interval, the ambient temperature is above 32°F, and the equipment is not dedicated. Field instruments are already calibrated. The equipment is setup according to the diagram at the end of these instructions.

1. Review well installation information. Record well depth, length of screen or open interval, and depth to top of the well screen. Determine the pump's intake depth (e.g., mid-point of screen/open interval).

2. On the day of sampling, check security of the well casing, perform any safety checks needed for the site, lay out a sheet of polyethylene around the well (if necessary), and setup the equipment. If necessary a canopy or an equivalent item can be setup to shade the pump's tubing and flow-through-cell from the sun light to prevent the sun light from heating the groundwater.

3. Check well casing for a reference mark. If missing, make a reference mark. Measure the water level (initial) to 0.01 ft. and record this information.

4. Install the pump's intake to the appropriate depth (e.g., midpoint) of the well screen or open interval. Do not turn-on the pump at this time.

5. Measure water level and record this information.

6. Turn-on the pump and discharge the groundwater into a graduated waste bucket. Slowly increase the flow rate until the water level starts to drop. Reduce the flow rate slightly so the water level stabilizes. Record the pump's settings. Calculate the flow rate using a graduated container and a stop watch. Record the flow rate. Do not let the water level drop below the top of the well screen.

If the groundwater is highly turbid or colored, continue to discharge the water into the bucket until the water clears (visual observation); this usually takes a few minutes. The turbid or colored water is usually from the well being disturbed during the pump installation. If the water does not clear, then you need to make a choice whether to continue purging the well (hoping that it will clear after a reasonable time) or continue to

the next step. Note, it is sometimes helpful to install the pump the day before the sampling event so that the disturbed materials in the well can settle out.

If the water level drops to the top of the well screen during the purging of the well, stop purging the well, and do the following:

> Wait for the well to recharge to a sufficient volume so samples can be collected. This may take awhile (pump maybe removed from well, if turbidity is not a problem). The project manager will need to make the decision when samples should be collected and the reasons recorded in the site's log book. A water level measurement needs to be performed and recorded before samples are collected. When samples are being collected, the water level must not drop below the top of the screen or open interval. Collect the samples from the pump's tubing. Always collect the VOCs and dissolved gases samples first. Normally, the samples requiring a small volume are collected before the large volume samples are collected just in case there is not sufficient water in the well to fill all the sample containers. All samples must be collected, preserved, and stored according to the analytical method. Remove the pump from the well and decontaminate the sampling equipment.

If the water level has dropped 0.3 feet or less from the initial water level (water level measure before the pump was installed); proceed to Step 7. If the water level has dropped more than 0.3 feet, calculate the volume of water between the initial water level and the stabilized water level. Add the volume of the water which occupies the pump's tubing to this calculation. This combined volume of water needs to be purged from the well after the water level has stabilized before samples are be collected.

7. Attach the pump's tubing to the "T" connector with a valve (or a three-way stop cock). The pump's tubing from the well casing to the "T" connector must be as short as possible to prevent the groundwater in the tubing from heating up from the sun light or from the ambient air. Attach a short piece of tubing to the other end of the end of the "T" connector to serve as a sampling port for the turbidity samples. Attach the remaining end of the "T" connector to a short piece of tubing and connect the tubing to the flow-through-cell bottom port. To the top port, attach a small piece of tubing to direct the water into a calibrated waste bucket. Fill the cell with the groundwater and remove all gas bubbles from the cell. Position the flow-through-cell in such a way that if gas bubbles enter the cell they can easily exit the cell. If the ports are on the same side of the cell and the cell is cylindrical shape, the cell can be placed at a 45-degree angle with the ports facing upwards; this position should keep any gas bubbles entering the cell away from the monitoring probes and allow the gas bubbles to exit the cell easily (see Low-Flow Setup Diagram). Note,

make sure there are no gas bubbles caught in the probes' protective guard; you may need to shake the cell to remove these bubbles.

8. Turn-on the monitoring probes and turbidity meter.

9. Record the temperature, pH, dissolved oxygen, specific conductance, and oxidation/reduction potential measurements. Open the valve on the "T" connector to collect a sample for the turbidity measurement, close the valve, do the measurement, and record this measurement. Calculate the pump's flow rate from the water exiting the flow-through-cell using a graduated container and a stop watch, and record the measurement. Measure and record the water level. Check flow-through-cell for gas bubbles and sediment; if present, remove them.

10. Repeat Step 9 every 5 minutes or as appropriate until monitoring parameters stabilized. Note at least one flow-through-cell volume must be exchanged between readings. If not, the time interval between readings will need to be increased. Stabilization is achieved when three consecutive measurements are within the following limits:

**Turbidity** (10% for values greater than 5 NTUs; if three Turbidity values are less than 5 NTUs, consider the values as stabilized),
**Dissolved Oxygen** (10% for values greater than 0.5 mg/L, if three Dissolved Oxygen values are less than 0.5 mg/L, consider the values as stabilized),
**Specific Conductance** (3%),
**Temperature** (3%),
**pH** (± 0.1 unit),
**Oxidation/Reduction Potential** (±10 millivolts).

If these stabilization requirements do not stabilize in a reasonable time, the probes may have been coated from the materials in the groundwater, from a buildup of sediment in the flow-through-cell, or a gas bubble is lodged in the probe. The cell and the probes will need to be cleaned. Turn-off the probes (not the pump), disconnect the cell from the "T" connector and continue to purge the well. Disassemble the cell, remove the sediment, and clean the probes according to the manufacturer's instructions. Reassemble the cell and connect the cell to the "T" connector. Remove all gas bubbles from the cell, turn-on the probes, and continue the measurements. Record that the time the cell was cleaned.

11. When it is time to collect the groundwater samples, turn-off the monitoring probes, and disconnect the pump's tubing from the "T" connector. If you are using a centrifugal or peristaltic pump check the pump's tubing to determine if the tubing is completely filled with water (no air space).

All samples must be collected and preserved according to the analytical method. VOCs and dissolved gases samples are normally collected first and directly into pre-preserved sample containers. However, this may not be the case for all sampling locations; the SAP/QAPP should list the order in which the samples are to be collected based on the project's objective(s). Fill all sample containers by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

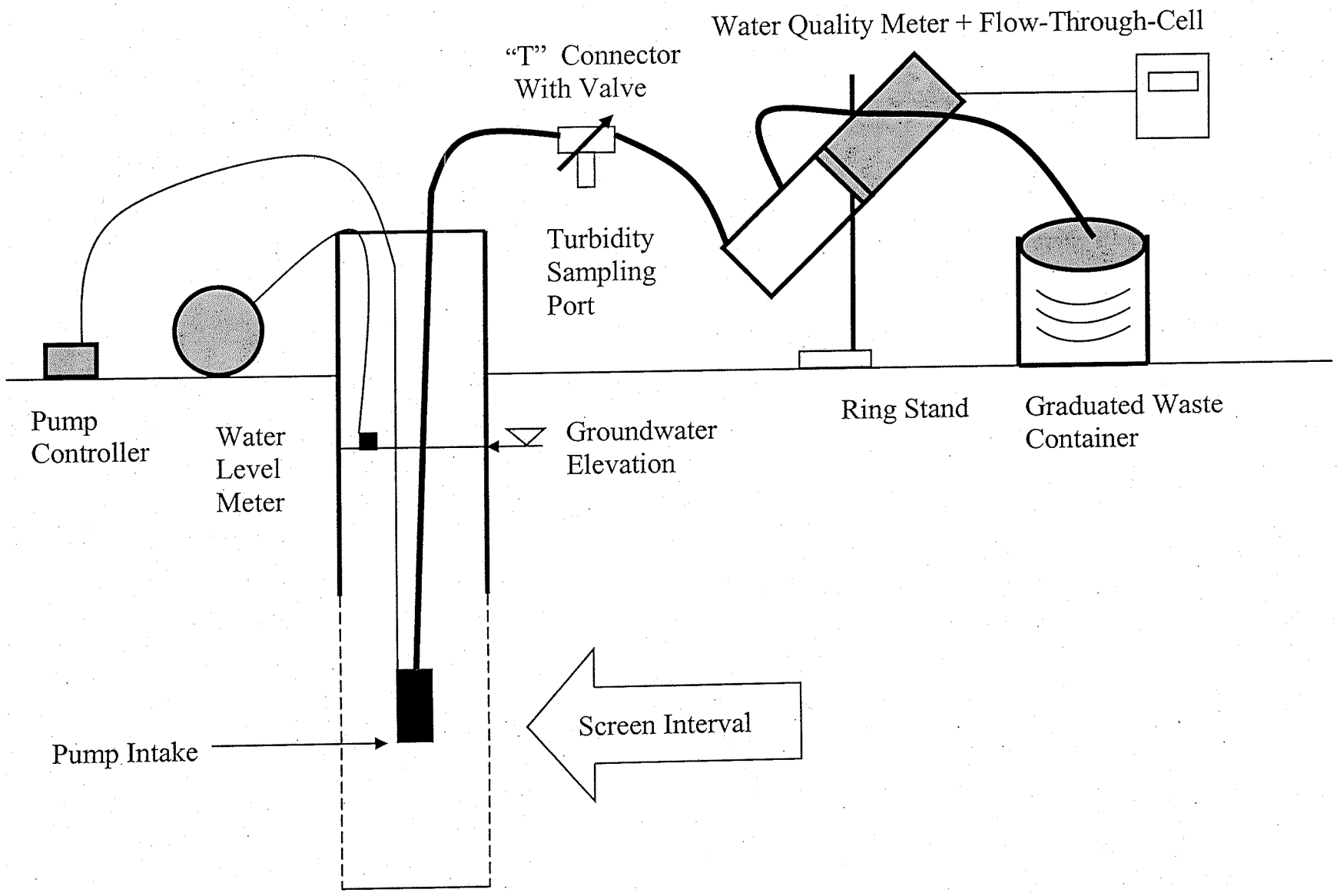
If the pump's tubing is not completely filled with water and the samples are being collected for VOCs and/or dissolved gases analyses using a centrifugal or peristaltic pump, do the following:

> All samples must be collected and preserved according to the analytical method. The VOCs and the dissolved gases (e.g., methane, ethane, ethene, and carbon dioxide) samples are collected last. When it becomes time to collect these samples increase the pump's flow rate until the tubing is completely filled. Collect the samples and record the new flow rate.

12. Store the samples according to the analytical method.

13. Record the total purged volume (graduated waste bucket). Remove the pump from the well and decontaminate the sampling equipment.

# Low-Flow Setup Diagram



APPENDIX C
EXAMPLE (Minimum Requirements)
WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Location (Site/Facility Name)_____
Well Number_____ Date_____
Field Personnel_____
Sampling Organization_____
Identify MP_____

Depth to _____/_____ of screen
(below MP) top bottom
Pump Intake at (ft. below MP)_____
Purging Device; (pump type)_____
Total Volume Purged _____

| Clock Time 24 HR | Water Depth below MP ft | Pump Dial[1] | Purge Rate ml/min | Cum. Volume Purged liters | Temp. °C | Spec. Cond.[2] µS/cm | pH | ORP[3] mv | DO mg/L | Turb-idity NTU | Comments |
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| | | | | | | | | | | | |
| Stabilization Criteria | | | | | 3% | 3% | ±0.1 | ± 10 mv | 10% | 10% | |

1. Pump dial setting (for example: hertz, cycles/min, etc).
2. µSiemens per cm(same as µmhos/cm)at 25 °C.
3. Oxidation reduction potential (ORP)

# APPENDIX G
# HEALTH AND SAFETY PLAN

# HEALTH & SAFETY PLAN

## 29-05 38th Avenue
## Long Island City, New York 11101

## Site Number C241250

Prepared on Behalf of:

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Prepared By:

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August 2022

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# 1.0 *GLOSSARY OF TERMS*

| | |
|---|---|
| AHA | Activity Hazard Analysis |
| BZ | Breathing Zone |
| C | Ceiling Limit |
| CNS | Central Nervous System |
| CTPV | Coal tar pitch volatiles |
| CRZ | Contamination Reduction Zone |
| CSP | Construction Superintendent |
| CZ | Clean Zone |
| dBA | Decibels Adjusted |
| ERCP | Emergency Response and Contingency Plan |
| EZ | Exclusion Zone |
| FDNY | New York City Fire Department |
| GI | Gastrointestinal |
| HSO | Health & Safety Officer |
| IP | Ionization Potential |
| $Mg/m^3$ | Micrograms per cubic meter |
| MPH | Miles per hour |
| NIOSH | National Institute for Occupational Safety and Health |
| OSHA | Occupational Health and Safety Administration |
| Owner | Street Five 116 LLC |
| PAHs | Poly aromatic hydrocarbons |
| PEL | Permissible Exposure Limit |
| PM | Project Manager |
| PPE | Personal Protective Equipment |
| PPM | Parts per Million |
| PSM | Project Safety Manager |
| SHASP | Site-Specific Health and Safety Plan |
| Site | 116 North $5^{th}$ Street, Brooklyn |
| STEL | Short-term exposure limit (15 minutes) |
| SZ | Support Zone |
| TLV | Threshold Limit Value |
| TWA | Time-weighted average (8 hours) |
| USEPA | United States Environmental Protection Agency |
| VP | Vapor Pressure at approximately 68 $F^o$ in mm Hg |

# 2.0 *INTRODUCTION*

Athenica Environmental Engineering PLLC (Athenica) has prepared this Construction Health and Safety Plan (CHASP) on behalf of FH 2BRO Builder Corp. (Volunteer) for the property known as the 29-05 38th Avenue Site (Site). The Site is located at 29-05 38th Avenue in the Long Island City section of Queens, New York (see Figure 2-1) and is identified as Block 371 and Lot 38 on the New York City Tax Map (Site) and is enrolled in the New York State Brownfield Cleanup Program (BCP) under BCP Site No. C241250.

The Site is an irregularly shaped, 10,600-square-foot lot with no remaining on-Site structures (demolition of the previous Site structures was completed in October 2021). The Site has approximately 160 feet of frontage along 38th Avenue, 70 feet of frontage along 30th Street, and 71 feet of frontage along Old Ridge Road. Most of the Site is enclosed by temporary fencing, with access via a rolling gate along 38th Avenue. The remaining area of the Site (approximately 1,500 square feet in area) does not have a fence along 38th Avenue; this area is currently used for vehicle parking and is accessed from 38th Avenue. The most recent occupants of the Site, from southeast to northwest, were a gasoline filling station, a carpet cleaning facility, and a pair of residential dwelling.

This CHASP has been developed by Athenica for specific activities associated with the construction of a new mixed-use (commercial and residential) building at the Site.

This CHASP documents the policies and procedures which will protect workers from potential chemical hazards associated with the soils and/or fill at this Site. Other plans and documentation will establish the policies and procedures that will protect workers from potential physical hazards associated with traditional demolition and construction activities at the Site.

This plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise during the disturbance of soil/fill at the Site. The general contractor and its subcontractors will be required to utilize this plan when working at the Site.

Although this plan focuses on the specific work activities planned for this Site, it must remain flexible because of the nature of this work. Conditions may change and unforeseen situations may arise that require modifications from the original plan. Therefore, Athenica only makes representations or warranties as to the adequacy of this CHASP for currently anticipated activities and conditions. This flexibility allows modification by authorized personnel, e.g. Project Manager, Project Safety Manager. All changes to procedures in this plan will be documented in writing using the form provided in Appendix B.

Refusal or failure to comply with this CHASP or violation of any safety procedures by field personnel and/or subcontractors may result in immediate removal from the Site following consultation with the Project Safety Manager (PSM) and the Project Manager (PM).

It is expected that this CHASP will be implemented at a multi-employer work Site. Information and references within this plan shall in no way imply or alleviate any other Site contractor from their responsibility to comply with any and all applicable State or Federal statutes or regulations regarding the completion of this project. It is the responsibility of each employer to communicate and coordinate work planning so as to prevent their work activities from becoming a potential hazard to other workers at the project Site. Failure to communicate will not alter an employer's responsibilities or obligations for any resulting injuries to their employees.

## 2.1 SITE HISTORY

Historic Sanborn maps presented in the March 2000 Phase I Environmental Site Assessment (ESA) by Middleton Environmental, Inc. (Middleton), revealed that the Site had been developed with four buildings. From southeast to northwest, these buildings included a 1-story commercial building, 1.5-story warehouse, 1-story residential building, and a 2-story residential building. Historic Sanborn maps identify the commercial building in the southeastern portion of the Site as an automotive service facility and gasoline station from 1947 until at least 1950. The 1.5-story warehouse is identified as a carpet cleaning facility from 1936 until 2006. The 1-story and 2-story residential buildings in the northwestern portion of the Site were constructed circa 1898 and 1936, respectively, and have maintained residential use since their construction.

The 1.5-story warehouse and a 1-story former gasoline station were demolished in early 2021, and the two residential structures were razed in October 2021, prior to the start of remedial investigation field activities.

Based on the findings of current and previous environmental studies at the Site, the identified areas of concern (AOCs) include:

1. Presence of historic fill material,
2. The past usage of the Site as a former gasoline station and automobile repair facility, as well as a carpet cleaning company, and
3. The past usage of the north adjacent property by historic dry-cleaning operations.

Soil sampling conducted as part of a Remedial Investigation (RI) of the Site by Athenica found soil impacted by polycyclic aromatic hydrocarbons (PAHs), and lead.

## 2.2 SCOPE OF WORK

The scope of work for redevelopment of the Site entails constructing a full basement beneath the entire existing building. Only those activities associated with the disturbance and handling of soil/fill are addressed in this CHASP.

The principal tasks covered in this HASP include the following:

- Mobilization/demobilization,
- Underpinning of existing walls,
- Excavation of urban fill and/or soil,
- Loading of urban fill into trucks for disposal,
- Installation of footings for new building,
- Heavy equipment decontamination, and
- ISCO treatment of groundwater at the southwest portion of the Site, corresponding to the area surrounding temporary well WC-3S.

Activity Hazard Analyses for these tasks are provided in Section 4.5.

This CHASP has been prepared and approved for the above scope of work. In order to remain approved, any changes to the scope of work will require amendment of the plan. The Site Health and Safety Amendment Documentation form (Appendix B) will be used for all revisions/amendments to this plan.

**FIGURE 2-1**
**SITE LOCATION MAP**



# 3.0 *KEY PERSONNEL*

The Project Manager (PM), Construction Superintendent (CS), Health & Safety Officer (HSO), and Project Safety Manager (PSM) all share responsibilities for formulating and enforcing health and safety requirements, and assuring that the CHASP is implemented as intended. This section outlines the responsibilities for each of these positions. Responsibilities for Site employees and subcontractor personnel are also outlined in this section. The General Contractor and/or other authorized personnel may also be involved and identified in future CHASP documents, as appropriate.

## 3.1 PROJECT MANAGER (PM)

The PM has the overall responsibility for the project and to assure that the requirements of the contract are attained in a manner consistent with the CHASP requirements. The PM will coordinate with the CS and the HSO to assure that the work is completed in a manner consistent with the CHASP. The PM will supervise the allocation of resources and staffing to implement specific aspects of the CHASP and may delegate authority to expedite and facilitate any application of the program. This role will be filled by the General Contractor or Excavation Subcontractor. OER will be notified in the future who the PM will be for this project.

## 3.2 CONSTRUCTION SUPERINTENDENT (CS)

The CS is responsible for field implementation of the CHASP and Site Emergency Response and Contingency Plan, and will act as the HSO in his/her absence. This role will be filled by the general contractor or primary subcontractor. NYSDEC will be notified in the future who the CS will be for this project.

Specific responsibilities for the CS include:

- Ensures that the CHASP is implemented;
- Ensures that field work is scheduled with adequate equipment to complete the job safely;
- Enforces Site health and safety rules;
- Ensures that proper personal protective equipment is utilized;
- Ensures that the PSM is informed of project changes which require modifications to the CHASP;
- Ensures that the procedure modifications are implemented;
- Investigates incidents;
- Conducts the daily Site safety briefing;
- Reports to PSM to provide summaries of field operations and progress; and

- Acts as Emergency Coordinator.

## 3.3 HEALTH AND SAFETY OFFICER (HSO)

The HSO is authorized to administer the CHASP. The HSO's primary operational responsibilities include personal and environmental monitoring, selection and monitoring of personal protective equipment, assignment of protection levels, coordination/review of work permits and observation of work activities. The HSO is authorized to stop work when an imminent health or safety risk exists. The HSO will review the essential safety requirements with all on-Site personnel and will facilitate the daily safety meetings. NYSDEC will be notified in the future who the HSO will be for this project.

Specific responsibilities for HSO performance include:

- Monitoring workers for signs of stress, such as cold stress, heat stress, and fatigue. Reevaluating Site conditions on an on-going basis.
- Coordinating protective measures including engineering controls, work practices and personal protective equipment.
- Assisting the CS in the preparation, presentation and documentation of daily safety meetings.
- Conducting and preparing reports of daily safety inspections of work processes, Site conditions, and equipment conditions. Discussing any necessary corrective actions with the CS and reviewing new procedures.
- Initiating revisions of the CHASP as necessary for new tasks or modifications of existing operations and submitting to the Project Safety Manager for approval (see Appendix B).
- Performing air monitoring as required by the CHASP.
- Assisting the PM and CS in incident investigations.
- Preparing permits for special operations, e.g., hot work, confined spaces, line breaking, etc.
- Maintaining Site safety records.
- Conducting inspections of all fire extinguishers, first-aid kits and eye washes on a regular basis.
- Informing subcontractors of the elements of the CHASP.

## 3.4 PROJECT SAFETY MANAGER (PSM)

The Project Safety Manager (PSM) is responsible for developing/reviewing the CHASP and ensuring that it is complete and accurate. The PSM provides technical and administrative support and will be available for consultation when required. If necessary, the PSM will direct modifications (Appendix B) to specific aspects of the CHASP to adjust for on-Site changes that affect safety. The HSO will coordinate with the PSM on necessary modifications to the CHASP.

The PSM may make periodic visits to the project Site to review implementation of this CHASP. This role is role will be filled by the General Contractor's representative.

## 3.5 EMPLOYEE SAFETY RESPONSIBILITIES

Each employee is responsible for personal safety as well as the safety of others in the work area and is expected to participate fully in the Site safety and health program. Employees will use all equipment provided in a safe and responsible manner as directed by the CS. Employees shall report any hazardous conditions which might affect the health and safety of Site personnel to the CS and/or HSO. To protect the health and safety of all personnel, Site employees that knowingly disregard safety policies/procedures will be subject to removal.

Specific requirements include:

- Reading the CHASP and any amendments prior to the start of on-Site work.
- Providing documentation of any applicable medical surveillance and training to the CS/HSO prior to the start of work.
- Attending the pre-entry briefing prior to beginning on-Site work as well as other scheduled safety meetings.
- Asking any questions or reporting concerns regarding the content of the CHASP to the CS/HSO prior to the start of work.
- Reporting all potentially dangerous situations, incidents, injuries, and illnesses, regardless of their severity, to the CS/HSO.
- Complying with the requirements of this CHASP and the requests of the CS/HSO.

# 4.0 *ACTIVITY HAZARD ANALYSIS*

This section outlines the potential chemical and physical hazards which workers may be exposed to during work on this project. The assessment of chemical hazards in this section is based on the results of samples collected at the Site by Athenica between June 2020 and November 2021, as documented in previous reports submitted for the Site. This is a representative list of potential contaminants that have been identified through extensive soil, groundwater, and soil vapor/ ambient air testing at the Site.

## 4.1 CHEMICAL HAZARDS

Based on review of the Remedial Investigation, workers at this Site have the potential to be exposed to chemicals in soil including common polycyclic aromatic hydrocarbons (PAHs) and metals in soil associated with historic fill material, as well as tetrachloroethene (PCE) in soil vapor. All listed compounds will be considered as potential contaminants of concern.

Potential exposure to the contaminants in historic fill (i.e., PAHs and metals) may occur by direct contact during soil disturbance activities (excavation, stockpiling, loading, etc.). In addition, exposure to PCE, PAHs, and metals could occur via inhalation (PCE as a volatile chemical could be inhaled directly, while PAHs and metals could be adhered to inhaled particulates/dust). A summary of hazard information is listed in Table 4-1.

The following general symptoms may indicate exposure to a hazardous material. Personnel will be removed from the work Site and provided immediate medical attention should any of the following symptoms occur:

- Dizziness or stupor
- Nausea, headaches, or cramps
- Irritation of the eyes, nose, or throat
- Euphoria
- Chest pains and coughing
- Rashes or burns

**TABLE 4-1**
**CHEMICAL DATA**

| COMPOUND | ACGIH TLV | OSHA PEL | ROUTE OF EXPOSURE | SYMPTOMS OF EXPOSURE | TARGET ORGANS | PHYSICAL DATA |
|---|---|---|---|---|---|---|
| PCE | 169 $mg/m^3$ | 678 $mg/m^3$ | Inhalation<br>Ingestion<br>Skin contact | Headache, nausea, vomiting, dizziness, and drowsiness | Respiratory system, eyes, skin, liver, kidneys, CNS | Non-combustible liquid |
| PAHs | 0.2 $mg/m^3$ | 0.2 $mg/m^3$ | Inhalation<br>Ingestion<br>Skin contact | Headache, nausea, vomiting, and diaphoresis | Genitourinary system, Hematopoietic system, GI Tract, Respiratory system, eyes, skin | Liquid, gas and solid, can be combustible |
| Lead | 0.05 $mg/m^3$ | 0.05 $mg/m^3$ | Inhalation<br>Ingestion<br>Skin contact | Weakness, lassitude, insomnia; facial pallor; eye irritation, anorexia, low-weight, malnutrition; constipation; abdominal pain; colic; hypertension, anemia; gingival lead line; tremors; paralysis of wrist, ankles; encephalopathy; neuropathy | GI Tract, CNS, kidneys, blood, gingival tissue | Noncombustible Solid |

Abbreviations
ACGIH = American Conference of Governmental Industrial Hygienists
C = Ceiling Unit
CNS = Central Nervous System
CVS = Cardiovascular System
GI = Gastrointestinal
TLV = Threshold Level Value
$mg/m^3$= milligrams per cubic meter
OSHA = Occupational Safety and Health Administration
PNS = Peripheral Nervous System
ppm = parts per million
PEL – Permissible Exposure Level

## 4.2 PHYSICAL HAZARDS

To minimize physical hazards, standard safety protocols will be followed at all times. Failure to follow safety protocols may result in removal of the employee from the Site. All personnel shall be familiar with the physical hazards presented by each of the tasks they perform. Task specific hazard analyses are provided in Section 4.5. These hazard analyses shall be reviewed prior to beginning each task and periodically throughout the task. It must be noted that these activity hazard analyses are general in nature. It is the responsibility of the CS to revise and adapt them as necessary to reflect Site-specific conditions.

The CS and HSO will observe the general work practices of each crew member and enforce safe procedures. Work areas will be inspected by the crew leaders, CS and HSO. All hazards will be corrected in a timely manner. A variety of physical hazards may be encountered during work activities at this Site. Activity Hazard Analyses will be developed for each principal activity and will identify all major hazards to which employees may be exposed. Hard hats, safety glasses, and steel-toe safety boots are required in all work areas of the Site. Site-specific hazards and all necessary precautions will be discussed at the daily safety meetings. The General Contractor's Safety Manual will be maintained at the project Site as a reference document.

## 4.3 ENVIRONMENTAL HAZARDS

Environmental factors such as weather, wild animals, insects, and irritant plants may pose a hazard when performing outdoor tasks. The HSO and CS will take necessary actions to alleviate these hazards should they arise.

### 4.3.1 *Heat Stress*

The combination of warm ambient temperature and protective clothing increases the potential for heat stress. Heat stress disorders include:

- Heat rash
- Heat cramps
- Heat exhaustion
- Heat stroke

This information will be reviewed during safety meetings. Workers are encouraged to increase consumption of water and electrolyte-containing beverages, e.g. Gatorade™. Heat stress can be prevented by assuring an adequate work/rest schedule. Guidelines are presented below.

The CS and HSO will determine the specific work-rest schedule based on project specific conditions. In addition, workers are encouraged to take rests and report symptoms whenever they

feel any adverse effects that may be heat-related. The frequency of breaks may need to be increased based on worker recommendation to the HSO and CS. The CS and HSO will determine the specific work-rest schedule based on project specific conditions. In addition, workers are encouraged to take rests and report symptoms whenever they feel any adverse effects that may be heat-related. The frequency of breaks may need to be increased based on worker recommendation to the HSO and CS.

Heat stress can be prevented by assuring an adequate work/rest schedule and adequate fluid consumption. A guide for work-rest schedules for various protection levels (defined in Section 5.0) is given below. The number of hours before a work-rest period is based on experience with similar work. The time periods should be considered maximum. It must also be remembered that individual physical variability and differences in physical work activities may require revisions to Site plans. This table should be used as a guide. Professional judgment (evaluation of individual work load, ambient weather conditions, worker acclimatization and PPE levels) of the CS and HSO is necessary to assure a fully protective plan to prevent heat stress disorders.

| **GUIDELINES FOR WORK-REST PERIODS FOR VARIOUS PROTECTION LEVELS (A-D) NUMBER OF HOURS BEFORE REST PERIOD** | | | | |
|---|---|---|---|---|
| **Temperature** | **Level D** | **Level C** | **Level B** | **Level A** |
| 90+ F* | 2.0 | 1.5 | 1.0 | 0.5 |
| 87.5 F | 2.5 | 2.0 | 1.5 | 1.0 |
| 82.5 F | 3.0 | 2.5 | 2.0 | 1.5 |
| 77.5 F | 3.5 | 3.0 | 2.5 | 1.5 |
| 72.5 | 4.0 | 3.5 | 2.5 | 1.5 |

**Work above 100 F will be reviewed with the Project Safety Manager to determine specific requirements.*

Alternately the work/rest schedule can be calculated based on heat stress monitoring results. Monitoring consists of taking the radial pulse of a worker for 30 seconds immediately after exiting the work area. The frequency of monitoring is described below.

If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by 1/3 and keep the rest period the same. If the heart rate still exceeds 110 beats per minute at the next rest period, increase the following rest period by 1/3. The initial rest period should be at least 5 minutes.

Body temperature, measured orally or through the ear canal, may also be monitored to assess heat stress. Workers should not be permitted to continue work when their body temperature exceeds

100.4 F (38C). Monitoring should be conducted at the beginning of each break period as noted above.

Monitoring for heat stress will begin when the ambient temperature reaches or exceeds 72.5 degrees Fahrenheit when wearing chemical protective clothing (Level C, B, A), or 80 degrees Fahrenheit for Site activities performed with no chemical protective clothing (Level D). Monitoring should include pulse rate, weight loss, oral/ or ear canal temperature, signs and symptoms of heat stress and fluid intake.

An additional measure that can be employed to minimize heat stress is through the utilization of Heat Stress Relief Stations. A Heat Stress Relief Station (HSRS) is a location inside the exclusion zone where workers can partially remove their personal protective equipment, rest and take in fluids. Since the HSRS is established inside the exclusion zone, it is imperative that its use be closely monitored and controlled to ensure that workers do not ingest contamination during use.

The following is a detailed description of the HSRS:

- Location- The HSRS should be located in an area of the exclusion zone where it will be predominantly upwind of Site activities. This can typically be adjacent to the contamination reduction zone.
- Delineation- The HSRS must be separated from the exclusion zone by temporary fencing and must be labeled as “Heat Stress Relief Station”.
- Elements- The HSRS contains several elements:
    - A tarp or tent for shade;
    - A bench or chairs for workers to sit on;
    - A wash station;
    - A table for fluids, cups and clean personal protective equipment (PPE); and
    - A trash can for contaminated PPE.
- Set-Up- Proper set up of the HSRS is imperative its successful use.
    - In the Support Zone, prepare the water cooler with ice and water or Gatorade.
    - The person bringing the items to the HSRS must don the appropriate PPE required for the Exclusion Zone.
    - Bring the following items to the HSRS:
        - Cooler;
        - Clean disposable cups;
        - Disinfectant wipes;
        - A clean trash bag;

        - Surgical gloves; and
        - Duct tape.
    - Ensure the wash station has clean water and paper towels for drying hands/face.
- Procedure for Use- In order for the HSRS to be effective, it must be properly used. It is imperative that workers decontaminate properly before drinking fluids so that ingestion of Site contaminants does not take place. The following are the steps to properly use the HSRS:
    - Upon entering the HSRS:
        - If wearing a protective suit, remove duct tape on wrists and unzip and tie around waist;
        - Remove your outer gloves and surgical gloves; set outer gloves aside and throw surgical gloves into trash;
        - Wash hands and/or face at Wash Station;
        - Use disinfectant wipe on hands;
        - Get drink and/or rest on bench/chair.
    - Before re-entering the Exclusion Zone:
        - Dispose of cups in trash;
        - Put on a clean pair of surgical gloves;
        - If wearing a Tyvek, pull up and rezip;
        - Re-apply duct tape to wrists;
        - Put on outer gloves.
- Monitoring- The CS and HSO are both responsible for monitoring the use of the Heat Stress Relief Station. The HSO should review the procedures for use of the HSRS with the workers before its use begins to ensure that everyone understands the parameters for proper use.

### 4.3.2 *Exposure to Cold*

With outdoor work in the winter months, the potential exists for hypothermia and frostbite. Several forms of cold stress as well as preventative measures are described in this section of the CHASP.

#### **4.3.2.1** *Cold Stress Conditions and Symptoms*

Typical cold stress conditions are included in the tables below, including symptoms and first aid precautions. If cold stress conditions develop, professional medical attention will be sought.

| TABLE 4.3.2A<br>COLD WEATHER INJURIES | | |
|---|---|---|
| **Cause** | **Symptoms** | **First Aid** |
| **Frostbite** | | |
| Freezing of tissue, normally due to exposure below 32°F | Numbness in affected area. Tingling, blistered, swollen or tender areas. Pale, yellowish waxy-looking skin. | Warm affected area with direct body heat. Consult with medical personnel ASAP. **Do not** thaw frozen area if treatment will be delayed. **Do not** massage or rub affected area. **Do not** wet area or rub with snow or ice. |
| **Chilblain** | | |
| Repeated exposure of bare skin for prolonged periods to temperatures 20° to 60°F (for those not acclimated to cold weather). | Swollen, red skin. Tender, hot skin, usually accompanied by itching. | Warm affected area with direct body heat. **Do not** massage or rub. **Do not** wet area or rub with snow or ice. **Do not** expose affected area to open fire, stove or any other intense heat source. |
| **Immersion Foot (Trench Foot)** | | |
| Prolonged exposure of the feet to wet conditions at temperatures between 32° to 50°F. Inactivity and damp socks (or tightly laced boots that impair circulation) speed onset and severity. | Cold numb feet may progress to hot with shooting pains. Swelling redness and bleeding. | Rewarm feet by exposing them to warm air. Evacuate victim to a medical facility. **Do not** massage, rub, moisten or expose affected area to extreme heat source. |
| **Dehydration** | | |
| Depletion of body fluids. | Dizziness. Weakness. | Replace lost water. Water should be sipped not gulped. Get medical treatment. |
| **Hypothermia** | | |
| Prolonged cold exposure and body heat loss. May occur at well above freezing, especially when a person is immersed in water. | Lack of shivering. Drowsiness, mental slowness, lack of coordination. Can progress to unconsciousness, irregular heartbeat and death. | Strip off clothing and wrap victim in blankets or a sleeping bag. Get victim to a heated location and medical treatment as soon as possible. |

In cold weather, the potential for frostbite exists, especially in body extremities. Personnel will be instructed to pay particular attention to hands, feet, and any exposed skin when dressing. Personnel will be advised to obtain more clothing if they begin to experience loss of sensation due to cold exposure.

**4.3.2.2** *Monitoring and Preventative Actions*

Typical cold stress monitoring procedures are included in the tables below, including temperatures to initiate monitoring, protective clothing uses and administrative practices to prevent or reduce the potential for cold stress related injury/illness. For weather conditions below -43 °C or -45 °F with no wind and/or similar conditions (see Work/Warm-up Table) all work will cease.

**TABLE 4.3.2B**
**COLD STRESS PREVENTION***

| | Temperature | Preventative Action |
|---|---|---|
| 1 | <61°F | Use thermometer to measure ambient temperature. |
| 2 | <40°F | Cold weather protective clothing available; check core body temperature at breaks using oral or ear canal thermometer. Maintain core body temperature above 96.8°F to avoid hypothermia. |
| 3 | <30°F | Record ambient temperature and wind speed every 4 hours; compare to wind chill chart when below 19.4°F. |
| 4 | <19°F | Provide and use heated warming shelters for work breaks and when cold stress symptoms appear. |
| 5 | <10°F | Constant observation of workers, i.e. "buddy system"; rest in heated shelters (see work-rest schedule); dry clothing available for change-out; acclimate new workers. |
| 6 | <0°F/ >5 mph winds | Obtain medical certification for workers subject to hypothermia risk. |

** Based on "2009 ACGIH Threshold Limit Values... for Physical Agents."*
*Note: refer to wind-chill and work-warmup charts in Table 4.3.2E*

| TABLE 4.3.2C<br>COLD WEATHER CLOTHING REQUIREMENTS | |
|---|---|
| 1 | If wind chill is a factor at a work location, the cooling effect of the wind shall be reduced by shielding the work area or providing employees an outer windbreak layer garment. |
| 2 | Extremities, ears, toes, and nose shall be protected from extreme cold by protective clothing. |
| 3 | Employees performing light work whose clothing may become wet shall wear an outer layer of clothing which is impermeable to water. |
| 4 | Employees performing moderate to heavy work whose clothing may become wet shall wear an outer layer of clothing which is impermeable to water. |
| 5 | Outer garments must provide for ventilation to prevent wetting of inner clothing by sweat, or if not possible, a heated shelter for warming/drying clothing, or a change of clothing, shall be provided prior to returning to work in a cold environment. |

Protective clothing greatly reduces the possibility of hypothermia in workers. However, personnel will be instructed to wear warm clothing and to stop work to obtain more clothing if they become too cold. Employees will also be advised to change into dry clothes if their clothing becomes wet from perspiration or from exposure to precipitation.

Employees will be instructed to use heated shelters on-Site, at regular intervals, depending upon the severity of ambient temperatures. Symptoms of cold stress, including heavy shivering, excessive fatigue, drowsiness, irritability, or euphoria necessitate immediate return to the shelter.

**TABLE 4.3.2D**
**COOLING POWER OF WIND ON EXPOSED FLESH EXPRESSED AS EQUIVALENT TEMPERATURE** *(under calm conditions)**

| **Actual Temperature Reading ( F)** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Estimated Wind Speed (in MPH)** | 50 | 40 | 30 | 20 | 10 | 0 | -10 | -20 | -30 | -40 | -50 | -60 |
| | **Equivalent Chill Temperature (F)** | | | | | | | | | | | |
| Calm | 50 | 40 | 30 | 20 | 10 | 0 | -10 | -20 | -30 | -40 | -50 | -60 |
| 5 | 48 | 37 | 27 | 16 | 6 | -5 | -15 | -26 | -36 | -47 | -57 | -68 |
| 10 | 40 | 28 | 16 | 4 | -9 | -24 | -33 | -46 | -58 | -70 | -83 | -95 |
| 15 | 36 | 22 | 9 | -5 | -18 | -32 | -45 | -58 | -72 | -85 | -99 | -112 |
| 20 | 32 | 18 | 4 | -10 | -25 | -39 | -53 | -67 | -82 | -96 | -110 | -121 |
| 25 | 30 | 16 | 0 | -15 | -29 | -44 | -59 | -74 | -88 | -104 | -118 | -133 |
| 30 | 28 | 13 | -2 | -18 | -33 | -48 | -63 | -79 | -94 | -109 | -125 | -140 |
| 35 | 27 | 11 | -4 | -20 | -35 | -51 | -67 | -82 | -98 | -113 | -129 | -145 |
| 40 | 26 | 10 | -6 | -21 | -37 | -53 | -69 | -85 | -100 | -116 | -132 | -148 |
| (Wind Speeds greater than 40 mph have little additional effect.) | ***Little Danger*** In < hr with dry skin. Maximum danger of false sense of security | | | | ***Increasing Danger*** Danger of freezing of exposed flesh within one minute**.** | | | | ***Great Danger*** Flesh may freeze within 30 seconds. | | | |
| | Trench foot and immersion foot may occur at any point on this chart. | | | | | | | | | | | |

**Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA. (Shaded area) Equivalent chill temperature requiring dry clothing to maintain core body temperature above 36 C (98.6 F) per cold stress TLV.*

**TABLE 4.3.2E**
**TLV WORK/WARM-UP SCHEDULE FOR FOUR-HOUR SHIFT***

| Air Temperature – Sunny Sky | | No Noticeable Wind | | 5 mph wind | | 10 mph wind | | 15 mph wind | | 20 mph wind | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C (appx.) | F (appx.) | Max. Work Period | No. of Breaks | Max. Work Period | No. of Breaks | Max. Work Period | No. of Breaks | Max. Work Period | No. of Breaks | Max. Work Period | No. of Breaks |
| -26 to -28 | -15 to -19 | Normal | 1 | Normal | 1 | 75 min | 2 | 55 min | 3 | 40 min | 4 |
| -29 to -31 | -20 to -24 | Normal | 1 | 75 min | 2 | 55 min | 3 | 40 min | 4 | 30 min | 5 |
| -32 to -34 | -25 to -29 | 75 min | 2 | 55 min | 3 | 40 min | 4 | 30 min | 5 | Non-Emergency work should cease | |
| -35 to -37 | -30 to -34 | 55 min | 3 | 40 min | 4 | 30 min | 5 | Non-emergency work should cease | | | |
| -38 to -39 | -35 to -39 | 40 min | 4 | 30 min | 5 | Non-emergency work should cease | | | | | |
| -40 to -42 | -40 to -44 | 30 min | 5 | Non-emergency work should cease | | | | | | | |
| < -43 | < -45 | Non-emergency work should cease | | | | | | | | | |

** Adapted from Occupational Health and Safety Division, Saskatchewan Department of Labor*

### 4.3.3 *Biological Hazards*

The contractor will be required to monitor and control insects, rodents, and other pests identified on-Site. Standing water will not be allowed on-Site, in an effort to control insects. Pest control procedures used by the contractor will include bait, trap, spray, or other means to abate pest problems that develop on-Site during disruption activities.

### 4.3.4 *Noise*

Hearing protection is required for workers operating or working near heavy equipment, where the noise level is greater than 85 dbA (Time Weighted Average). The HSO will determine the need and appropriate testing procedures, (i.e., sound level meter and/or dosimeter) for noise measurement. The provisions for noise protection for workers are presented in other safety-related documents for the Site.

## 4.4 VEHICLE AND HEAVY EQUIPMENT SAFETY

### 4.4.1 *Vehicle Safety*

Motor vehicle incidents are the number one cause of occupational fatalities, accounting for one in three deaths. The safety provisions for vehicle use at the Site are presented in other safety-related documents for the Site.

### 4.4.2 *Heavy Equipment Safety*

The use of backhoes, front-end loaders, etc. for excavation and other material handling equipment will present various physical hazards. The safety provisions for heavy equipment use at the Site are presented on other safety-related documents for the Site.

## 4.5 TASK-SPECIFIC ACTIVITY HAZARD ANALYSES (AHA)

This section of the HASP provides a breakdown of the hazards and control measures for each principal task. These Activity Hazard Analyses (AHAs) are general in nature and must be made project specific by the Construction Superintendent prior to each task. The AHAs will be field checked by the supervisor on an ongoing basis and revised as necessary. All revisions will be communicated to the work crew.

| **Project Identification**<br>BCP Site No. C241250 | **Location**<br>29-05 38th Avenue, Long Island City, Queens, NY | **Estimated Dates**<br>October 2022 – December 2024 |
|---|---|---|
| **Phase of Work**<br>Mobilization/ Demobilization | | **Analysis Approved by**<br>Spiro Dongaris |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| 1. Mobilization and demobilization of equipment Site tools, personnel.<br>2. Set up/remove staging and decontamination areas. | Slips/trips/falls | • Maintain alertness to slip/trip/fall hazards<br>• Maintain good housekeeping<br>• Walk, do not run<br>• Wear footwear with soles that grip |
| | Manual lifting/ material handling | • Observe proper lifting techniques<br>• Obey sensible lifting limits (50 lb. maximum per person manual lifting)<br>• Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads |
| | Temperature extremes | • Drink plenty of fluids<br>• Train personnel of signs/symptoms of cold/heat stress<br>• Monitor air temperatures when extreme weather conditions are present<br>• Stay in visual and verbal contact with your buddy |
| | Hand tool usage | • Daily inspections will be performed<br>• Remove broken or damaged tools from service<br>• Use the tool for its intended purpose<br>• Use in accordance with manufacturer instructions. |
| | Biological hazards | • Be alert to the presence of biological hazards<br>• Wear insect repellent<br>• CS/HSO should be aware of on-Site personnel with allergic reactions in insect bites and stings. |

| **Project Identification**<br>BCP Site No. C241250 | **Location**<br>29-05 38th Avenue, Long Island City, Queens, NY | **Estimated Dates**<br>October 2022 – December 2024 |
|---|---|---|
| **Phase of Work**<br>Trenching/Excavation | | **Analysis Approved by**<br>Spiro Dongaris |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| 1. Trenching and excavation.<br>2. Install shoring/ sheeting protective system. | Chemical hazards | • Wear appropriate PPE per Section 5.1<br>• Practice contamination avoidance<br>• Conduct real-time air monitoring per section 7.1.1<br>• Follow proper decontamination procedures<br>• Wash hands/face before eating, drinking, smoking |
| | Cave-in | • Do not allow entry into the trench unless approved protective system is in place and has been inspected by the competent person.<br>• Follow OSHA excavation regulations<br>• Place ladder or entry device every 25 feet of lateral travel |
| | Struck By/ Against Motor Vehicles/ Operating Equipment | • Wear reflective warning vests when exposed to vehicular traffic<br>• Isolate potential equipment swing areas<br>• Make eye contact with vehicle operators before approaching/crossing high traffic areas<br>• Understand and review hand signals<br>• Use a spotter to direct equipment movement in high traffic areas<br>• Audible back-up alarms on equipment<br>• Operator inspects equipment daily for safety defects, including the braking system |
| | Slips/trips/falls | • Clear walkways, work areas of equipment and tools<br>• Mark, identify, or barricade other obstructions<br>• Use barricades or fencing for trenches greater than 6 feet deep<br>• Maintain alertness to slip/trip/fall hazards<br>• Maintain good housekeeping<br>• Walk, do not run<br>• Wear footwear with soles that grip |
| | Electrical hazards | • Maintain 10 foot minimum clearance to any overhead power lines<br>• Call for Utility mark out prior to digging |

| **Project Identification**<br>BCP Site No. C241250 | **Location**<br>29-05 38th Avenue, Long Island City, Queens, NY | **Estimated Dates**<br>October 2022 – December 2024 |
|---|---|---|
| **Phase of Work**<br>Trenching/Excavation | | **Analysis Approved by**<br>Spiro Dongaris |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| 1. Trenching and excavation.<br>2. Install shoring/ sheeting protective system. | Hand and power tool usage | • Daily inspections will be performed on tools and cords<br>• Ensure all guards are in place<br>• Remove broken or damaged tools from service<br>• Use the tool for its intended purpose<br>• Use in accordance with manufacturer instructions |
| | Noise | • Hearing protection mandatory at or above 85 dBA.<br>• Instruct personnel how to properly wear hearing protective devices.<br>• Disposable ear plugs or other hearing protection required while around noisy equipment. |
| | Manual lifting/ Material handling | • Observe proper lifting techniques<br>• Obey sensible lifting limits (50 lb. maximum per person manual lifting)<br>• Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads |
| | Temperature extremes. | • Drink plenty of fluids:<br>• Train personnel of signs/symptoms of cold/heat stress;<br>• Monitor air temperatures when extreme weather conditions are present;<br>• Stay in visual and verbal contact with your buddy; and<br>• Use procedures in Sections 3.3.1 and 3.3.2 |

| **Project Identification**<br>BCP Site No. C241250 | **Location**<br>29-05 38th Avenue, Long Island City, Queens, NY | **Estimated Dates**<br>October 2022 – December 2024 |
|---|---|---|
| **Phase of Work**<br>Loading of Trucks | | **Analysis Approved by**<br>Spiro Dongaris |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| 1. Load trucks with contaminated soils.<br>2. Cover and clean trucks. | Chemical hazards | • Wear appropriate PPE per Section 6.1<br>• Practice contamination avoidance<br>• Conduct real-time air monitoring per section 8.1.1<br>• Follow proper decontamination procedures<br>• Wash hands/face before eating, drinking, smoking |
| | Struck By/ Against Motor Vehicles/ Operating Equipment | • Wear reflective warning vests when exposed to vehicular traffic<br>• Isolate potential equipment swing areas<br>• Make eye contact with vehicle operators before approaching/crossing high traffic areas<br>• Understand and review hand signals<br>• Use a spotter to direct equipment movement in high traffic areas<br>• Audible back-up alarms on equipment<br>• Operator inspects equipment daily for safety defects, including the braking system |
| | Slips/trips/falls | • Maintain alertness to slip/trip/fall hazards<br>• Maintain good housekeeping<br>• Walk, do not run<br>• Wear footwear with soles that grip |
| | Manual lifting/ material handling | • Observe proper lifting techniques<br>• Obey sensible lifting limits (50 lb. maximum per person manual lifting)<br>• Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads |
| | Temperature extremes | • Drink plenty of fluids<br>• Train personnel of signs/symptoms of cold/heat stress<br>• Monitor air temperatures when extreme weather conditions are present<br>• Stay in visual and verbal contact with your buddy<br>• Use procedures in Sections 4.3.1 and 4.3.2 |
| | Noise | • Hearing protection mandatory at or above 85 dBA.<br>• Instruct personnel how to properly wear hearing protective devices.<br>• Disposable ear plugs or other hearing protection required while around noisy equipment. |

| **Project Identification**<br>BCP Site No. C241250 | **Location**<br>29-05 38th Avenue, Long Island City, Queens, NY | **Estimated Dates**<br>October 2022 – December 2024 |
|---|---|---|
| **Phase of Work**<br>Installation of Footers | | **Analysis Approved by**<br>Spiro Dongaris |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| 1. Build forms.<br>2. Pour concrete.<br>3. Remove forms. | Chemical hazards | • Wear appropriate PPE per Section 6.1<br>• Practice contamination avoidance<br>• Conduct real-time air monitoring per section 8.1.1<br>• Follow proper decontamination procedures<br>• Wash hands/face before eating, drinking, smoking |
| | Struck By/ Against Motor Vehicles/ Operating Equipment | • Wear reflective warning vests when exposed to vehicular traffic<br>• Isolate potential equipment swing areas<br>• Make eye contact with vehicle operators before approaching/crossing high traffic areas<br>• Understand and review hand signals<br>• Use a spotter to direct equipment movement in high traffic areas<br>• Audible back-up alarms on equipment<br>• Operator inspects equipment daily for safety defects, including the braking system |
| | Concrete pumper | • Make sure nozzle man has eye contact with pump truck operator.<br>• Ensure steady control over nozzle |
| | Splashing concrete | • Ensure eye protection is worn and other PPE as required by Section 6.1<br>• A portable eyewash will be maintained in the work area |
| | Falls from heights | • Fall protection is required over 6 feet when removing forms<br>• Use PFAS where needed<br>• OSHA required training before use of PFAS, scaffold or lift<br>• Competent person inspects PFAS and scaffold |
| | Sharp Objects | • Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects being handled<br>• Maintain all hand and power tools in a safe condition<br>• Keep guards in place during use |

| **Project Identification**<br>BCP Site No. C241250 | **Location**<br>29-05 38th Avenue, Long Island City, Queens, NY | **Estimated Dates**<br>October 2022 – December 2024 |
|---|---|---|
| **Phase of Work**<br>Installation of Footers | | **Analysis Approved by**<br>Spiro Dongaris |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| 1. Build forms.<br>2. Pour concrete.<br>3. Remove forms. | Hand and power tool usage | • Daily inspections will be performed on tools and cords<br>• Ensure all guards are in place<br>• Remove broken or damaged tools from service<br>• Use the tool for its intended purpose<br>• Use in accordance with manufacturer instructions |
| | Noise | • Hearing protection mandatory at or above 85 dBA.<br>• Instruct personnel how to properly wear hearing protective devices.<br>• Disposable ear plugs or other hearing protection required while around noisy equipment. |
| | Manual lifting/ material handling | • Observe proper lifting techniques<br>• Obey sensible lifting limits (50 lb. maximum per person manual lifting)<br>• Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads |
| | Slips/trips/falls | • Maintain alertness to slip/trip/fall hazards<br>• Maintain good housekeeping<br>• Walk, do not run<br>• Wear footwear with soles that grip |
| | Temperature extremes. | • Drink plenty of fluids:<br>• Train personnel of signs/symptoms of cold/heat stress;<br>• Monitor air temperatures when extreme weather conditions are present;<br>• Stay in visual and verbal contact with your buddy; and<br>• Use procedures in Sections 4.3.1 and 4.3.2 |

| **Project Identification**<br>BCP Site No. C241250 | **Location**<br>29-05 38th Avenue, Long Island City, Queens, NY | **Estimated Dates**<br>October 2022 – December 2024 |
|---|---|---|
| **Phase of Work**<br>Heavy Equipment Decontamination | | **Analysis Approved by**<br>Spiro Dongaris |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| 1. Pressure wash or steam clean heavy equipment and vehicles. | Chemical hazards | • Wear appropriate PPE per Section 6.1<br>• Practice contamination avoidance<br>• Conduct real-time air monitoring per section 8.1.1<br>• Follow proper decontamination procedures<br>• Wash hands/face before eating, drinking, smoking |
| | Struck By/ Against Motor Vehicles/ Operating Equipment | • Wear reflective warning vests when exposed to vehicular traffic<br>• Isolate potential equipment swing areas<br>• Make eye contact with vehicle operators before approaching/crossing high traffic areas<br>• Understand and review hand signals<br>• Use a spotter to direct equipment movement in high traffic areas<br>• Audible back-up alarms on equipment<br>• Operator inspects equipment daily for safety defects, including the braking system |
| | Steam/heat/ splashing | • Wear face shield + safety glasses<br>• Stay out of splash radius to minimize exposure<br>• Do not direct steam/spray at anyone |
| | Hand and power tool usage | • Daily inspections will be performed on tools and cords<br>• Ensure all guards are in place<br>• Remove broken or damaged tools from service<br>• Use the tool for its intended purpose<br>• Use in accordance with manufacturer's instructions |
| | Slips/trips/falls | • Maintain alertness to slip/trip/fall hazards<br>• Maintain good housekeeping<br>• Walk, do not run<br>• Wear footwear with soles that grip |
| | Temperature extremes | • Drink plenty of fluids<br>• Train personnel of signs/symptoms of cold/heat stress<br>• Monitor air temperatures when extreme weather conditions are present<br>• Stay in visual and verbal contact with your buddy<br>• Use procedures in Sections 4.3.1 and 4.3.2 |

# 5.0 *WORK AND SUPPORT AREAS*

To prevent migration of contamination from personnel and equipment, work areas will be clearly specified as designated below prior to beginning operations. Each work area will be clearly identified using signs or physical barriers.

## 5.1 EXCLUSION ZONE (EZ)

The EZ is the area suspected of contamination and presents the greatest potential for worker exposure. Personnel entering the area must wear the mandated level of protection for that area. In certain instances, different levels of protection will be required depending on the tasks and monitoring performed within that zone. The EZ for this project will include the excavation areas, any stockpiling/staging areas, and areas where disturbance of urban fill is likely occurring.

## 5.2 CONTAMINATION - REDUCTION ZONE (CRZ)

The CRZ or transition zone will be established between the EZ and support zone (SZ). In this area, personnel will begin the sequential decontamination process required to exit the EZ. To prevent off-Site migration of contamination and for personnel accountability, all personnel will enter and exit the EZ through the CRZ. The CRZ for this project will be the access/egress routes to/from the EZ and the personnel and equipment decontamination stations.

## 5.3 SUPPORT ZONE (SZ)

The SZ serves as a clean, control area. Operational support facilities are located within the SZ. Normal work clothing and support equipment are appropriate in this zone. Contaminated equipment or clothing will not be allowed in the SZ. There will be a clearly marked controlled access point from the SZ into the CRZ and EZ that is monitored closely by the HSO and the CS to ensure proper safety protocols are followed. The SZ will be any office areas/trailers and the parking and visitor access ways to the project Site.

## 5.4 SITE CONTROL LOG

A log of all personnel visiting, entering or working on the Site shall be maintained in the main office location. The log will record the date, name, company or agency, and time entering or exiting the Site.

No visitor will be allowed in the EZ without showing proof of training and compliance with applicable medical monitoring requirements. Visitors will supply their own protective equipment, including hard hat, boots and respiratory equipment, if required. Visitors will attend a Site orientation given by the HSO and sign the HASP.

## 5.5 GENERAL

The following items are requirements to protect the health and safety of workers and will be discussed in the safety briefing prior to initiating work on the Site.

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and ingestion of contamination is prohibited in the EZ and CRZs.
- Hands and face must be washed upon leaving the EZ and before eating, drinking, chewing gum or tobacco and smoking or other activities which may result in ingestion of contamination.
- During Site operations, each worker will consider himself as a safety backup to his partner. All personnel will be aware of dangerous situations that may develop.
- Visual contact will be maintained between workers on-Site when performing hazardous duties.
- No personnel will be admitted to the Site without the proper safety equipment, training, and medical surveillance certification.
- All personnel must comply with established safety procedures. Any Site personnel who do not comply with safety policy, as established by the HSO or the CS, will be dismissed from the Site.
- Proper decontamination procedures must be followed before leaving the Site.
- All Site workers are authorized to stop work if they observe unsafe actions of workers or other unsafe conditions on-Site which may cause an imminent danger.
- All workers and visitors must sign in and out of the Site.

# 6.0 *PROTECTIVE EQUIPMENT*

This section specifies the levels of personal protective equipment (PPE) which are or may be required for each principal activity performed at this Site. All Site personnel must be trained in the use of all PPE utilized.

## 6.1 ANTICIPATED PROTECTION LEVELS

The following protection levels have been established for the Site work activities based on-Site information concerning the levels of contaminants and the scope of work. Results of Site air monitoring and visual inspection of the work activities may indicate the need for changes in final PPE level(s). Changes in the initial PPE Levels prescribed in the Table below require completion of the HASP amendment form in Appendix B.

| Task | Initial PPE Level | Upgrade/ Downgrade PPE Level | Skin Protection | Respiratory Protection | Other PPE |
|---|---|---|---|---|---|
| General Support Zone Activities | Level D | — | Generally none | None | Hard-hat, Steel-toe work boots, safety glasses, safety vests. Leather work gloves as needed. Hearing protection when >85 dBA. |
| Mobilization/ Demobilization | Level D | — | Generally none | None | Hard-hat, Steel-toe work boots, safety glasses, safety vests. Leather work gloves as needed. Hearing protection when >85 dBA. |
| Excavation, Loading of Trucks with Contaminated Soil/Fill, Equipment Decontamination | Level D | | Generally none | Initial: None (See Section 7) | Hard-hat, Steel-toe work boots, safety glasses, leather work gloves for material handling, hearing protection >85 dBA |

## 6.2 PROTECTION LEVEL DESCRIPTIONS

This section lists the minimum requirements for each protection level. Modification to these requirements may have been noted in the Table shown above.

### 6.2.1 *Level D*

Level D consists of the following:

- Safety glasses with side shields
- Hard hat
- Steel-toed work boots
- Work clothing as prescribed by weather
- Leather work gloves when material handling

# 7.0 *DECONTAMINATION PROCEDURES*

This section describes the procedures necessary to ensure that both personnel and equipment are free from contamination when they leave the work Site.

## 7.1 PERSONNEL DECONTAMINATION

Decontamination procedures will ensure that material which workers may have contacted in the EZ does not result in personal exposure and is not spread to clean areas of the Site. This sequence describes the general decontamination procedures for Level D. The specific stages will vary depending on the Site, the task, the protection level, etc. Dry decontamination may be used if there is insufficient space to support a full decontamination station as delineated with the steps below and approved by the HSO. The CS and the HSO will ensure that the decontamination procedures are adequate.

*Level D Decontamination*

1. Go to end of EZ
2. Cross into CRZ
3. Wash face and hands

### 7.1.1 *Suspected Contamination*

Any employee suspected of sustaining skin contact with chemical materials will first use the emergency shower. Following a thorough drenching, the worker will proceed to the decontamination area. Here the worker will remove clothing and don clean clothing. Medical attention will be provided as determined by the degree of injury.

### 7.1.2 *Personal Hygiene*

Personnel will wash hands, arms, neck and face, following decontamination and before any eating, smoking, or drinking.

## 7.2 EQUIPMENT DECONTAMINATION

Heavy equipment and other vehicles operated within the EZ will be decontaminated before being removed from the Site. Workers operating the equipment/vehicles will move the equipment to a gross decontamination location near the exit of the EZ. Following gross decontamination the equipment/vehicle will be moved to the decontamination pad. Equipment decontamination will be performed on the pad until the equipment is visually clean. Following decontamination activities equipment will be inspected by the HSO or CS prior to leaving the Site. Once the equipment is inspected it will be removed from the Site.

*Heavy Equipment / Vehicle Decontamination*

1. Equipment operator will move the heavy equipment / vehicle to a position near the EZ / CRZ interchange
2. Worker will use manual equipment (shovel, track spade) to remove gross contamination from tracks, bucket, dump box, and vehicle undercarriage (as required)
3. Following removal of gross decontamination equipment will be moved onto the decontamination pad and pressure washed / steam cleaned until equipment / vehicle is visually clean.
4. Equipment / vehicle decontaminated for removal from the Site will be moved to a clean area for the HSO / CS inspection.
5. Once the equipment / vehicle is inspected and approved it will be removed from the Site. Vehicles that fail inspection will be returned to the decontamination pad for further cleaning and re-inspected.

## 7.3 DISPOSAL OF WASTES

Wastes will be disposed according to applicable Local, State and Federal regulations.

## 7.4 DUST /EROSION CONTROL

The contractor will control dust and implement erosion control measures to be protective of nearby ecologically sensitive areas and sensitive receptors.

# 8.0 *AIR MONITORING*

Air monitoring will be conducted in order to characterize personnel exposures and fugitive emissions from Site contaminants. Principal contaminants of concern are listed in Section 4.0 of this HASP. The target compounds selected for air monitoring purposes for this Site include particulates. Results of air monitoring will be used to ensure the proper selection of protective clothing and equipment, including respiratory protection, to protect on-Site personnel and off-Site receptors from exposure to unacceptable levels of Site contaminants. Descriptions of air monitoring strategies, procedures and equipment are provided below. Modification of this plan, including additional monitoring, may be considered as judged necessary by the PSM, in conjunction with the HSO.

## 8.1 WORK AREA AIR MONITORING

Work area air monitoring will include direct reading methods and personal exposure monitoring, and will conducted in accordance with the approved CAMP for the Site. Air monitoring will be conducted during soil excavation, transportation, relocation and/or staging, and any other activities that disturb soil or are intrusive. Air monitoring within the work zone will be conducted at least four times per day, and more frequently as warranted due to detected odors or other indications of contamination, or other factors.

### 8.1.1 *Direct Reading Air Monitoring*

During active sifting operations, direct reading air monitoring will be performed to determine the potential for worker exposure to airborne hazards. A summary of air monitoring information is provided in Section 8.1.5. Real-time air samples will be taken at least four times each 8-hour worker shift in the workers' breathing zone.

### 8.1.2 *Instrumentation*

The following is a description of the air monitoring equipment to be used:

- MIE PDR-1000 Personal DataRAM, Dust trak or equivalent unit for real-time measuring particulates.
- MiniRAE PID equipped with a 106 eV lamp, or equivalent for real-time measuring of VOC levels.

### 8.1.3 *Use and Maintenance of Survey Equipment*

All personnel using field survey equipment must have training in its operation, limitations, and maintenance. Maintenance and internal or electronic calibration will be performed in accordance

with manufacturer recommendations by individuals familiar with the devices before their use on-Site. Repairs, maintenance, and internal or electronic calibration of these devices will be recorded in an equipment maintenance logbook. The equipment maintenance logbook for each instrument will be kept in that instrument's case. For rented monitoring equipment, repairs and maintenance will be conducted by the rental company. Daily calibration records will be documented on a log sheet found in Appendix C.

Air monitoring equipment will be calibrated before work begins. Only basic maintenance (such as changing batteries) will be performed by on-Site personnel. Any additional maintenance or repairs will be performed by a trained service technician.

### 8.1.4 *Air Monitoring Recordkeeping*

The HSO will ensure that all air-monitoring data is recorded on a data sheet found in Appendix C. The PSM may periodically review this data.

### 8.1.5 *Action Levels*

During soil/waste excavation, transportation, relocation and/or staging or any intrusive activities, direct reading air monitoring will be performed in the EZ to determine exposure to workers. A summary of air monitoring information is provided in the table below.

| **Monitoring Device** | **Monitoring Location/ Personnel** | **Monitoring Frequency** | **Action Level** | **Action** |
|---|---|---|---|---|
| pDr-1000 (Dust) | Soil excavation areas/laborers, technicians, equipment operators | Minimum of four times every 8-hour shift during soil disturbance activities | <5.0 $mg/m^3$ * | Level D |
| | | | ≥5.0 $mg/m^3$ * | Stop work; notify PSM |
| | | | | Implement dust suppression measures and resume work after dust levels are below action level |
| MiniRAE 3000 PID (VOCs) | Soil excavation areas/laborers, technicians, equipment operators | Minimum of four times every 8-hour shift during soil disturbance activities | <5.0 parts per million (ppm) * | Level D |
| | | | 5.0 ppm to 25.0 ppm * | Implement VOC suppression measures and resume work after VOC levels are below action level |
| | | | ≥25.0 ppm * | Stop work; notify PSM |

** Above background levels and sustained in the breathing zone for 5 minutes*

As indicated by the below calculations, the action level for PAHs and lead were selected based on the OSHA PEL for respirable dust, which was found to be significantly lower than the calculated actions levels for PAHs and lead based on utilizing the highest concentrations of these contaminants found in soil.

- OSHA PEL for respirable dust: 5 $mg/m^3$,
- Maximum concentration of PAHs found in soil is 1.53 ppm or 0.000153%.
    - 5.0 $mg/m^3$ multiplied by 0.000153% = 0.000008 $mg/m^3$.
    - OSHA PEL for PAHs is 0.2 $mg/m^3$.
- Maximum concentration of lead found in soil is 92.8 ppm or 0.00928%.
    - 5.0 $mg/m^3$ multiplied by 0.00928% = 0.00464 $mg/m^3$.
    - OSHA PEL for lead is 0.05 $mg/m^3$.

As indicated by the below calculations, the action level for PCE was selected based on the OSHA PEL of 100 ppm (which corresponds to 678 $mg/m^3$), as follows:

- OSHA PEL for PCE: 100 ppm, or 678 $mg/m^3$.
- PID response factor (10.6 eV lamp) for PCE is 0.57.
- Multiplying the PID response factor and the PEL yields a PID reading of 57 ppm that would equal the PEL, based on a "worst-case" assumption that the entire PID reading is from PCE.
- Maximum concentration of PCE detected in soil vapor: 23 $mg/m^3$, or 3.39 ppm. As a result, using the 25 ppm limit for total VOCs (as measured by the PID) for stopping work (as identified in the CAMP) will be approximately half of the PEL, and therefore conservative.

# 9.0 *EMERGENCY RESPONSE AND CONTINGENCY PLAN (ERCP)*

## 9.1 PRE-EMERGENCY PLANNING

Prior to engaging in construction/remediation activities at the Site, the CS will plan for possible emergency situations and have adequate supplies and manpower to respond. In addition, Site personnel will be briefed on proper emergency response procedures during the Site orientation.

The following situations would warrant implementation of the emergency plan:

| | |
|---|---|
| Fire/Explosion | • The potential for human injury exists.<br>• Toxic fumes or vapors are released.<br>• The fire could spread on-Site or off-Site and possibly ignite other flammable materials or cause heat-induced explosions.<br>• The use of water and/or chemical fire suppressants could result in contaminated run-off.<br>• An imminent danger of explosion exists. |
| Spill or Release of Hazardous Materials | • The spill could result in the release of flammable liquids or vapors, thus causing a fire or gas explosion hazard.<br>• The spill could cause the release of toxic liquids or fumes in sufficient quantities or in a manner that is hazardous to or could endanger human health. |
| Natural Disaster | • A rain storm exceeds the flash flood level.<br>• The facility is in a projected tornado path or a tornado has damaged facility property.<br>• Severe wind gusts are forecasted or have occurred and have caused damage to the facility. |
| Medical Emergency | • Overexposure to hazardous materials.<br>• Trauma injuries (broken bones, severe lacerations/ bleeding, burns).<br>• Eye/skin contact with hazardous materials.<br>• Medical Conditions e.g., loss of consciousness, heat stress (heat stroke), heart attack, respiratory failure, allergic reaction. |

The following measures will be taken to assure the availability of adequate equipment and manpower resources:

- Sufficient equipment and materials will be kept on-Site and dedicated for emergencies only. The inventory will be replenished after each use.
- It will be the responsibility of the CS/HSO to brief on-Site personnel on anticipated hazards at the Site. The CS/HSO shall also be responsible for anticipating and requesting equipment that will be needed for response activities.

Communications will be established prior to commencement of any activities at the remediation-Site. Communication will be established so that all responders on-Site have availability to all pertinent information to allow them to conduct their activities in a safe and healthful manner. A telephone will be available to summon assistance in an emergency.

Primary communication with local responders in the event of an emergency will be accomplished using commercial telephone lines.

## 9.2 EMERGENCY RECOGNITION AND PREVENTION

Because unrecognized hazards may result in emergency incidents, it will be the responsibility of the CS and Health & Safety Officer (HSO), through daily Site inspections and employee feedback to recognize and identify hazards that are found at the Site. These may include:

| | | |
|---|---|---|
| Chemical Hazards | • Materials at the Site<br>• Materials brought to the Site | |
| Physical Hazards | • Fire/explosion<br>• Slip/trip/fall<br>• Electrocution | • Confined space<br>• IDLH atmospheres<br>• Excessive noise |
| Mechanical Hazards | • Heavy equipment<br>• Stored energy system<br>• Pinch points | • Electrical equipment<br>• Vehicle traffic |
| Environmental Hazards | • Electrical Storms<br>• High winds<br>• Heavy Rain/Snow | • Heat Stress<br>• Vehicle traffic |

## 9.3 EMERGENCY TELEPHONE NUMBERS

Emergency telephone numbers can be found in Table 9-1. The emergency numbers will be posted at strategic locations across the Site and in all Site trailers.

Figure 9-1 is the Hospital Route Map with directions to the nearest hospital. Only in a non-emergency situation are personnel to be transported to the hospital by Site representatives.

***TABLE 9-1***
***EMERGENCY TELEPHONE NUMBERS***

**Emergency Contacts**

| | |
|---|---|
| Emergency Medical Service ( New York City Fire Department (FDNY))….. | 911 |
| Police: New York City Police Department (NYPD)……..... | 911 |
| Hospital: Mount Sinai Hospital Queens……...…… | (718) 932-1000 |
| Fire: New York City Fire Department (FDNY)……. | 911 |
| New York City Office of Emergency Management……... | 911 |
| National Response Center…….. | (800) 424-8802 |
| Poison Control Center……..... | (800) 222-1222 |
| Chemtrec……. | (800) 262-8200 |
| Center for Disease Control……. | (800) 311-3435 |
| USEPA (Region II)……. | (212) 637-5000 |
| NYSDEC Emergency Spill Response…….…… | (800) 457-7362 |

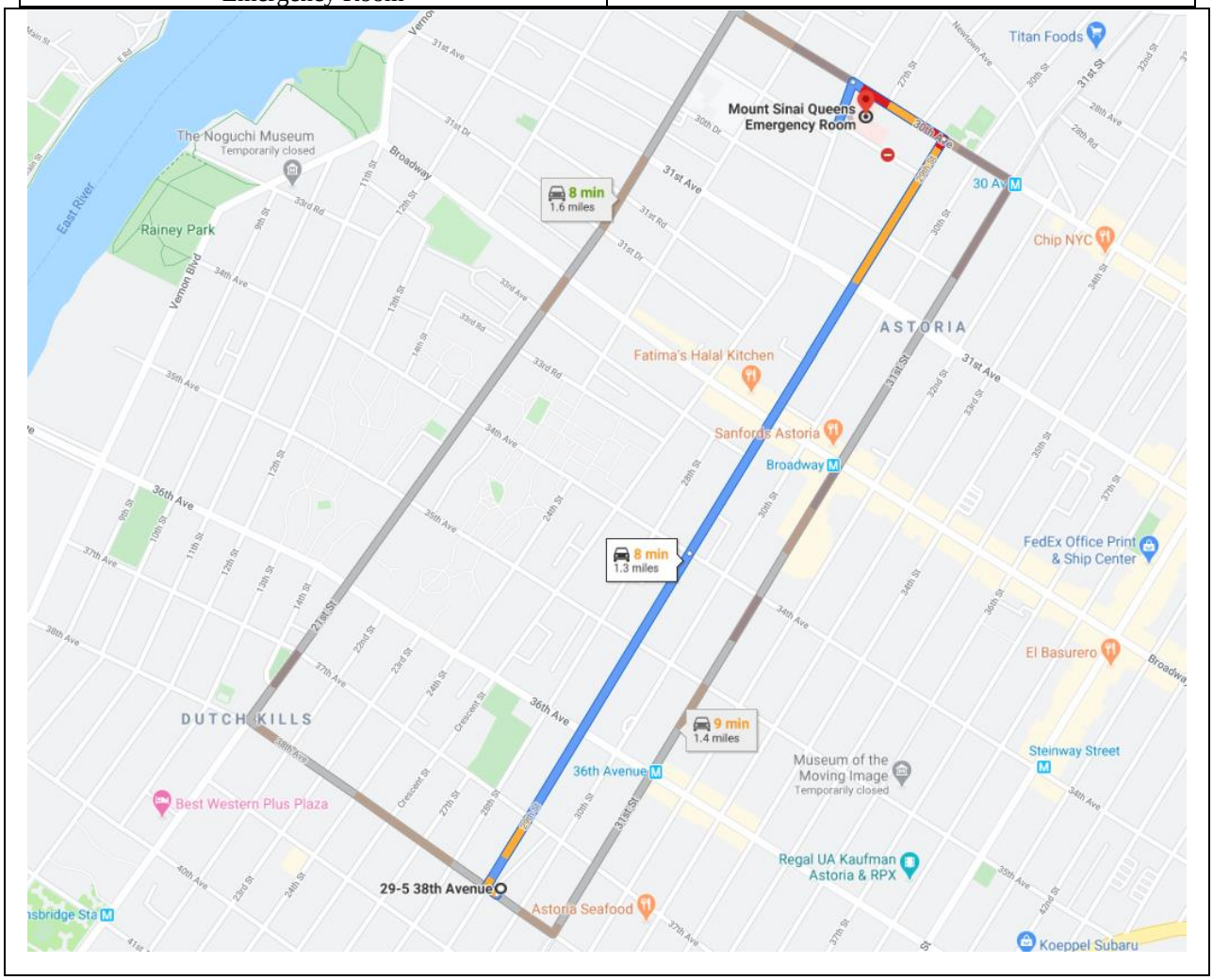
**Project Contacts**

| | |
|---|---|
| Athenica, Principal: Spiro Dongaris, P.E. ……..…….. | (718) 784-7490 |
| Athenica Project Manager: Kenneth Wenz, P.G. ……..... | (631) 742-0638 |
| Athenica Field Task Leader: To be determined……... | |
| General Contractor Safety Officer: To be determined…….. | |

**FIGURE 9-1**
**DIRECTIONS AND HOSPITAL ROUTE MAP**

**Site Location: 29-05 38th Avenue, Long Island City (Queens), New York**
**Hospital Location:** 2530 30th Avenue, Long Island City (Queens), New York 11102
**Telephone:** (718) 932-1000

| Direction | Distance |
|---|---|
| Head northwest on 38th Avenue toward 29th Street | 100 feet |
| Turn right onto 29th Street | 1.1 mile |
| Turn left onto 30th Avenue | .1 mile |
| Hospital will be on the left. Follow signs for Emergency Room | End |



Once a hazard has been recognized, the CS and/or the HSO will take immediate action to prevent the hazard from becoming an emergency. This may be accomplished by the following:

- Daily safety meeting
- Task-specific training prior to commencement of activity
- Personal Protective Equipment (PPE) selection/use
- Written and approved permits for hot work, confined space
- Trenching/shoring procedure
- Air monitoring
- Following all standard operating procedures

## 9.4 PERSONNEL ROLES, LINES OF AUTHORITY, AND COMMUNICATIONS

This section of the ERCP describes the various roles, responsibilities, and communication procedures that will be followed by personnel involved in emergency responses.

The primary emergency coordinator for this Site is the CS. In the event an emergency occurs and the emergency coordinator is not on-Site, the HSO will serve as the emergency coordinator until the CS arrives. The emergency coordinator will determine the nature of the emergency and take appropriate action as defined by this ERCP.

The emergency coordinator will implement the ERCP immediately as required. The decision to implement the plan will depend upon whether the actual incident threatens human health or the environment.

Immediately after being notified of an emergency incident, the emergency coordinator or his designee will evaluate the situation to determine the appropriate action.

### 9.4.1 *Responsibilities and Duties*

This section describes the responsibilities and duties assigned to the emergency coordinator.

It is recognized that the structure of the "Incident Command System" will change as additional response organizations are added. Personnel will follow procedures as directed by the fire department, LEPC, State and Federal Agencies as required.

### 9.4.2 *On-Site Emergency Coordinator Duties*

The on-Site emergency coordinator is responsible for implementing and directing the emergency procedures. All emergency personnel and their communications will be coordinated through the emergency coordinator. Specific duties are as follows:

- Identify the source and character of the incident, type and quantity of any release. Assess possible hazards to human health or the environment that may result directly from the problem or its control.
- Discontinue operations in the vicinity of the incident if necessary to ensure that fires, explosions, or spills do not recur or spread to other parts of the Site. While operations are dormant, monitor for leaks, pressure build-up, gas generation, or ruptures in valves, pipes, or other equipment, where safe and appropriate.
- Notify the Client Representative and local Emergency Response Teams if their help is necessary to control the incident. Table 9-1 provides telephone numbers for emergency assistance.
- Direct on-Site personnel to control the incident until, if necessary, outside help arrives. Specifically: Ensure that the building or area where the incident occurred and the surrounding area are evacuated and shut off possible ignition sources, if safe and appropriate. The Emergency Response Coordinator is responsible for directing Site personnel such that they avoid the area of the incident and leave emergency control procedures unobstructed.
- If fire or explosion is involved, notify local Fire Department.
- Have protected personnel, in appropriate PPE, on standby for rescue.

If the incident may threaten human health or the environment outside of the Site, the emergency coordinator should immediately determine whether evacuation of area outside of the Site may be necessary and, if so, notify the Police Department and the Office of Emergency Management.

When required, notify the National Response Center. The following information should be provided to the National Response Center:

- Name and telephone number
- Name and address of facility
- Time and type of incident
- Name and quantity of materials involved, if known
- Extent of injuries
- Possible hazards to human health or the environment outside of the facility.

The emergency telephone number for the National Response Center is 800-424-8802.

If hazardous waste has been released or produced through control of the incident, ensure that:

- Waste is collected and contained.
- Containers of waste are removed or isolated from the immediate Site of the emergency.

- Treatment or storage of the recovered waste, contaminated soil or surface water, or any other material that results from the incident or its control is provided.
- Ensure that no waste that is incompatible with released material is treated or stored in the facility until cleanup procedures are completed.
- Ensure that all emergency equipment used is decontaminated, recharged, and fit for its intended use before operations are resumed.
- Notify the USEPA Regional Administrator that cleanup procedures have been completed and that all emergency equipment is fit for its intended use before resuming operations in the affected area of the facility. The USEPA Regional Administrator's telephone number is included in the Emergency Contacts.
- Record date, time, details of the incident, and submit a written report to the USEPA Regional Administrator. The report is due to the USEPA within 15 days of the incident.

## 9.5 SAFE DISTANCES AND PLACES OF REFUGE

The emergency coordinator for all activities will be the CS. No single recommendation can be made for evacuation or safe distances because of the wide variety of emergencies which could occur. Safe distances can only be determined at the time of an emergency based on a combination of Site and incident-specific criteria. However, the following measures are established to serve as general guidelines.

In the event of minor hazardous materials releases (small spills of low toxicity), workers in the affected area will report initially to the contamination reduction zone. Small spills or leaks (generally less than 55 gallons) will require initial evacuation of at least 50 feet in all directions to allow for cleanup and to prevent exposure. After initial assessment of the extent of the release and potential hazards, the emergency coordinator or his designee will determine the specific boundaries for evacuation. Appropriate steps such as caution tape, rope, traffic cones, barricades, or personal monitors will be used to secure the boundaries.

If a major incident may threaten the health or safety of the surrounding community, the public will be informed and, if necessary, evacuated from the area. The emergency coordinator, or his designee will inform the proper agencies in the event that this is necessary. Telephone numbers are listed in Table 9-1.

Places of refuge will be established prior to the commencement of activities. These areas must be identified for the following incidents:

- Chemical release
- Fire/explosion
- Power loss

- Medical emergency
- Hazardous weather

In general, evacuation will be made to the Site entrance, unless the emergency coordinator determines otherwise. It is the responsibility of the emergency coordinator to determine when it is necessary to evacuate personnel to off-Site locations.

In the event of an emergency evacuation, all the employees will gather at the entrance to the Site until a head count establishes that all are present and accounted for. No one is to leave the Site without notifying the emergency coordinator.

## 9.6 EVACUATION ROUTES AND PROCEDURES

All emergencies require prompt and deliberate action. In the event of an emergency, it will be necessary to follow an established set of procedures. Such established procedures will be followed as closely as possible. However, in specific emergency situations, the emergency coordinator may deviate from the procedures to provide a more effective plan for bringing the situation under control. The emergency coordinator is responsible for determining which situations require Site evacuation.

### 9.6.1 *Evacuation Signals and Routes*

Two-way radio communication or equivalent will be used to notify employees of the necessity to evacuate an area or building involved in a release/spill of a hazardous material. As necessary, each crew supervisor will have a two-way radio. Total Site evacuation will be initiated only by the emergency coordinator, however, in his absence, decision to preserve the health and safety of employees will take precedence.

### 9.6.2 *Evacuation Procedures*

In the event evacuation is necessary the following actions will be taken:

- The emergency signal will be activated.
- No further entry of visitors, contractors, or trucks will be permitted. Vehicle traffic within the Site will cease in order to allow safe exit of personnel and movement of emergency equipment.
- Shut off all machinery if safe to do so.
- ALL on-Site personnel, visitors, and contractors in the support zone will assemble at the entrance to the Site for a head count and await further instruction from the emergency coordinator.

- ALL persons in the exclusion zone and contamination reduction zone will be accounted for by their immediate crew leaders. Leaders will determine the safest exits for employees and will also choose an alternate exit if the first choice is inaccessible.
- During exit, the crew leader should try to keep the group together. Immediately upon exit, the crew leader will account for all employees in his crew.
- Upon completion of the head count, the crew leader will provide the information to the emergency coordinator.
- Contract personnel and visitors will also be accounted for.
- The names of emergency response team members involved will be reported to the emergency coordinator.
- A final tally of persons will be made by the emergency coordinator or designee. No attempt to find persons not accounted for will involve endangering lives of Site personnel by re-entry into emergency areas.
- In all questions of accountability, immediate crew leaders will be held responsible for those persons reporting to them. Visitors will be the responsibility of those employees they are seeing. Contractors and truck drivers are the responsibility of the Construction Superintendent.
- Personnel will be assigned by the emergency coordinator to be available at the main gate to direct and brief emergency responders.
- Re-entry into the Site will be made only after clearance is given by the emergency coordinator. At his direction, a signal or other notification will be given for re-entry into the facility.

## 9.7 EMERGENCY SPILL RESPONSE PROCEDURES AND EQUIPMENT

In the event of an emergency involving a hazardous material spill or release, the following general procedures will be used for rapid and safe response and control of the situation. Emergency contacts found in Table 9-1 provide a quick reference guide to follow in the event of a major spill.

### 9.7.1 *Notification Procedures*

If an employee discovers a chemical spill or process upset resulting in a vapor or material release, he or she will immediately notify the on-Site emergency coordinator.

On-Site Emergency Coordinator will obtain information pertaining to the following:

- The material spilled or released.
- Location of the release or spillage of hazardous material.
- An estimate of quantity released and the rate at which it is being released.
- The direction in which the spill, vapor or smoke release is heading.

- Any injuries involved.
- Fire and/or explosion or possibility of these events.
- The area and materials involved and the intensity of the fire or explosion.

This information will help the on-Site emergency coordinator to assess the magnitude and potential seriousness of the spill or release.

### 9.7.2 *Procedure for Containing/Collecting Spills*

The initial response to any spill or discharge will be to protect human health and safety, and then the environment. Identification, containment, treatment, and disposal assessment will be the secondary response.

If for some reason a chemical spill is not contained within a dike or sump area, an area of isolation will be established around the spill. The size of the area will generally depend on the size of the spill and the materials involved. If the spill is large (greater than 55 gallons) and involves a tank or a pipeline rupture, an initial isolation of at least 100 ft. in all directions will be used. Small spills (less than or equal to 55 gallons) or leaks from a tank or pipe will require evacuation of at least 50 ft. in all directions to allow cleanup and repair and to prevent exposure. When any spill occurs, only those persons involved in overseeing or performing emergency operations will be allowed within the designated hazard area. If possible the area will be roped or otherwise blocked off.

If the spill results in the formation of a toxic vapor cloud (by reaction with surrounding materials or by outbreak of fire) and its release (due to high vapor pressures under ambient conditions), further evacuation will be necessary. In general an area at least 500 feet wide and 1,000 feet long will be evacuated downwind if volatile materials are spilled. (Consult the DOT Emergency Response Guide for isolation distances for listed hazardous materials.)

If an incident may threaten the health or safety of the surrounding community, the public will be informed and possibly evacuated from the area. The on-Site emergency coordinator will inform the proper agencies in the event this is necessary. (Refer to Table 9-1)

As called for in regulations developed under the Comprehensive Environmental Response Compensation Liability Act of 1980 (Superfund), a spill of a pound or more of any hazardous material for which a reportable quantity has not been established and which is listed under the Solid Waste Disposal Act, Clean Air Act, Clean Water Act, or TSCA shall be reported.

Clean up personnel will take the following measures:

- Make sure all unnecessary persons are removed from the hazard area.
- Put on protective clothing and equipment.

- If a flammable material is involved, remove all ignition sources, and use spark and explosion proof equipment for recovery of material.
- Remove all surrounding materials that could be especially reactive with materials in the waste. Determine the major components in the waste at the time of the spill.
- If wastes reach a storm sewer, try to dam the outfall by using sand, earth, sandbags, etc. If this is done, pump this material out into a temporary holding tank or drums as soon as possible.
- Place all small quantities of recovered liquid wastes (55 gallons or less) and contaminated soil into drums for incineration or removal to an approved disposal Site.
- Spray the spill area with foam, if available, if volatile emissions may occur.
- Apply appropriate spill control media (e.g. clay, sand, lime, etc.) to absorb discharged liquids.

For large spills, establish diking around leading edge of spill using booms, sand, clay or other appropriate material. If possible, use diaphragm pump to transfer discharged liquid to drums or holding tank.

### 9.7.3 *Emergency Response Equipment*

The following equipment will be staged in the support zone and throughout the Site, as needed, to provide for safety and first aid during emergency responses.

- ABC-type fire extinguisher
- First-aid kit, industrial size
- Portable eyewash

### 9.7.4 *Emergency Spill Response Clean-Up Materials and Equipment*

A sufficient supply of appropriate emergency response clean-up and personal protective equipment will be available as needed.

The materials listed below may be kept on-Site for spill control, depending on the types of hazardous materials present on-Site. The majority of this material will be located in the support zone, in a supply trailer or storage area. Small amounts, as necessary, will be placed on pallets and located in the active work areas.

- Sand or clay to solidify/absorb liquid spills.

* **Note: All contaminated soils, absorbent materials, solvents and other materials resulting from the clean-up of spilled or discharged substances shall be properly stored, labeled, and disposed of off-Site.**

## 9.8 EMERGENCY CONTINGENCY PLAN

This section of the ERCP details the contingency measures the Site Contractor will take to prepare for and respond to fires, explosions, spills and releases of hazardous materials, hazardous weather, and medical emergencies.

## 9.9 MEDICAL EMERGENCY CONTINGENCY MEASURES

The procedures listed below will be used to respond to medical emergencies. A minimum of one First-Aid/CPR trained personnel should be available on-Site.

### 9.9.1 *Response*

The nearest workers will immediately assist a person who shows signs of medical distress or who is involved in an accident. The work crew supervisor will be summoned.

The work crew supervisor will immediately make radio contact with the on-Site emergency coordinator to alert him of a medical emergency situation. The supervisor will advise the following information:

- Location of the victim at the work Site
- Nature of the emergency
- Whether the victim is conscious
- Specific conditions contributing to the emergency, if known

The Emergency Coordinator will notify the Health & Safety Officer. The following actions will then be taken depending on the severity of the incident:

- *Life-Threatening Incident* – If an apparent life-threatening condition exists, the crew supervisor will inform the emergency coordinator by radio, and the local Emergency Response Services (EMS) will be immediately called. An on-Site person will be appointed who will meet the EMS and have him/her quickly taken to the victim. Any injury within the EZ will be evacuated by personnel to a clean area for treatment by EMS personnel. No one will be able to enter the EZ without showing proof of training, medical surveillance and Site orientation.
- *Non-Life-Threatening Incident* – If it is determined that no threat to life is present, the Health & Safety Officer will direct the injured person through decontamination procedures (see below) appropriate to the nature of the illness or accident. Appropriate first aid or medical attention will then be administered.

* **Note: The area surrounding an accident Site must not be disturbed until the scene has been cleared by the Health & Safety Officer.**

Any personnel requiring emergency medical attention will be evacuated from exclusion and contamination reduction zones if doing so would not endanger the life of the injured person or otherwise aggravate the injury. Personnel will not enter the area to attempt a rescue if their own lives would be threatened. The decision whether or not to decontaminate a victim prior to evacuation is based on the type and severity of the illness or injury and the nature of the contaminant. For some emergency victims, immediate decontamination may be an essential part of life-saving first aid. For others, decontamination may aggravate the injury or delay life-saving first aid. Decontamination will be performed if it does not interfere with essential treatment.

If decontamination can be performed, observe the following procedures:

- Wash external clothing and cut it away.

If decontamination cannot be performed, observe the following procedures:

- Wrap the victim in blankets or plastic to reduce contamination of other personnel.
- Alert emergency and off-Site medical personnel to potential contamination, instruct them about specific decontamination procedures.
- Send Site personnel familiar with the incident and chemical safety information, e.g. MSDS, with the affected person.

All injuries, no matter how small, will be reported to the HSO or the CS. An accident/injury/illness report will be completely and properly filled out and submitted to the Corporate Health and Safety Manager.

A list of emergency telephone numbers is given in Table 9.1.

### 9.9.2 *Notification*

The following personnel/agencies will be notified in the event of a medical emergency:

- Local Fire Department or EMS
- On-Site Emergency Coordinator
- Workers in the affected areas
- Client Representative

## 9.10 FIRE CONTINGENCY MEASURES

Because flammable/combustible materials are present at this Site, fire is an ever-present hazard. Safety personnel are not trained professional firefighters. Therefore, if there is any doubt that a fire can be quickly contained and extinguished, personnel will notify the emergency coordinator by radio and vacate the structure or area. The emergency coordinator will immediately notify the local Fire Department.

The following procedures will be used to prevent the possibility of fires and resulting injuries:

- Sources of ignition will be kept away from where flammable materials are handled or stored.
- The air will be monitored for explosivity before and during hot work and periodically where flammable materials are present. Hot work permits will be required for all such work.
- "No smoking" signs will be conspicuously posted in areas where flammable materials are present.
- Fire extinguishers will be placed in all areas where a fire hazard may exist.
- Before workers begin operations in an area the foreman will give instruction on egress procedures and assembly points. Egress routes will be posted in work areas and exit points clearly marked.

### 9.10.1 *Response*

The following procedures will be used in the event of a fire:

- Anyone who sees a fire will notify their supervisor who will then contact the Emergency Coordinator by radio. The emergency coordinator will activate the emergency air horns and contact the local Fire Department.
- When the emergency siren sounds, workers will disconnect electrical equipment in use (if possible) and proceed to the nearest fire exit.
- Work crews will be comprised of pairs of workers (buddy system) who join each other immediately after hearing the fire alarm and remain together throughout the emergency. Workers will assemble at a predetermined rally point for a head count.
- When a small fire has been extinguished by a worker, the emergency coordinator will be notified.

## 9.11 HAZARDOUS WEATHER CONTINGENCY MEASURES

Operations outside will not be started or continued when the following hazardous weather conditions are present:

- Lightning
- Heavy Rains/Snow
- High Winds

### 9.11.1 *Response*

- Excavation/soil stock piles will be covered with plastic liner.
- All equipment will be shut down and secured to prevent damage.
- Personnel will be moved to safe refuge. The emergency coordinator will determine when it is necessary to evacuate personnel to off-Site locations and will coordinate efforts with fire, police and other agencies.

### 9.11.2 *Notification*

The emergency coordinator will be responsible for assessing hazardous weather conditions and notifying personnel of specific contingency measures. Notifications will include:

- Site workers and subcontractors
- Client Representative
- Local Emergency Management Agency

## 9.12 SPILL/RELEASE CONTINGENCY MEASURES

In the event of release or spill of a hazardous material the following measures will be taken:

### 9.12.1 *Response*

Any person observing a spill or release will act to remove and/or protect injured/contaminated persons from any life-threatening situation. First aid and/or decontamination procedures will be implemented as appropriate.

First aid will be administered to injured/contaminated personnel. All personnel will act to prevent any unsuspecting persons from coming in contact with spilled materials by alerting other nearby persons. Attempt to stop the spill at the source, if possible. Without taking unnecessary risks, personnel will attempt to stop the spill at the source. This may involve activities such as righting a drum, closing a valve or temporarily sealing a hole with a plug.

The emergency coordinator will be notified of the spill/release, including information on material spilled, quantity, personnel injuries and immediate life threatening hazards. Air monitoring will be implemented by the emergency coordinator and HSO to determine the potential impact on the surrounding community. Notification procedures will be followed to inform on-Site personnel and off-Site agencies. The emergency coordinator will make a rapid assessment of the spill/release and

direct confinement, containment and control measures. Depending upon the nature of the spill, measures may include:

- Construction of a temporary containment berm utilizing on-Site clay absorbent earth
- Digging a sump, installing a polyethylene liner and
- Diverting the spill material into the sump placing drums under the leak to collect the spilling material before it flows over the ground
- Transferring the material from its original container to another container

The emergency coordinator will notify the Client Representative of the spill and steps taken to institute clean-up. Emergency response personnel will clean-up all spills following the spill clean-up plan developed by the emergency coordinator. Supplies necessary to clean up a spill may include, but are not limited to:

- Shovel, rake
- Clay absorbent
- Polyethylene liner
- Personal safety equipment
- Steel drums
- Pumps and miscellaneous hand tools

The emergency coordinator will inspect the spill Site to determine that the spill has been cleaned up to the satisfaction of the Client Representative. If necessary, soil, water or air samples may be taken and analyzed to demonstrate the effectiveness of the spill clean-up effort. The emergency coordinator will determine the cause of the spill and determine remedial steps to ensure that recurrence is prevented. The emergency coordinator will review the cause with the Client Representative and obtain his concurrence with the remedial action plan.

# 10.0 *TRAINING REQUIREMENTS*

All personnel entering the exclusion zone will be trained in the provisions of this Site safety plan and be required to sign the CHASP Acknowledgment form in Appendix A.

## 10.1 SITE-SPECIFIC TRAINING ORIENTATION

Outlines of the orientation for Site workers, subcontractor personnel and visitors are presented below:

| CONTRACTOR WORKERS | VISITORS |
|---|---|
| • HASP sign off<br>• Sign in/out procedures<br>• Site background/characterization<br>• Chain of command<br>• Rules and regulations<br>• Hours of work<br>• Absences<br>• Personal Protective Equipment/respirator fit test (if applicable)<br>• Emergency Information<br>  • Emergency signal<br>  • Gathering point<br>  • Responsibilities/roles<br>  • Emergency phone numbers<br>• Site Control/Work Zones<br>• Hazards/AHAs<br>• Air Monitoring Program<br>• Forms, Site-specific<br>• Incident Reporting<br>• Lead Awareness (Appendix C) | • Sign in/out procedures<br>• Site Background/ Characterization<br>• Review of Site map<br>• Work Zones in progress<br>• Emergency plan/signals<br>• Training/medical requirements<br>• Zones/areas open to visitors |

## 10.2 DAILY SAFETY MEETINGS

A safety meeting will be conducted by the CS and the HSO 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. Meetings will be documented in a log book and/or on the Daily Safety Meeting Form in Appendix D.

## APPENDIX A

- ***HEALTH AND SAFETY PLAN CERTIFICATION***
- ***GENERAL/SUB-CONTRACTOR HEALTH & SAFETY PLAN ACKNOWLEDGEMENT***
- ***NOTICE OF SAFETY VIOLATION***
- ***PRE-JOB SAFETY CHECKLIST***

**HEALTH AND SAFETY PLAN CERTIFICATION**

By signing this document, I am stating that I have read and understand the Site health and safety plan for _____ (Contractor) personnel, subcontractors and visitors entering the Site.

| COMPANY NAME | NAME (PRINT) | SIGNATURE | DATE |
|---|---|---|---|
| | | | |
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# NOTICE OF SAFETY VIOLATION

**TO:** _____(Name of Contractor/Subcontractor Supervisor)
**FROM:** _____(Name of Owner/Contractor's Project Manager)
**DATE:** _____
**SUBJECT:** ***Notice of Safety Violations***

The following Safety Violations were observed at the Name of Site/Project on Date.

1. _____
2. _____
3. _____
4. _____
5. _____

You are requested to take the necessary corrective action to alleviate these safety violations by _____ (Date).

Please notify _____(Name of Contractor/Subcontractor's Project Manager) when you have completed this corrective action.

Thank you in advance for your cooperation in this effort.

**CONTRACTOR/SUBCONTRACTOR**
**PRE-JOB SAFETY CHECKLIST**

JOB: SUBCONTRACTOR:

LOCATION: PROJECT NO.:

| | | Yes | No |
|---|---|---|---|
| 1. | Standard emergency signals fully understood? | ☐ | ☐ |
| 2. | Subcontractor responsibility in time of emergency understood? | ☐ | ☐ |
| 3. | Fire and ambulance telephone numbers known? | ☐ | ☐ |
| 4. | Areas for possible evacuation designated? | ☐ | ☐ |
| 5. | Special safety rules for the plant or area known? | ☐ | ☐ |
| 6. | Nature of Chemical or special hazards for area reviewed with safety officer? | ☐ | ☐ |
| 7. | Special safety equipment for the area of job known? | ☐ | ☐ |
| 8. | Safety shower and eye wash locations known? | ☐ | ☐ |
| 9. | Smoking area designated? | ☐ | ☐ |
| 10. | Have you been advised of potential hazards, protective Measures and availability of hazard information? e.g. Health & Safety Plan | ☐ | ☐ |
| 11. | Do you understand you are required to provide your employees with the information in (10) above? | ☐ | ☐ |
| 12. | Have you provided MSDSs to Athenica for any hazardous material you intend to bring on-Site? | ☐ | ☐ |
| 13. | Have you submitted training/medical certification records? | ☐ | ☐ |
| 14. | Are your subcontractors aware of the above rules? | ☐ | ☐ |

Remarks: (Explain all No Answers)

_____

_____

_____

_____

_____ _____

Subcontractor's Supervisor Date

_____ _____

Contractor's Project Manager Date

_____ _____

Contractor's Project Supervisor Date

_____ _____

Health & Safety Officer Date

## APPENDIX B

### *HEALTH AND SAFETY PLAN AMENDMENTS AND DOCUMENTATION FORM*

**SITE-SPECIFIC HEALTH AND SAFETY PLAN**
**AMENDMENT DOCUMENTATION**

**Project Name:** _____ **Project No.:** _____

**Amendment No.:** _____ **Date:** _____

**Amendment Page(s)**: **Revises:** _____ **Section(s):** _____

**Task(s) Amendment Affects:*** _____

_____

**(Attach new/revised Job Safety Analyses)*

**Reason For Amendment:**

_____

_____

_____

**Amendment:** *(Attach separate sheet(s) as necessary)*

_____

_____

_____

_____

_____

_____

**Completed by:** _____ **Approved by:** _____

## APPENDIX C

***DAILY SAFETY REPORT FORM***

***AIR MONITORING RECORD FORM***

***EQUIPMENT CALIBRATION RECORD FORM***

# DAILY SAFETY REPORT

| Date: | Site Name: | Site Location: |
|---|---|---|

| Time | Temp. | Wind Dir | Wind Spd | Conditions |
|---|---|---|---|---|
| | | | | |
| | | | | |
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| Activity | PPE Worn |
|---|---|
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| Time | Observations/Actions |
|---|---|
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Notes Taken By: _____

| AIR MONITORING RECORD | | | | |
|---|---|---|---|---|
| **Site Name**: | | **Site Location:** | **Date:** | |
| **Time** | **Respirable Particulates ($mg/m^3$)** | **Location** | **Activity** | **Initials** |
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| EQUIPMENT CALIBRATION RECORD | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Site Name:** | | | | | **Site Location:** | | |
| **Date** | **Instrument** | **S/N** | **Battery** | **Zero** | **Init. Rdg.** | **Adjustments** | **Initials** |
| | pDR-1500, Dusttrack or equivalent | | | Filter | | | |
| | Mini-RAE 3000 PID, or equivalent | | | 100 ppm isobutylene | | | |
| | pDR-1500, Dusttrack or equivalent | | | Filter | | | |
| | Mini-RAE 3000 PID, or equivalent | | | 100 ppm isobutylene | | | |
| | pDR-1500, Dusttrack or equivalent | | | Filter | | | |
| | Mini-RAE 3000 PID, or equivalent | | | 100 ppm isobutylene | | | |
| | pDR-1500, Dusttrack or equivalent | | | Filter | | | |
| | Mini-RAE 3000 PID, or equivalent | | | 100 ppm isobutylene | | | |
| | pDR-1500, Dusttrack or equivalent | | | Filter | | | |
| | Mini-RAE 3000 PID, or equivalent | | | 100 ppm isobutylene | | | |
| | pDR-1500, Dusttrack or equivalent | | | Filter | | | |
| | Mini-RAE 3000 PID, or equivalent | | | 100 ppm isobutylene | | | |
| | pDR-1500, Dusttrack or equivalent | | | Filter | | | |
| | Mini-RAE 3000 PID, or equivalent | | | 100 ppm isobutylene | | | |

Calibration gases: 1. 100 ppm isobutylene, 2. 50% LEL methane, 3. 50 ppm CO, 4. 25 ppm $H_2$

## APPENDIX D

### *TAILGATE SAFETY MEETING FORM*

**Daily Safety Meeting Report**

Project Name:
Location:
Date:

Today's Tasks/Activities:

Potential Chemical/Physical Hazards:

Personal Protective Equipment:

Attendees:

HSO: _____ Const. Supt: _____

**(Signature)** **(Signature)**

# APPENDIX H
# COMMUNITY AIR MONITORING PLAN

# 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 are based on NYSDEC guidance, and exceedances thereof will necessitate appropriate response actions, such as increased monitoring, corrective actions to abate emissions, and/or work shut-down. Additionally, the CAMP helps to confirm that work activities did not spread contamination to off-Site receptors through the air.

Implementation of this CAMP will not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around all intrusive work areas.

## Community Air Monitoring Plan

Real-time air monitoring for VOCs and particulate levels at locations upwind and downwind of the work area will be conducted during all intrusive sampling activities, as follows:.

**Continuous monitoring** will be conducted for all ground intrusive activities. Ground intrusive activities include, but are not limited to, advancing of soil borings, soil/waste excavation and handling, test pitting or trenching, and installation of monitoring wells or soil vapor probes.

**Periodic monitoring** for VOCs will be conducted during non-intrusive activities, such as collection of soil vapor/ambient air samples or sampling of existing monitoring wells. 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 baling/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 such 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) will be monitored at the upwind and downwind perimeter of the immediate work area on a continuous basis. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present (i.e., photoionization detector (PID)). The instruments will be calibrated at least daily in accordance with manufacturers' instructions. The equipment will 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 will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities 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 will 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 VOC level is above 25 ppm at the perimeter of the work area, activities will be halted.

4. All 15-minute readings will be recorded and will be available for review upon request. Instantaneous readings, if any, used for decision purposes will also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations, 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 will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 $\mu g/m^3$ 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 $\mu g/m^3$ above the upwind level, work will 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 $\mu g/m^3$ of the upwind level and in preventing visible dust migration.

3. All readings will be recorded and will be available for review upon request.

# APPENDIX I
# SITE MANAGEMENT FORMS

**Site Management Inspection Checklist**
Prepared By: _____

| WEATHER | Snow | | Rain | | Overcast | | Partly Cloudy | | Sun | |
|---|---|---|---|---|---|---|---|---|---|---|
| TEMP. | < 32 | | 32-50 | | 50-70 | | 70-85 | | >85 | |

| BCP Project No.: | C241250 | Address: | 29-05 38th Avenue, Long Island City, NY 11101 | Date: | |
|---|---|---|---|---|---|
| Project Name: | 29-05 38th Avenue Site | | | | |

| Consultant: Athenica Environmental Engineering, PLLC. | Owner: |
|---|---|

| SVE/SSDS Operation | Yes | No | Comments |
|---|---|---|---|
| System blower running? | | | |
| Observed leaks around blower/exhaust stack? | | | |
| Vacuum gauges operational? | | | |
| Alarm system green light on? | | | |
| Alarm system audible function operational? | | | |
| Condensate Knockout Drum Emptied? | | | |
| Observed leaks around gauge or alarm? | | | |

For vacuum readings and total VOC readings, refer to attached field sheet.

For Groundwater Monitoring Well gauging and sampling logs, refer to attached field sheet.

**Problems Encountered:**

**Recommendations:**

Date and Time of Inspection: _____

Inspector Signature: _____

_____

| | | |
|---|---|---|
| | **Date** | |
| | **Time** | |
| **SVE Blower** | State | |
| | Flow Rate (SCFM) | |
| | Vacuum in (-InWc) | |
| | Vacuum out (-InWc) | |
| **Discharge** | Pre-Treatment PID Reading (PPM) | |
| | Post-Treatment PID Reading (PPM) | |
| | | |
| **EW-1** | State | |
| | Flow Rate (SCFM) | |
| | Temperature (deg F) | |
| | PID (ppm) | |
| | Vacuum (-InWc) | |
| **EW-2** | State | |
| | Flow Rate (SCFM) | |
| | Temperature (deg F) | |
| | PID (ppm) | |
| | Vacuum (-InWc) | |
| **EW-3** | State | |
| | Flow Rate (SCFM) | |
| | Temperature (deg F) | |
| | PID (ppm) | |
| | Vacuum (-InWc) | |
| **EW-4** | State | |
| | Flow Rate (SCFM) | |
| | Temperature (deg F) | |
| | PID (ppm) | |
| | Vacuum (-InWc) | |
| **EW-5** | State | |
| | Flow Rate (SCFM) | |
| | Temperature (deg F) | |
| | PID (ppm) | |
| | Vacuum (-InWc) | |
| **EW-6** | State | |
| | Vacuum (-InWc) | |
| **MP-1** | Vacuum (-InWc) | |
| | PID (ppm) | |
| **MP-2** | Vacuum (-InWc) | |
| | PID (ppm) | |
| **MP-3** | Vacuum (-InWc) | |
| | PID (ppm) | |
| **MP-4** | Vacuum (-InWc) | |
| | PID (ppm) | |
| **MP-5** | Vacuum (-InWc) | |
| | PID (ppm) | |
| **MP-6** | Vacuum (-InWc) | |
| | PID (ppm) | |
| **MP-7** | Vacuum (-InWc) | |
| | PID (ppm) | |
| **MP-8** | Vacuum (-InWc) | |
| | PID (ppm) | |
| **MP-9** | Vacuum (-InWc) | |
| | PID (ppm) | |
| **MP-10** | Vacuum (-InWc) | |
| | PID (ppm) | |
| **MP-11** | Vacuum (-InWc) | |
| | PID (ppm) | |
| **MP-12** | Vacuum (-InWc) | |
| | PID (ppm) | |
| **MP-13** | Vacuum (-InWc) | |
| | PID (ppm) | |

ATHENICA ENVIRONMENTAL ENGINEERING PLLC
Environmental Engineering Consultants

31-33 31st Street, 2nd Floor, Astoria, NY 11106
p: 718-784-7490 f: 718-784-4085
e: info@athenica.com

# Groundwater Purge Log

| | | | | | |
|---|---|---|---|---|---|
| **Job No:** | | **Client:** | | **Well No:** | |
| **Project Location:** | | **Sampled By:** | | | |
| **Date:** | | **Time:** | | | |
| **Total Depth:** | **ft.** | **Well Diameter:** | **in.** | *= 0.163 * WC for 2" wells | |
| **Depth to Water:** | **ft.** | **Well Volume*:** | **gal.** | *= 0.653 * WC for 4" wells | |
| **Water Column (WC):** | **ft.** | **Total Volume Purged:** | | *= 1.469 * WC for 6" wells | |

| Time | Pump Rate | Turbidity (NTU) | Temperature (°C) | Conductivity (µS/cm) | DO (mg/L) | pH | ORP (mV) | Comments |
|---|---|---|---|---|---|---|---|---|
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| **Stabilization Criteria** | | 10% | 3% | 3% | 10% | ±0.1 | ±10 | |

Purge until turbidity is less than 50 NTU for three successive readings or until water quality indicators are within 10% for three successive readings. Purge a minimum of three well volumes.

Site Address: 29-05 38th Avenue

| **Well I.D.** | **Depth To Water (ft.)** | **Head Space (PPM)** | **Sample Date** | **Sample Time** | **Analysis** |
|---|---|---|---|---|---|
| MW-1 | | | | | Total VOCs |
| MW-2 | | | | | Total VOCs |
| MW-3 | | | | | Total VOCs |

**Summary of Green Remediation Metrics for Site Management**

Site Name: _____ Site Code: _____
Address: _____ City: _____
State: _____ Zip Code: _____ County: _____

**Initial Report Period (Start Date of period covered by the Initial Report submittal)**
Start Date: _____

**Current Reporting Period**
Reporting Period From: _____ To: _____

**Contact Information**
Preparer's Name: _____ Phone No.: _____
Preparer's Affiliation: _____

**I. Energy Usage:** Quantify the amount of energy used directly on-site and the portion of that derived from renewable energy sources.

| | **Current Reporting Period** | **Total to Date** |
|---|---|---|
| Fuel Type 1 (e.g. natural gas (cf)) | | |
| Fuel Type 2 (e.g. fuel oil, propane (gals)) | | |
| Electricity (kWh) | | |
| **Of that Electric usage, provide quantity:** | | |
| Derived from renewable sources (e.g. solar, wind) | | |
| **Other energy sources** (e.g. geothermal, solar thermal (Btu)) | | |

*Provide a description of all energy usage reduction programs for the site in the space provided on Page 3.*

**II. Solid Waste Generation:** Quantify the management of solid waste generated on-site.

| | **Current Reporting Period (tons)** | **Total to Date (tons)** |
|---|---|---|
| **Total waste generated on-site** | | |
| OM&M generated waste | | |
| **Of that total amount, provide quantity:** | | |
| Transported off-site to landfills | | |
| Transported off-site to other disposal facilities | | |
| Transported off-site for recycling/reuse | | |
| Reused on-site | | |

*Provide a description of any implemented waste reduction programs for the site in the space provided on Page 3.*

**III. Transportation/Shipping:** Quantify the distances travelled for delivery of supplies and lab-supplied bottles, shipping of laboratory samples, and the removal of waste.

| | **Current Reporting Period (miles)** | **Total to Date (miles)** |
|---|---|---|
| Standby Engineer/Contractor | | |
| Laboratory Courier/Delivery Service (bottle and sample delivery) | | |
| Waste Removal/Hauling | | |

*Provide a description of all mileage reduction programs for the site in the space provided on Page 3. Include specifically any local vendor/services utilized that are within 50 miles of the site.*

**IV. Water Usage:** Quantify the volume of water used on-site from various sources.

| | **Current Reporting Period (gallons)** | **Total to Date (gallons)** |
|---|---|---|
| Total quantity of water used on-site (not including treated water) | | |
| **Of that total amount, provide quantity:** | | |
| Public potable water supply usage | | |
| Surface water usage | | |
| On-site groundwater usage | | |
| Collected or diverted storm water usage | | |

*Provide a description of any implemented water consumption reduction programs for the site in the space provided on Page 3.*

**V. Land Use and Ecosystems:** Quantify the amount of land and/or ecosystems disturbed and the area of land and/or ecosystems restored to a pre-development condition (i.e. Green Infrastructure).

| | **Current Reporting Period (acres)** | **Total to Date (acres)** |
|---|---|---|
| Land disturbed | | |
| Land restored | | |

*Provide a description of any implemented land restoration/green infrastructure programs for the site in the space provided on Page 3.*

| **Description of green remediation programs reported above**<br>(Attach additional sheets if needed) |
|---|
| Energy Usage: |
| Waste Generation: |
| Transportation/Shipping: |
| Water usage: |
| Land Use and Ecosystems: |
| Recommendations/Other: |

| **CONTRACTOR CERTIFICATION** |
|---|
| I, _____ (**Name**) do hereby certify that I am _____ (**Title**) of _____ (**Contractor Name**), which is responsible for the work documented on this form. According to my knowledge and belief, all of the information provided in this form is accurate and the site management program complies with the DER-10, DER-31, and CP-49 policies.<br><br>_____<br>**Date** **Contractor** |

# APPENDIX J – FIELD SAMPLING PLAN

ATHENICA ENVIRONMENTAL ENGINEERING PLLC
Environmental Engineering Consultants

# Field Sampling Plan

**29-05 38th Avenue**
**Queens, New York**
**NYSDEC BCP Site No. C241250**

**Prepared For:**

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

**On Behalf Of:**

FH 2BRO Building Corporation
23-01 41st Avenue, Long Island City, NY 11101
(646) 533-2801

**Prepared by:**

Athenica Environmental Engineering, PLLC
31-33 31st Street, 2nd Floor Astoria, NY 11106
info@athenica.com
(718) 784-7490

---

**DECEMBER 2024**

## 1.0 INTRODUCTION

On behalf of FH 2BRO Building Corporation, Athenica Environmental Engineering PLLC (Athenica), has prepared this Field Sampling Plan (FSP) for the post-remedial sampling at the 29-05 38th Avenue BCP Site, located at 37-42 30th Street, Queens, NY (Site).

## 2.0 SAMPLING PLAN

Sampling for the Site will include confirmatory end-point soil sampling and performance monitoring and post-treatment groundwater sampling. Grab sampling using appropriate hand-held dedicated sampling equipment will be the preferred method for collection of end-point samples. Low-flow groundwater sampling methods will be utilized for collection of groundwater samples for laboratory analysis.

### 2.1 Post-Treatment Groundwater Sample Collection

Representative groundwater samples will be collected from permanent groundwater monitoring wells, utilizing dedicated sampling equipment. The groundwater sampling will follow USEPA's low-flow (minimal draw down) procedures that are summarized below and described in more detail in Appendix B.

The low-flow sampling procedure was designed to facilitate collection of groundwater samples that reflect total mobile organic and inorganic contaminant levels in the groundwater, with minimal physical and chemical alterations caused by the sampling event.

The low-flow groundwater sampling procedure will include the following general steps:

1. An appropriate, dedicated sampling pump will be selected for use at the Site;
2. The pump intake will be placed at least 2 feet above the bottom of the well screen;
3. Prior to purging, the depth to groundwater will be measured utilizing a groundwater interface meter and recorded on a well purging purge form;
4. Groundwater will be purged at a flow rate that causes the groundwater level to be lowered (i.e., drawdown) by no more than 0.3 feet;
5. During purging, depth to groundwater will be periodically measured to allow adjustment of the groundwater flow rate to minimize any drawdown;
6. After the water level in the monitoring well has stabilized, purged water will be conveyed to a flow-through cell to allow for monitoring of the following indicator field parameters, including turbidity, temperature, specific conductance, pH, Oxidation/Reduction Potential (ORP), and dissolved oxygen (DO);
7. During the well purging, the above indicator parameters will be measured at least every 5 minutes;
8. Purging will cease after stabilization of these indicator parameters. Stabilization is considered to be achieved when three consecutive readings are within the following limits:
    - Turbidity = less than 5 NTUs or 10 percent for values greater than 5 NTUs.
    - DO = less than 0.5 mg/L or 10 percent for values greater than 0.5 mg/L.
    - Specific Conductance = 3 percent of prior reading.
    - Temperature = 3 percent of prior reading.

- ORP = plus or minus 10 millivolts of prior reading.

9. After stabilization of indicator parameters, the tubing from the pump will be disconnected from the flow-through-cell, and representative groundwater samples will be collected directly from the pump's tubing;
10. After completion of purging, samples will be collected using the same equipment (i.e., pump and tubing) that were utilized for purging.

## 2.2 Soil Vapor Sampling

As noted in the SMP, post-remediation soil vapor samples will be collected at the Site. The following steps should be follows for all soil vapor sampling:

**1. Pre-Sampling Preparation**

1. **Review the Sampling Plan:**
   - Consult the site-specific work plan and health and safety plan (HASP) to understand the goals, safety requirements, and regulatory compliance standards for the project.
2. **Verify Equipment and Supplies:**
   - **Sampling Equipment:**
     - Permanent soil vapor points
     - Flow controllers or restrictors
     - Sampling pumps or evacuated canisters (e.g., Summa canisters)
     - Tubing (e.g., Teflon or stainless steel)
     - Manometer or vacuum gauge
     - Air-tight fittings and connectors
   - **Field Instruments:**
     - Portable photoionization detector (PID)
     - Helium detector (if performing tracer tests)
     - Barometer
   - **Ancillary Supplies:**
     - Decontamination materials
     - Field logbook
     - Labels and chain-of-custody forms
3. **Inspect and Calibrate Equipment:**
   - Calibrate field instruments according to the manufacturer's instructions.
   - Ensure all equipment is clean, leak-free, and functioning properly.

**2. Site Setup**

1. **Locate Sampling Points:**
   - Verify the position of the permanent soil vapor points using the site map and unique identifiers.
2. **Seal the Sampling Area:**
   - Inspect the soil vapor point seals to ensure they are intact and free from leaks.
   - Apply additional sealant (e.g., bentonite or non-volatile silicone) if necessary.
3. **Tracer Gas Application (Optional):**
   - Introduce a tracer gas (e.g., helium) around the soil vapor point.

- Monitor the sampling system for the presence of tracer gas to confirm no atmospheric intrusion.

**3. Sampling Procedure**

1. **Initial Purging:**
   - Connect the tubing and pump or canister to the soil vapor point.
   - Purge the system at a low flow rate (<0.2 L/min) to remove stagnant air without disturbing equilibrium conditions.
   - Measure vacuum levels using the manometer.
2. **Collect Samples:**
   - Adjust the flow rate for sample collection based on project requirements, typically <0.2 L/min.
   - Fill the sampling device (e.g., Summa canister or Tedlar bag) to the required volume.
   - Record the final vacuum reading on the canister to ensure proper sample integrity.
3. **Quality Assurance:**
   - Collect field duplicates, equipment blanks, and ambient air samples as specified in the project's quality assurance/quality control (QA/QC) plan.
4. **Document Field Observations:**
   - Record weather conditions, barometric pressure, and any unusual site observations.
   - Note equipment readings, purge times, and flow rates in the field logbook.

**4. Post-Sampling Activities**

1. **Seal the Vapor Point:**
   - Disconnect the sampling equipment and re-cap the vapor point securely.
   - Reapply sealant around the point if needed.
2. **Decontaminate Equipment:**
   - Clean reusable equipment with a suitable solvent (e.g., isopropanol) and rinse with distilled water.
3. **Sample Handling:**
   - Label samples with unique identifiers, location, date, and time of collection.
   - Store samples in a secure location to prevent contamination.
   - Complete chain-of-custody forms and prepare samples for transport to the laboratory.

## 2.3 Sample Handling

As noted above and in the RAWP, all soil and groundwater samples will be collected using new, dedicated sampling equipment. As a result, field decontamination of equipment will not be conducted as part of this site characterization. Representative soil samples will be collected directly from the acetate sleeve of the direct-push boring or dedicated hand-held sampling equipment. For VOC analysis, a discrete soil sample will be collected from the desired sampling depth utilizing a dedicated Encore™ sampler or Terra Core sampling kit that includes a dedicate sample plunger. Representative groundwater samples will be collected from temporary or permanent groundwater monitoring wells after well development, utilizing dedicated sampling

equipment. The groundwater sampling will follow USEPA's low-flow (minimal draw down) procedures that are summarized below and described in more detail in Appendix B.

### 2.3.1 Sample Identification/Labeling

Immediately upon collection, each sample will be labeled with an adhesive label. This sample label contains the authoritative information for the sample, including the Site name, date and time of sampling, sampler's initials, tests to be performed, preservative (if applicable), and a unique sample identifier. The unique identifier for each sample will include, at a minimum, the sample location and (where applicable) sample horizon (e.g., S-1 12-14', WC-3S, SV-2). This information will also be included on the chain of custody forms that will accompany the samples to the laboratory.

### 2.3.2 Sample Containers and Preservation

The analytical laboratory will supply appropriate sample containers for the media that will be sampled during this program. The containers will be pre-preserved, where appropriate. Table 3 provides a summary of the sample preservation and containerization requirements.

Soil samples submitted for VOC analysis will be collected by utilizing Encore™ samplers or field-preserved using methanol (i.e., Terra Core sampling kits). Groundwater samples submitted for VOC analysis will be preserved to a pH of ≤ 2 with hydrochloric acid (HCl. The laboratory will provide all required Encore™ samplers or Terra Core sampling kits, -and preserved 40-mL VOC vials. All soil and groundwater samples will also be preserved by cooling to 4° C.

### 2.3.3 Equipment Decontamination

Non-dedicated sampling equipment will be decontaminated between each use in the following manner:

- Wash and scrub with non-phosphate detergent (e.g., Alconox) and potable water solution, and
- Rinse with potable water.

## 2.4 Field Quality Assurance

Field quality assurance/quality control samples associated with the generation of environmental data typically include field (equipment rinsate) blanks; field duplicates; and trip blanks. The sampling frequency of these field-related QA/QC samples are discussed below and summarized in Table 4.

### 2.4.1 Equipment (Rinsate) Blanks

The purpose of an equipment blank is to determine if contaminants have been introduced through contact with sampling equipment. As dedicated sampling equipment will be utilized, no use of equipment blanks is anticipated.

### 2.4.2 Field Duplicate Samples

The purpose of duplicates is to evaluate precision. Duplicates will be collected at a frequency of 1 per 20 samples of soil or groundwater and will be analyzed for the same parameters as the environmental sample. A field duplicate sample is a co-located sample or a sample that is divided into two from the same sampling location and depth.

### 2.4.3 Trip Blanks

The purpose of a trip blank is to identify any VOC-related contamination that occurred during transportation of the samples. The trip blank travels along with empty glassware from the lab to the Site and returns from the Site with the collected sampled. A trip blank will be submitted to the laboratory at a frequency of one sample per each groundwater sampling event and will be analyzed for VOCs.

## 2.5 Laboratory Quality Assurance

Method-required laboratory quality assurance includes an instrument performance check; calibration check; and method blank analysis for each group of 20 or fewer samples. In addition, internal standards are added to every sample (environmental samples and laboratory QA/QC samples). Laboratories typically perform additional QC, such as spikes, laboratory duplicates, and laboratory control samples. The frequency of these analyses is specified in the laboratory's analytical SOP for the method and is discussed below and summarized in Table 4.

### 2.5.1 Instrument Performance Check

The instrument performance check verifies the operation of the GC/MS and verifies that it mees tuning and mass spectral abundance criteria prior to sample data acquisitions.

### 2.5.2 Calibration Checks

An initial five-point calibration check must be performed after the instrument performance check but prior to the analysis of blanks and samples. Concentrations of the calibration standards should be selected to span the concentration range of interest. One of the concentrations of the initial calibration must be the same as the daily calibration check.

On a daily basis, a single-point calibration check must be analyzed (with each group of 20 or fewer samples). The percent difference (%D) for each compound in the daily calibration check should be within ±30 percent of the response determined in the initial calibration in order to proceed with sample analysis. If the %D criteria are not met, a new five-point calibration should be performed.

### 2.5.3 Method Blanks

Method blanks are used to assess the background variability of the method and to assess the introduction of contamination to the samples by the method, technique, or instrument as the sample is prepared and analyzed in the laboratory.

The method blank should not contain any target analytic at a concentration greater than its quantitation level (reporting limit; typically, three times the MDL) or its action level, whichever is more stringent. Method blanks are analyzed at a frequency of one for every 20 samples analyzed, or every analytical batch, whichever is more frequent.

### 2.5.4 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Site-specific MS/MSD samples will be submitted at a rate of one per 20 samples, for soil and groundwater samples collected during this sampling program.

### 2.5.5 Internal Standards

Internal standards (IS) are added to every sample analyzed for VOCs (in any matrix). Sample-specific IS recovery should be 40 percent or less of the mean response in the most recent valid calibration.

## 3.0 FIELD DOCUMENTATION AND CHAIN-OF-CUSTODY

### 3.1 Sample Collection Documentation

#### 3.1.1 Field Notes

Field team members will maintain bound logbooks to document all field activities. Field logbooks will provide the means for recording field observations and data collection activities conducted during the investigation. Logbooks will be supported by (but not replaced by) standardized forms, including, but not limited to boring logs, groundwater sampling logs, and equipment calibration sheets.

#### 3.1.2 Chain-of-Custody and Shipping

Chain-of-Custody forms will be utilized to document the path of sample containers from the Site to the laboratory. Sample/bottle tracking sheets or the Chain-of-Custody will be used to document the custody of the samples within the laboratory from sample receipt though completion of analysis. The project manager will notify the laboratory of upcoming field sampling events and the subsequent transfer of samples. This notification will include information concerning the number and type of samples and the anticipated date of arrival. Sample shipping containers (e.g., coolers) will be provided by the laboratory for shipping samples. All sample containers within each shipping will be individually labeled with an adhesive identification label provided by the laboratory.

In the event that collected samples require shipping (as opposed to sample pick-up by the laboratory or delivery to the laboratory by Athenica personnel), each sample shipping container will be sealed with two adhesive custody seals. The custody seals will be initialed by a member of the field sampling team.

### 3.2 Laboratory Custody Procedures

After accepting the custody of the shipping containers, the laboratory will document the receipt of the shipping containers by signing the COC records. The laboratory will perform the following tasks:

- 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 COC records;

- Compare samples received against those listed on the COC;
- 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 COC forms;
- Sign and date the COC 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 Athenica data manager;
- 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 completed COC, air bills, and any additional documentation will be placed in the project file.

## 4.0 CALIBRATION PROCEDURES

Field instruments will be calibrated according to the manufacturer's specifications. As previously discussed in Section 4.0, calibration procedures for laboratory instruments will consist of initial calibrations and as needed, continuing calibrations. Detailed descriptions of the calibration procedures for specific laboratory instruments are included in the laboratory's quality assurance plan.

Air monitoring instruments will be calibrated to a known reference gas standard and ambient air outside the work zone. Calibration will be completed daily. If concentrations of VOCs are encountered above the reference gas standard, the soil screening photoionization detector (PID) may be calibrated or re-checked against the reference gas standard. All 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, and the readings. The following equipment may be used during soil sampling activities.

End-Point Soil Sampling Activities:

- RAE Systems MiniRAE 3000 (PID) with 11.7 eV lamp or equivalent.

MIE pDR 1200 with cyclone and pump [particulate monitor] or equivalent.

# APPENDIX K – OPERATIONS & MAINTENANCE MANUAL

# Soil Vapor Extraction System/ Sub-Slab Depressurization System Operations and Maintenance Manual

**29-05 38th Avenue**
**Queens, New York**
**NYSDEC BCP Site No. C241250**

**Prepared For:**

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

**On Behalf Of:**

FH 2BRO Building Corporation
23-01 41st Avenue, Long Island City, NY 11101
(646) 533-2801

**Prepared by:**

Athenica Environmental Engineering, PLLC
31-33 31st Street, 2nd Floor Astoria, NY 11106
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(718) 784-7490

# FEBRUARY 2025

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# APPENDICES

**Appendix A – SVE/ SSDS Component Manuals and Specification Documentation**

## INTRODUCTION

On behalf of FH 2BRO Building Corporation, Athenica Environmental Engineering PLLC (Athenica), has prepared this Operations and Maintenance (O&M) Manual for the Soil Vapor Extraction (SVE) system and Sub-Slab Depressurization System (SSDS), at the 29-05 38th Avenue BCP Site, located at 37-42 30th Street, Queens, NY (Site).

Installation and operation of the SVE/ SSDS system has been implemented as part of the Remedial Action (RA) to mitigate off-Site migration of volatile organic compound (VOC) contamination detected in the soil vapor beneath the Site, and mitigate soil vapor intrusion into the on-Site building. The SVE/SSDS system has been designed and installed in accordance with the Remedial Action Workplan (RAWP) dated May 2023, as amended by design refinements determined through additional delineation sampling and pilot testing.

The SVE/ SSDS system has been installed at the Site to mitigate potential vapor intrusion into the newly-constructed building and to prevent off-Site migration of VOC contamination in soil vapor that was identified during the Remedial Investigation (RI).

The SVE system has been designed to target an area of approximately 3,500 square feet, where VOC concentrations were elevated in subsurface testing. However, the system also provides additional sub-slab depressurization across the entire Site footprint.

## GENERAL PROCESS DESCRIPTION

SVE involves applying a vacuum within the subsurface, to induce airflow and extract soil vapors from the area of concern. The SVE process permits mass transfer from adsorbed and dissolved volatile organic compounds (VOCs) in soil and groundwater into the vapor phase, for removal under the vacuum, treatment using granular activated carbon (GAC), and ultimate discharge to the atmosphere above the building. Airflow is induced within the subsurface by a regenerative blower, via a piping system connected to five SVE wells and one SSDS well. Any water recovered from the SVE/ SSDS wells or SVE piping is collected in a 55-gallon condensate knockout drum, which will be characterized and properly disposed. The system is monitored using vacuum gauges and flow rate sensors at each extraction well's riser pipe and within the blower enclosure (before and after the knockout drum). Each riser pipe is also outfitted with a sample port to measure VOCs using a handheld photoionization detector (PID) and/or conduct soil vapor sampling. Vacuum and VOC readings can also be measured at eight soil vapor monitoring points located throughout the Site cellar; these monitoring points can also be used for soil vapor sampling. To confirm sub-slab depressurization across the entire Site footprint, an additional five sub-slab monitoring points, located near the extremities of the Site, can be monitored for vacuum.

## SITE CONTACTS

| Name | Title | Organizational Affiliation | Responsibilities | Phone Number |
|---|---|---|---|---|
| Jack Fang | Owner | FH2Bro Building Corporation | Owner/ Developer | C: 646-533-2801 |
| Spiro Dongaris, PE | Principal | Athenica | Design of System<br>Manages Project | O: 718-784-7490<br>C: 917-796-2406 |
| Kenneth Wenz, PG | Senior Project Manager | Athenica | Manages Project Operations | O: 718-784-7490<br>C: 631-742-0638 |
| Jessica Collins | Project Manager | Athenica | Manages Project Operations – Coordinates Field Teams | O: 718-784-7490<br>C: 516-220-2143 |
| Evan Greenberg | Project Engineer | Athenica | Assist in System Design<br>Oversee Installation<br>Conducting On-Site Operations and Maintenance Procedures | O: 718-784-7490<br>C: 347-661-5428 |

## SYSTEM COMPONENTS:

The SVE system consists of five individual 4" SVE wells installed beneath the cellar slab. Each well is constructed of a 3-foot section of perforated 4-inch pre-packed PVC well screen, set to a depth of 3 to 6 feet below the bottom of the foundation slab, and solid 4-inch PVC pipe to the bottom of the slab. The annular space around the screen was backfilled with No. 1 sand, which was overlain by a bentonite/concrete slurry. Three of these wells, EW-3, EW-4, and EW-5, connect directly to vertical 4-inch cast iron risers, which run up support columns to the cellar ceiling. The remaining two wells, EW-1 and EW-2, are slightly offset from the associated column, and connect to their vertical risers via sub-slab 4-inch solid PVC piping. Each of the cast iron riser pipes is outfitted with a Dwyer DS-200 flow sensor with Dwyer 2SQRT vacuum gauge, a Dwyer 2015 magnehelic gauge, a sample port, and a gate valve. The system includes an additional SSDS well, EW-6, which consists of a 3-inch diameter Schedule 40 cast iron pipe installed directly beneath the upper cellar's concrete floor slab.

The piping from the extraction wells manifold into a single overhead 4-inch cast iron pipe that runs along the cellar ceiling to the SVE enclosure within the northwest corner of the cellar. The enclosure contains the SVE blower (Ametek Rotron 5hp Regenerative Blower Model #EN757F72XL), electrical control panel, 55-gallon condensate knockout drum, a flow rate sensor, and a vacuum gauge. The discharge from the SVE blower is piped through two 55-gallon carbon filtration drums in series, located adjacent to the enclosure. The discharge from these drums is piped via a vertical riser pipe for discharge to the atmosphere, above the roofline on the 2-story portion of the building. The discharge pipe is outfitted with a rain cap to prevent rainwater intrusion, and has been placed a minimum of 10 feet from any windows, doors, air intakes, or occupiable spaces.

The SVE system also includes eight permanent monitoring points that are utilized to monitor vacuum and conduct soil vapor sampling. Each monitoring point is capped with a flush-mounted

metal cover. These eight of these monitoring points are within the targeted SVE area. Five additional monitoring points are located near the extremities of the Site footprint and are used to measure vacuum for the SSDS.

**STANDARD OPERATING PROCEDURES AND MONITORING PLAN**

The following operating and monitoring procedures should be followed during normal operating conditions. If circumstances arise while operating the system which are not covered in this document, the Principal Engineer and Project Manager must be notified immediately, to assess whether development and implementation of additional operating/monitoring procedures are warranted. This section discusses step-by-step procedures for operating and monitoring the system in a safe manner.

The SVE/SSDS system start-up will include continuous system operation during the initial start-up period of approximately two days. Periodic monitoring during the start-up period will include:

- Flow rate and vacuum levels at each extraction well.
- Total VOC measurements in effluent from each extraction well (utilizing a PID).
- Flow rate and vacuum level for the overall (measured at the blower enclosure).
- Total VOC measurements in system effluent prior to the carbon drums (utilizing a PID).
- Total VOC measurements in system effluent between the carbon drums (utilizing a PID).
- Total VOC measurements in system effluent after the carbon drums (utilizing a PID).
- Vacuum levels and total VOC measurements (utilizing a PID) at each monitoring point.

During start-up, the system will be optimized by adjusting flow rates from individual extraction wells as necessary.

Following the start-up period, Athenica will inspect the SVE system weekly for the first month and quarterly thereafter. The following tasks will be conducted during routine Site visits:

- All SVE/SSDS components will be checked for leaks, including vertical and overhead piping, PVC piping within the SVE enclosure, plumbing to the carbon treatment drums, and around tubing to gauges.
- The condensate knockout drum will be checked and emptied as needed. Condensate will be characterized and properly disposed.
- Monitoring of flow rates, vacuum levels, and VOC levels as described above.
- System tuning will be performed, including tuning gate valves on each riser, and adjusting the SVE makeup air valve to ensure vacuum influence across all monitoring points and optimized system performance.
- Air samples will periodically be collected for quantitative laboratory analysis. Locations that may be sampled include effluent discharge pre- and/or post-treatment, individual extraction wells, and/or monitoring points
- Activated carbon drums will be replaced as needed.

## Start-Up And Shut-Down Procedures

The following steps should be taken during the initial start-up, or during any subsequent start-ups:

- All extraction well gate valves will be rotated to their fully open positions, for maximum airflow. The SVE makeup air valve will be fully opened to reduce vacuum throughout the system.
- The condensate knockout drum will be properly drained, and the drain valve closed.
- The SVE blower will be switched on, from a dedicated 3-phase 230 volt electrical service.
- Following start-up, vacuum readings and flow rate readings will be measured at the blower enclosure each extraction well riser pipe.
- Following start-up, vacuum readings will be measured at each of the monitoring points until vacuum readings stabilize.
- System tuning will be performed, including adjusting gate valves on each extraction well riser and the SVE makeup air valve to ensure vacuum influence across all monitoring points and optimized system operation.
- Effluent will be measured using a handheld PID meter to ensure there is no breakthrough on any of the carbon treatment drums.
- All SVE/SSDS components will be checked for leaks, including vertical and overhead piping, PVC piping within the SVE enclosure, plumbing to the carbon treatment drums, and around tubing to gauges.

## Field Readings

The following field readings will be collected during inspection, testing, or monitoring of the SVE system components:

- SVE Extraction Wells
    - Valve Position.
    - Total VOCs (parts per million (PPM), via handheld PID meter).
    - Vacuum (Inches Water Column), measured from gauge.
    - Flow Rate (CFM), measured from gauge.
- SSDS Extraction Well
    - Valve Position.
    - Vacuum (Inches Water Column), measured from gauge.
- SVE Monitoring Points
    - Total VOCs (PPM, via handheld PID meter).
    - Vacuum (Inches Water Column), measured from a handheld manometer.
- Sub-Slab Monitoring Points (confirmation of sub-slab depressurization)
    - Vacuum (Inches Water Column), measured from a handheld manometer.
- SVE Blower
    - Makeup air valve position.
    - Vacuum into the water knockout drum (Inches Water Column), measured from gauge.
    - Vacuum into the blower (Inches Water Column), measured from gauge.
    - Flow Rate (CFM), measured from gauge.

    - Confirmation that alarm is functional
- Carbon Vessels
    - Total VOCs before treatment drums (PPM, via handheld PID meter).
    - Total VOCs between treatment drums (PPM, via handheld PID meter).
    - Total VOCs following treatment drums (PPM, via handheld PID meter).

**EQUIPMENT MAINTENANCE REQUIREMENTS**

The SVE/SSDS system includes the following components, which will require routine maintenance:

- SVE Blower – Blower-specific maintenance, such as lubrication, will be conducted per the manufacturer's requirements.

- VOC Treatment (GAC Units) - The GAC vessels will be operated in series (i.e., with a lead/lag configuration). Carbon in the lead vessel will be replaced when monitoring/sampling indicates breakthrough into the second GAC vessel or saturation of the lead GAC vessel, as indicated by an outlet PID reading that is significantly above background and within 20% of the inlet reading. Spent GAC within the primary vessel will be replaced, the secondary vessel will be moved to the primary treatment position, and the vessel containing the new GAC will be placed at the secondary treatment position. Spent GAC will be either re-generated or properly disposed off-Site. GAC samples will be collected as required to ensure proper classification and disposal.

- Flow Sensors and Vacuum Gauges - Each extraction well riser pipe is equipped with a flow sensor, vacuum gauge, and sample port, which are sealed to the riser via threaded brass fittings. Routine maintenance will include ensuring all fittings are properly sealed with no air leaks; ensuring all gauges are visible, unobstructed, and operating properly; and ensuring all tubing is properly connected and free of leaks. Any damaged gauges or tubing will be promptly replaced.

- Monitoring Points – Routine maintenance will include ensuring all monitoring points are intact, and airtight. Tubing within each monitoring point should be capped, and each stainless-steel cover secured. If leaks are observed, the point should be reinstalled to ensure proper seal. Each cover utilizes a rubber compression ring for airtightness. Rings should be replaced if damaged or dried out.

**HEALTH AND SAFETY PLAN**

All field activities will be conducted safely in accordance with the Site-wide Health and Safety Plan (HASP). The HASP will remain available at the Site.

**GENERAL NOTES:**

1. "SITE" REFERS TO THE SUBJECT PROPERTY AT 37-42 30TH STREET, LONG ISLAND CITY, NEW YORK 11101, QUEENS BLOCK 3371, LOT 38, ALTERNATIVELY IDENTIFIED AS THE "29-05 38TH AVENUE BCP SITE".
2. DRAWINGS NOT TO BE USED FOR STRUCTURAL, ARCHITECTURAL, OR OTHER REFERENCE EXCEPT FOR SOIL VAPOR EXTRACTION (SVE) SYSTEM.

**SUMMARY OF WORK:**

1. DRAWINGS OUTLINE THE DESIGN SPECIFICATIONS FOR A SVE SYSTEM DESIGNED AND INSTALLED TO REMEDIATE CONTAMINATED SOIL VAPOR BENEATH THE SITE.
2. DETAILED SCHEMATICS ILLUSTRATE THE SVE SYSTEM LAYOUT, COMPONENTS, AND SPECIFICATIONS, AS INSTALLED.

**CONSTRUCTION NOTES:**

1. ALL CONCRETE SLABS THAT COME IN CONTACT WITH THE GROUND ARE LAID OVER A GAS PERMEABLE MATERIAL MADE UP OF A MINIMUM OF 6" THICKNESS OF $\frac{3}{4}$" SIZE GRAVEL OR CRUSHED STONE.
2. 20 MIL STEGO WRAP VAPOR BARRIER MATERIAL HAS BEEN INSTALLED BENEATH CELLAR SLAB, UNDER ELEVATOR PIT AND BEHIND INTERIOR WALLS TO GRADE. ALL PERFORATIONS WERE SEALED WITH APPROVED STEGO TAPE OR STEGO MASTIC MATERIAL IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
3. ALL OPENINGS, GAPS AND JOINTS IN FLOOR, AND WALL ASSEMBLIES HAVE BEEN FILLED OR CLOSED WITH MATERIALS THAT PROVIDE A PERMANENT AIRTIGHT SEAL.
4. WARNING LABELS HAVE BEEN INSTALLED ON VERTICAL SVE SYSTEM PIPING WHERE EXPOSED. SEE DETAIL IN DRAWING ENV-7.
5. REFER TO DRAWINGS ENV-1 THROUGH ENV-7 FOR ADDITIONAL SVE SYSTEM REQUIREMENTS.

RISER AND ROOF NOTES:

1. DISCHARGE EXHAUST ON THE ROOF MUST REMAIN AT LEAST 10 FEET AWAY FROM ANY OPERABLE WINDOW OR AIR INTAKE FOR ANY BUILDING, OR OCCUPIABLE SPACE. FENCING HAS BEEN INSTALLED TO PREVENT UNAUTHORIZED ACCESS.
2. RISER PIPING HAS BEEN INSTALLED IN ACCORDANCE WITH THE NEW YORK CITY MECHANICAL AND PLUMBING CODE, INCLUDING, BUT NOT LIMITED TO, THOSE REQUIREMENTS FOR:
   - PROTECTION OF SYSTEM COMPONENTS
   - STRUCTURAL SAFETY
   - PIPING SUPPORT
   - JOINTS
   - RISER LOCATION
   - FIRE PROTECTION

COMPONENTS:

1. THE SVE SYSTEM BLOWER IS AN AMETEK 5 HORSEPOWER REGENERATIVE BLOWER, POWERED BY THREE-PHASE 230 VOLT POWER SUPPLY.
2. ALARM UNIT IS RADONAWAY CHECKPOINT II.
3. VACUUM GAUGES ARE SERIES 2000 MAGNEHELIC GAUGES.
4. FLOW SENSORS ARE DWYER DS-300 WITH DWYER 2SQRT DIFFERENTIAL PRESSURE GAUGES.

LEGEND

- 4" Schedule 40 Cast Iron Riser Pipe
- EW-X — 4" Schedule 40 PVC Pipe with Pre-Packed Extraction Well Mesh Screen
- EW-X — 4" Schedule 40 Cast Iron Riser Pipe connected to Sub-Slab PVC Well Screen
- Overhead 4" Schedule 40 Cast Iron Pipe Along Cellar Ceiling
- Sub-Surface 4" Schedule 40 PVC Pipe for Off-Set Extraction Well
- MP-X — 1" PVC Vapor Monitoring Point with Stainless Steel Cap, Flush Mount to Cellar Floor
- MP-X — SVE Sub-Slab Monitoring Point (MP-9 through MP-13)
- SVE ENCLOSURE
- GAC TREATMENT DRUMS
- EW-6 — 3" Schedule 40 Cast Iron Pipe to Ceiling, Set into Gravel Layer beneath shallower Slab Area in Upper Cellar, wrapped with Geotextile Fabric
- Overhead 3" Schedule 40 Cast Iron Pipe Along Cellar Ceiling
- Shallower Slab Area in Upper Cellar

| DRAWING LIST | |
|---|---|
| **SHEET NO.** | **SHEET TITLE** |
| ENV-1 | GENERAL NOTES |
| ENV-2 | SVE SYSTEM CELLAR PLAN |
| ENV-3 | SVE SYSTEM FIRST FLOOR PLAN |
| ENV-4 | SVE SYSTEM SECOND FLOOR PLAN |
| ENV-5 | SVE SYSTEM THIRD FLOOR PLAN |
| ENV-6 | SVE SYSTEM PIPING AND INSTRUMENTATION DIAGRAM |
| ENV-7 | SVE SYSTEM DETAILS |




1 ENV-1 SITE LOCATION
SCALE: 1" = 80'-0" (ARCH D)

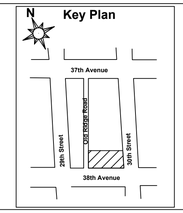
RESERVED FOR PLAN EXAMINER

General Notes

| No. | Revision/Issue | Date |
|---|---|---|
| | | |
| | | |
| 2 | AS BUILT | 2/20/25 |
| 1 | AS BUILT | 11/26/24 |


ATHENICA ENVIRONMENTAL ENGINEERING PLLC
Environmental Engineering Consultants
31-33 31ST STREET, 2ND FLOOR
ASTORIA, NEW YORK 11106


Key Plan

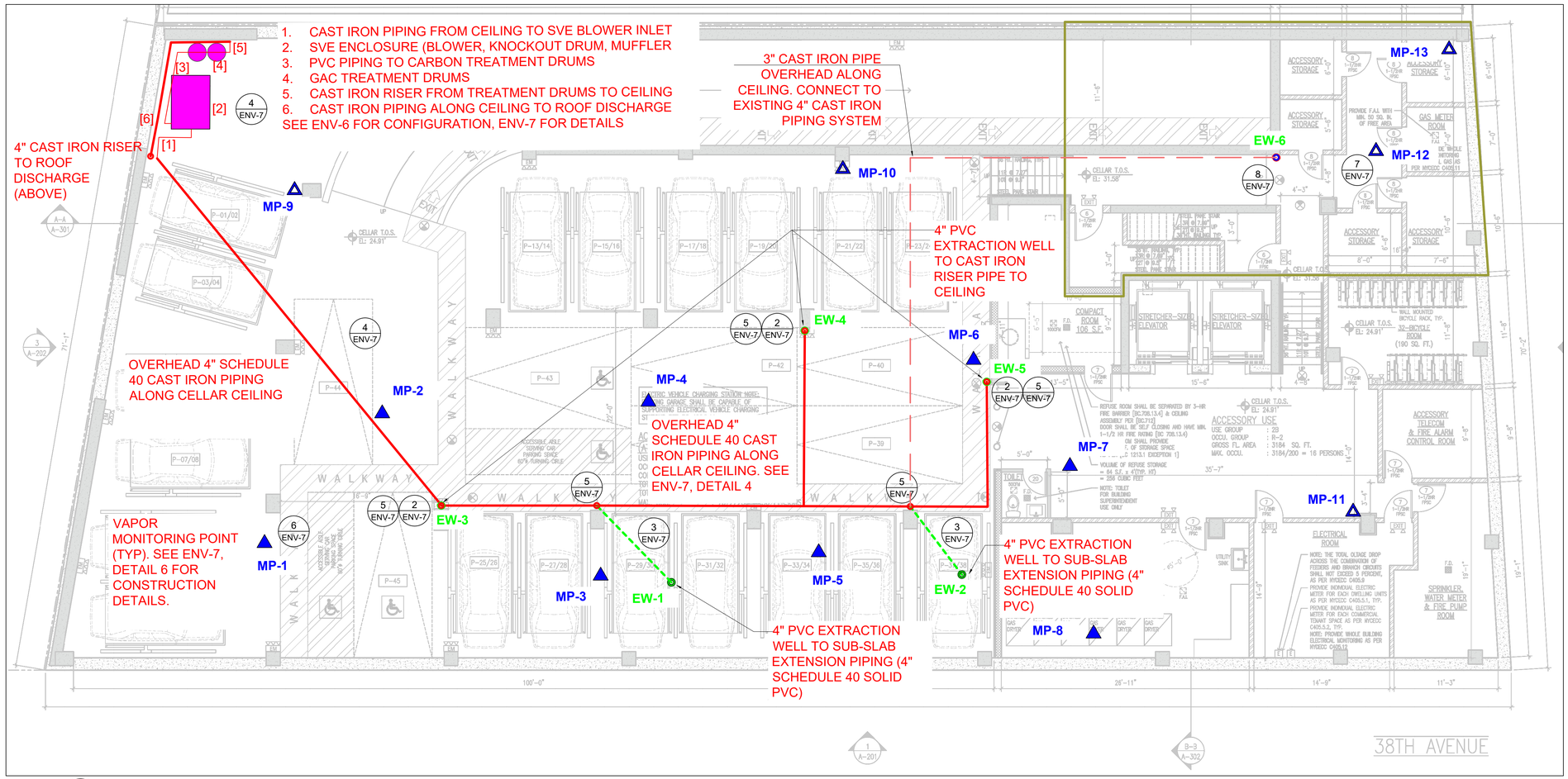



Drawn By: Evan Greenberg, E.I.T.
Checked By: Spiro Dongaris, P.E.
29-05 38th Avenue BCP Site
Address: 37-42 30th Street Long Island City New York 11101
Drawing Title: GENERAL NOTES
Drawing No.: ENV-1
Date: 2/20/24
Project No. 21-134-0741
Prepared for: FH2BRO Builder Corp.
Scale N/A

Certification

STATE OF NEW YORK
SPIRO I DONGARIS
095954
LICENSED PROFESSIONAL ENGINEER

Athenica Environmental Engineering, PLLC




1 ENV-2 SOIL VAPOR EXTRACTION SYSTEM CELLAR PLAN

SCALE: 5/32" = 1'-0" (ARCH D)

Scale

=10 Feet

= 50 Feet

LEGEND

- 4" Schedule 40 Cast Iron Riser Pipe
- EW-X 4" Schedule 40 PVC Pipe with Pre-Packed Extraction Well Mesh Screen
- EW-X 4" Schedule 40 Cast Iron Riser Pipe connected to Sub-Slab PVC Well Screen
- Overhead 4" Schedule 40 Cast Iron Pipe Along Cellar Ceiling
- 4" Schedule 40 PVC Pipe for Off-Set Extraction Well
- MP-X 1" PVC Vapor Monitoring Point with Stainless Steel Cap, Flush Mount to Cellar Floor (MP-1 through MP-8)
- MP-X SVE Sub-Slab Monitoring Point (MP-9 through MP-13)
- SVE ENCLOSURE
- GAC TREATMENT DRUMS
- EW-6 3" Schedule 40 Cast Iron Pipe to Ceiling, Set into Gravel Layer beneath shallower Slab Area in Upper Cellar, wrapped with Geotextile Fabric
- Overhead 3" Schedule 40 Cast Iron Pipe Along Cellar Ceiling
- Shallower Slab Area in Upper Cellar

RESERVED FOR PLAN EXAMINER

**General Notes**

Adapted from MEI Architect PLLC: *CELLAR FLOOR PLAN*, A-101.00, Drawn by S.M, 9/26/2020

VMP-2, VMP-3, VMP-6, and VMP-8 removed following SVE Pilot Testing. Monitoring Points renumbered to MP-1 through MP-8.

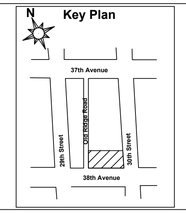
MP-9 through MP-11 added in November 2024 to assess SSDS vacuum at building extremities.

SSDS Extraction Well EW-6 and Monitoring points MP-12 and MP-13, installed in January 2025 to ensure the SVE system also provides full sub-slab depressurization over the entire footprint of the Site (in particular the upper slab area).

| No. | Revision/Issue | Date |
|---|---|---|
| | | |
| | | |
| 2 | AS BUILT | 2/20/25 |
| 1 | AS BUILT | 11/26/24 |

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Environmental Engineering Consultants
31-33 31ST STREET, 2ND FLOOR
ASTORIA, NEW YORK 11106

Key Plan




Drawn By: Evan Greenberg, E.I.T.

Checked By: Spiro Dongaris, P.E.

29-05 38th Avenue BCP Site

Address:
37-42 30th Street
Long Island City
New York 11101

Drawing Title: **SVE SYSTEM CELLAR PLAN**

Drawing No.: ENV-2

Date: 2/20/24

Project No.: 21-134-0741

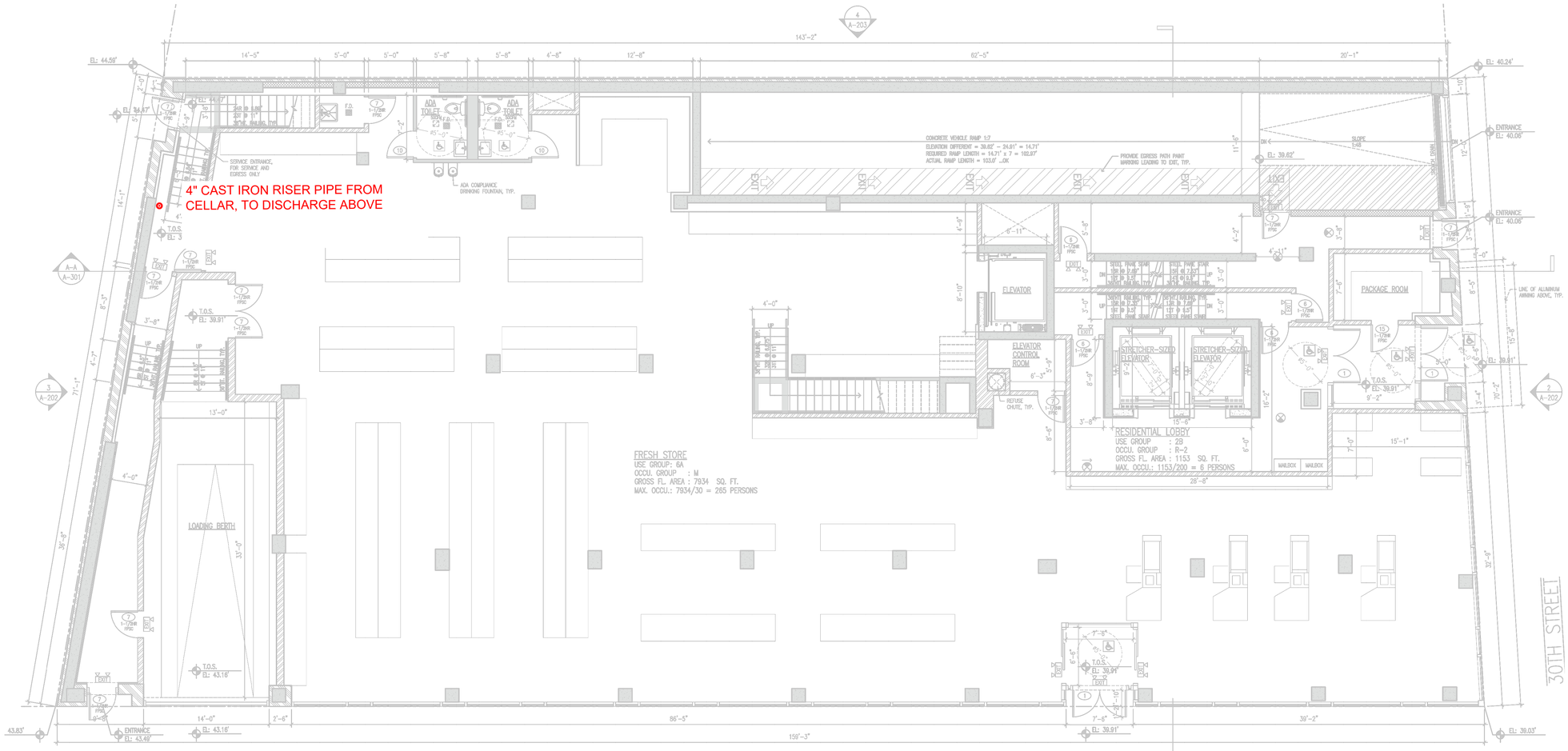
Prepared for: FH2BRO Builder Corp.

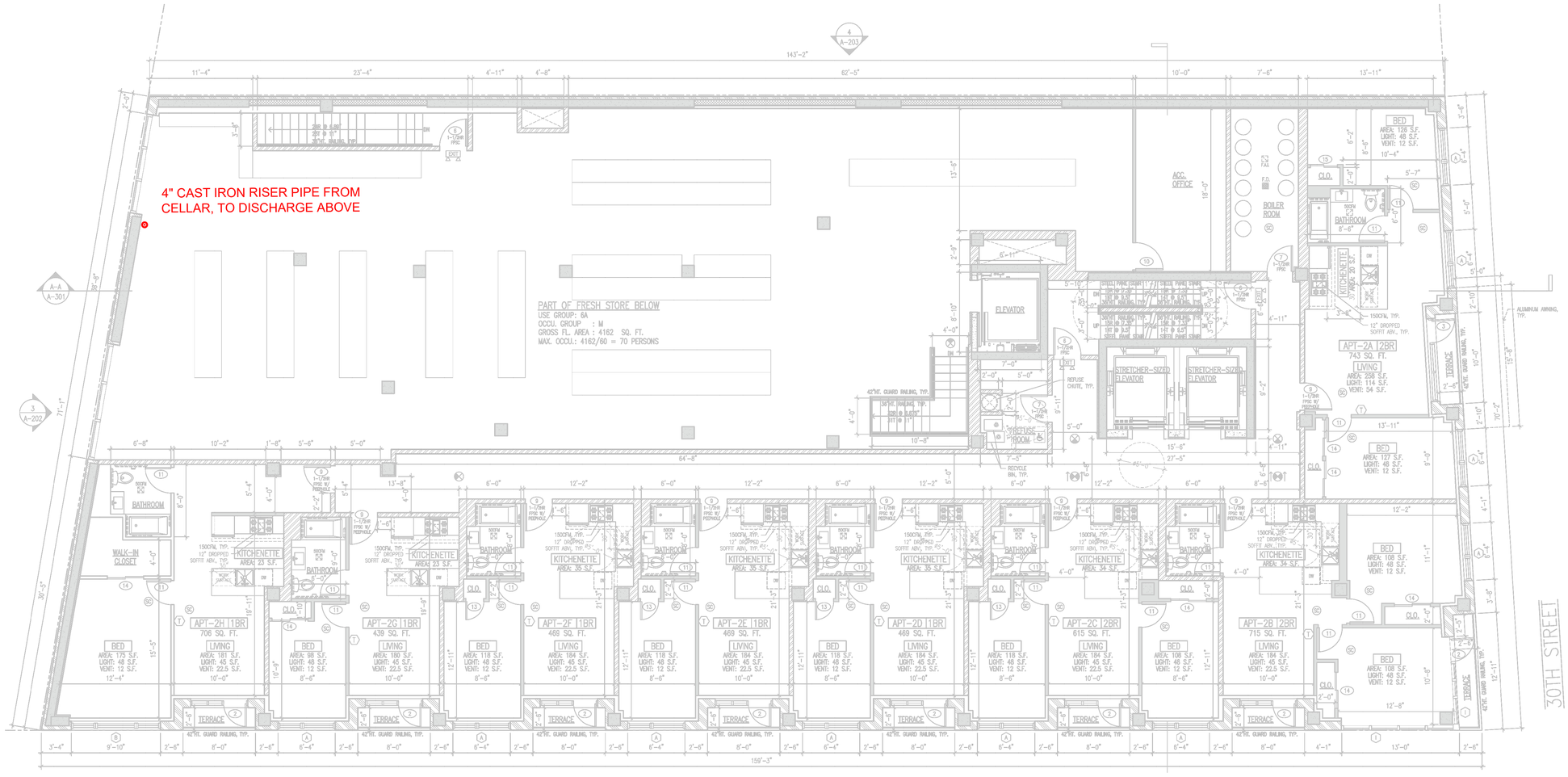
Scale: 5/32" = 1'-0" (ARCH D)

Certification




Athenica Environmental Engineering, PLLC


4" CAST IRON RISER PIPE FROM CELLAR, TO DISCHARGE ABOVE
FRESH STORE
USE GROUP: 6A
OCCU. GROUP : M
GROSS FL. AREA : 7934 SQ. FT.
MAX. OCCU.: 7934/30 = 265 PERSONS
RESIDENTIAL LOBBY
USE GROUP : 29
OCCU. GROUP : R-2
GROSS FL. AREA : 1153 SQ. FT.
MAX. OCCU.: 1153/200 = 6 PERSONS
ELEVATOR
ELEVATOR CONTROL ROOM
STRETCHER-SIZED ELEVATOR
STRETCHER-SIZED ELEVATOR
PACKAGE ROOM
LOADING BERTH
ADA TOILET
ADA TOILET
SERVICE ENTRANCE, FOR SERVICE AND EGRESS ONLY
ADA COMPLIANCE DRINKING FOUNTAIN, TYP.
CONCRETE VEHICLE RAMP 1:7
ELEVATION DIFFERENT = 39.62' - 24.91' = 14.71'
REQUIRED RAMP LENGTH = 14.71' x 7 = 102.97'
ACTUAL RAMP LENGTH = 103.0' ..OK
PROVIDE EGRESS PATH PAINT MARKING LEADING TO EXIT, TYP.
REFUSE CHUTE, TYP.
MAILBOX
MAILBOX
ENTRANCE EL: 40.08'
ENTRANCE EL: 40.08'
ENTRANCE EL: 43.49'
LINE OF ALUMINUM AWNING ABOVE, TYP.
30TH STREET
EL: 44.56'
EL: 44.17'
EL: 39.67'
EL: 40.24'
EL: 39.62'
EL: 39.91'
EL: 39.91'
EL: 39.91'
EL: 43.16'
EL: 43.16'
EL: 39.03'
T.O.S. EL: 3
T.O.S. EL: 39.91
T.O.S. EL: 43.16'
T.O.S. EL: 39.91'
T.O.S. EL: 39.91'
A-A A-301
3 A-202
7 A-202
4 A-203
14'-5"
5'-0"
5'-0"
5'-8"
5'-8"
4'-8"
12'-8"
62'-5"
20'-1"
143'-2"
13'-0"
4'-0"
14'-0"
2'-6"
86'-5"
39'-2"
159'-3"
43.83'
28'-8"
15'-6"
15'-1"
9'-2"
7'-0"
7'-6"
7'-6"
6'-6"
6'-6"
6'-8"
6'-8"
6'-3"
6'-0"
4'-0"
8'-11"
8'-10"
4'-2"
4'-11"
7'-8"
7'-0"
6'-0"
5'-8"
3'-8"
3'-4"
3'-0"
2'-10"
2'-0"
1'-6"
1'-0"
35'-8"
32'-8"
71'-1"
14'-1"
8'-5"
4'-2"
3'-8"
9'-8"
4'-0"
33'-0"
UP
DN
EXIT
SLOPE 1:48
SLOPE 1:20
SLOPE 1:48
SLOPE 1:20
SLOPE 1:48
SLOPE 1:20




1 ENV-4 SOIL VAPOR EXTRACTION SYSTEM SECOND FLOOR PLAN

SCALE: 5/32" = 1'-0" (ARCH D)

| Scale |
|---|
| =10 Feet |
| = 50 Feet |

LEGEND

4" Schedule 40 Cast Iron Riser Pipe

RESERVED FOR PLAN EXAMINER

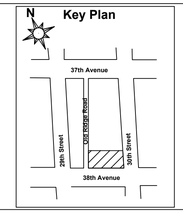
## General Notes

Adapted from MEI Architect PLLC: *SECOND FLOOR PLAN*, A-103.00, Drawn by S.M, 9/26/2020

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Environmental Engineering Consultants
31-33 31ST STREET, 2ND FLOOR
ASTORIA, NEW YORK 11106


Key Plan




Drawn By: Evan Greenberg, E.I.T.

Checked By: Spiro Dongaris, P.E.

29-05 38th Avenue
BCP Site

Address:
37-42 30th Street
Long Island City
New York 11101

Drawing Title:
**SVE SYSTEM SECOND FLOOR PLAN**

Drawing No.:
ENV-4

Date:
2/20/24

Project No.
21-134-0741

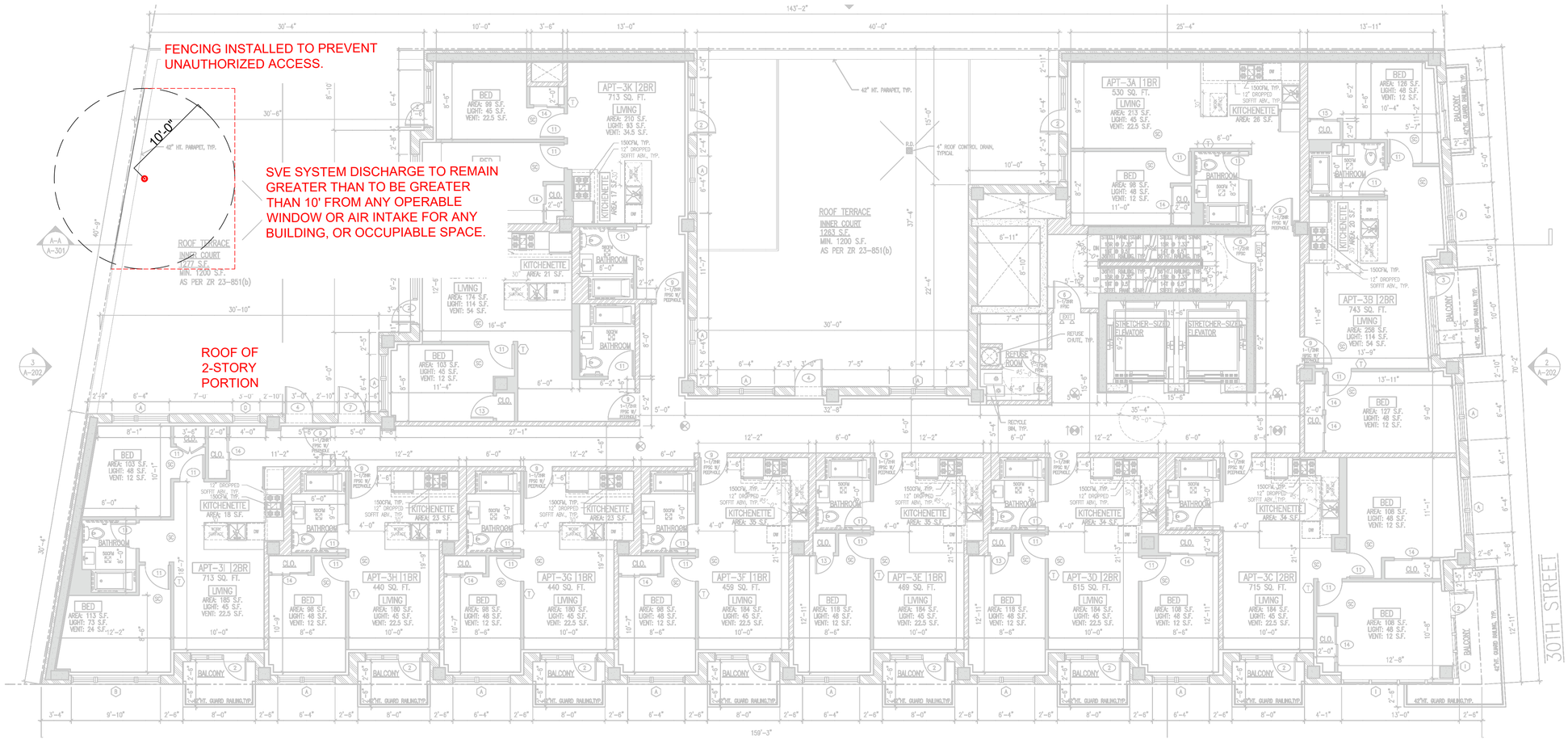
Prepared for:
FH2BRO Builder Corp.

Scale
5/32" = 1'-0" (ARCH D)

Certification

STATE OF NEW YORK
SPIRO I DONGARIS
095954
LICENSED PROFESSIONAL ENGINEER

Athenica Environmental Engineering, PLLC




1 ENV-5 SOIL VAPOR EXTRACTION SYSTEM THIRD FLOOR PLAN

SCALE: 5/32" = 1'-0" (ARCH D)

| Scale |
|---|
| =10 Feet |
| = 50 Feet |

LEGEND

4" Schedule 40 Cast Iron Riser Pipe

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Athenica Environmental Engineering, PLLC

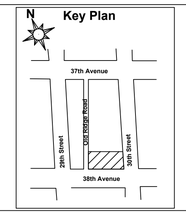
**General Notes**

Adapted from MEI Architect PLLC: *THIRD FLOOR PLAN*, A-104.00, Drawn by S.M, 9/26/2020

| No. | Revision/Issue | Date |
|---|---|---|
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| 1 | AS BUILT | 11/26/24 |

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Environmental Engineering Consultants
31-33 31ST STREET, 2ND FLOOR
ASTORIA, NEW YORK 11106

**Key Plan**




Drawn By: Evan Greenberg, E.I.T.

Checked By: Spiro Dongaris, P.E.

29-05 38th Avenue
BCP Site

Address:
37-42 30th Street
Long Island City
New York 11101

Drawing Title:
**SVE SYSTEM THIRD FLOOR PLAN**

Drawing No.:
ENV-5

Date:
2/20/24

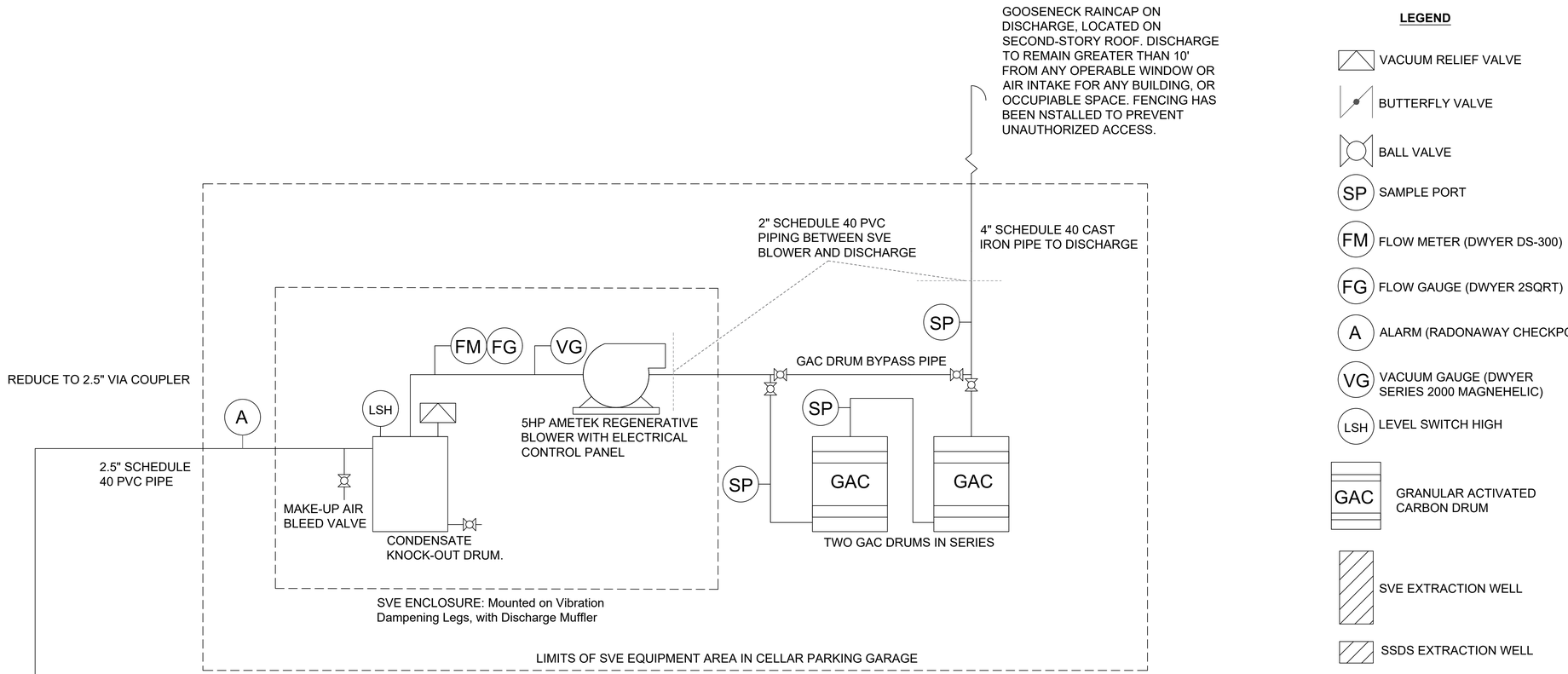
Project No.
21-134-0741

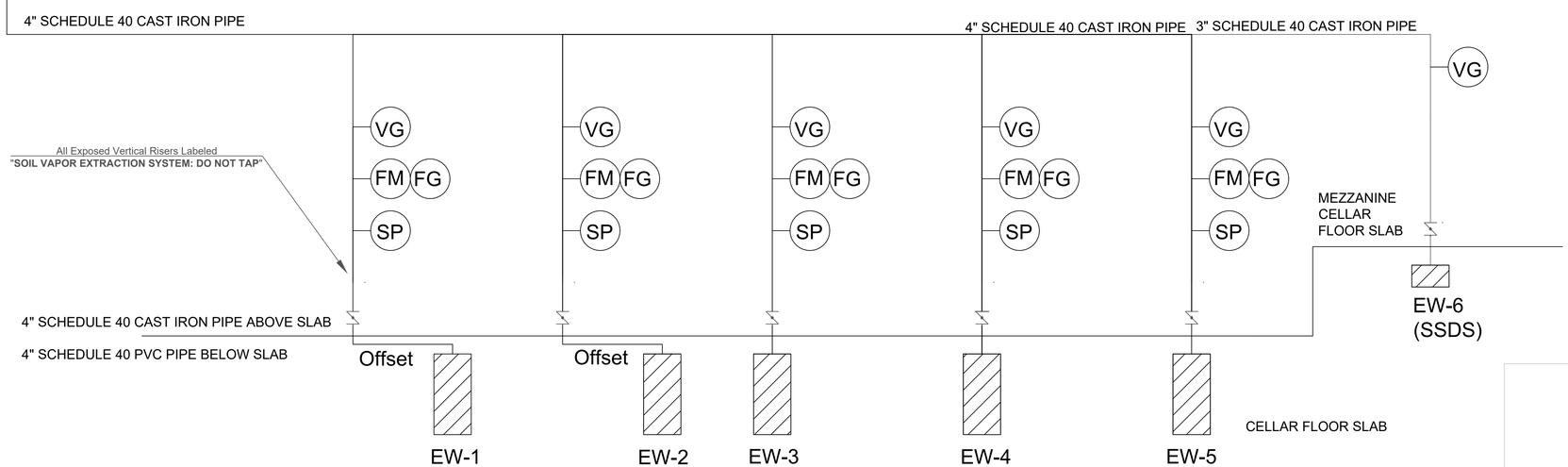
Prepared for:
FH2BRO Builder Corp.

Scale
5/32" = 1'-0" (ARCH D)

Certification






1 ENV-6 SOIL VAPOR EXTRACTION SYSTEM PIPING AND INSTRUMENTATION DIAGRAM
SCALE: N.T.S.

**LEGEND**

- VACUUM RELIEF VALVE
- BUTTERFLY VALVE
- BALL VALVE
- SP — SAMPLE PORT
- FM — FLOW METER (DWYER DS-300)
- FG — FLOW GAUGE (DWYER 2SQRT)
- A — ALARM (RADONAWAY CHECKPOINT II)
- VG — VACUUM GAUGE (DWYER SERIES 2000 MAGNEHELIC)
- LSH — LEVEL SWITCH HIGH
- GAC — GRANULAR ACTIVATED CARBON DRUM
- SVE EXTRACTION WELL
- SSDS EXTRACTION WELL

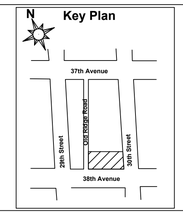
RESERVED FOR PLAN EXAMINER

General Notes

| No. | Revision/Issue | Date |
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| 2 | AS BUILT | 2/20/25 |
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Environmental Engineering Consultants
31-33 31ST STREET, 2ND FLOOR
ASTORIA, NEW YORK 11106

Key Plan




Drawn By: Evan Greenberg, E.I.T.
Checked By: Spiro Dongaris, P.E.
29-05 38th Avenue BCP Site
Address: 37-42 30th Street Long Island City New York 11101
Drawing Title: SVE SYSTEM PIPING AND INSTRUMENTATION DIAGRAM
Drawing No.: ENV-6
Date: 2/20/24
Project No.: 21-134-0741
Prepared for: FH2BRO Builder Corp.
Scale: N.T.S.

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STATE OF NEW YORK SPIRO I DONGARIS 095954 LICENSED PROFESSIONAL ENGINEER

Athenica Environmental Engineering, PLLC

GO TO GEOTECH

# Soil Vapor Extraction Systems

## *Geotech SVE*

The Geotech Soil Vapor Extraction system is designed to remove hazardous vapors from the subsurface by drawing air through contaminated soil, and volatilizing adsorbed phase pollutants. Geotech SVE systems are ideal for well point or trench type vapor barriers.

### FEATURES

- **Compact, durable design**
- **Skid Mounted with moisture separator drum/mist eliminator**
  - 37 gallon (140 liters) liquid holding capacity
  - Hi Water level switch
  - Hi Vacuum switch
- **Continuous reliable operation**
- **Many blower types are available to meet your requirements:**
  - Regenerative
  - Rotary Claw
  - Positive Displacement (Rotary Lobe)
  - Rotary Vane
  - Centrifugal Fan
- **Thermal overload protection**
- **Influent dilution air valve**
- **Two vacuum gauges**
- **Optional NEC code available** (Class 1, Div. 1, or Div. 2)
- **Non-explosive units are available**

### OPERATION

The Geotech SVE system works by pulling air through soil that has been saturated with hydrocarbons or other volatile organic compounds, causing these compounds to volatilize. The vapors are then discharged to the atmosphere, through carbon polishing or vapor oxidation.

These systems are deployed with a moisture separator and mist eliminator filter to protect blower and end treatment from corrosion particulates and debris.

Every Geotech SVE system is factory assembled and fully tested for function, performance, and safety to meet the design conditions of each site application.



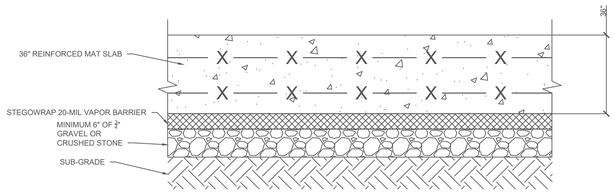
**Regenerative Blower SVE inside optional hazmat enclosure**



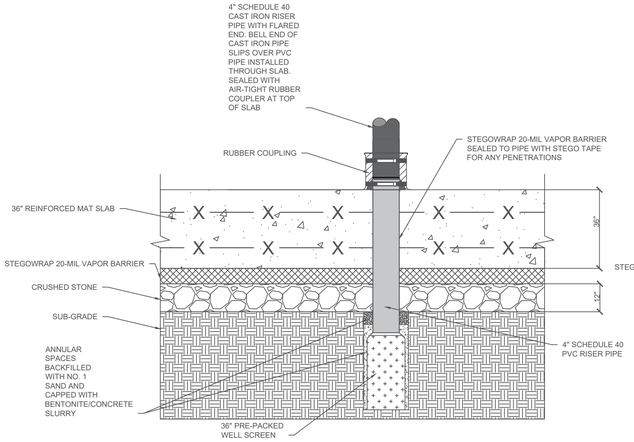

**Regenerative Blower SVE**

**CALL GEOTECH TODAY (800) 833-7958**

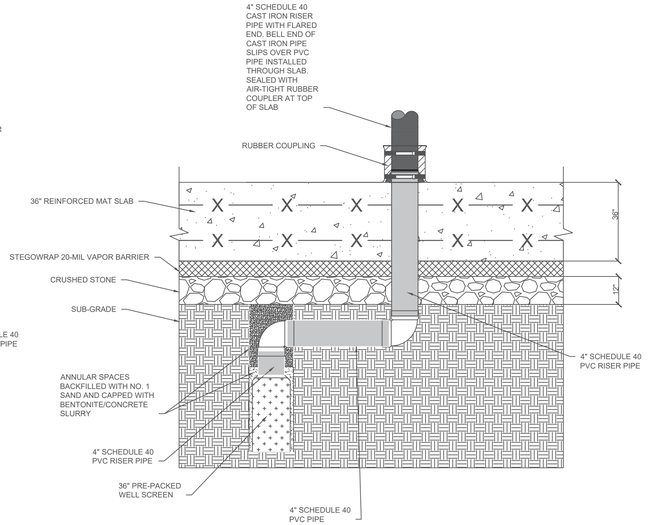
**Geotech Environmental Equipment, Inc.**
2650 East 40th Avenue • Denver, Colorado 80205
(303) 320-4764 • **(800) 833-7958** • FAX (303) 322-7242
email: sales@geotechenv.com website: www.geotechenv.com



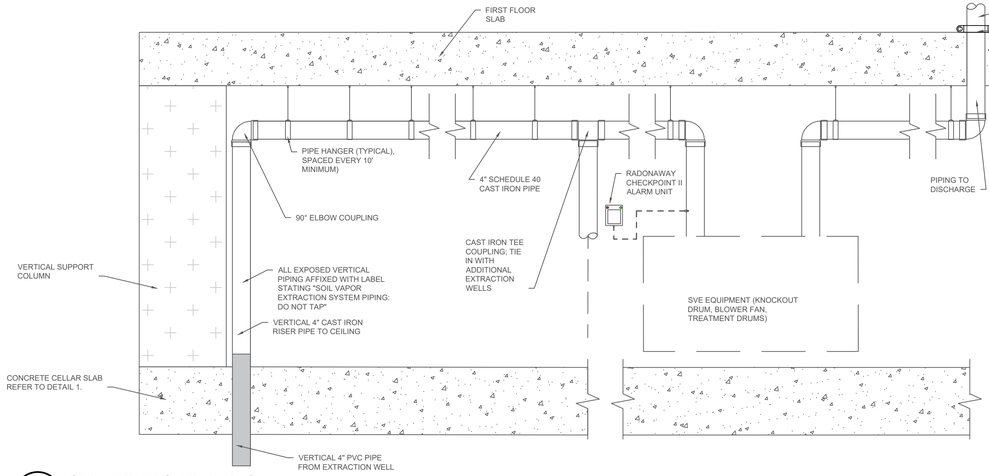

1 ENV-7 **TYPICAL SLAB DETAILS**
SCALE: N.T.S.



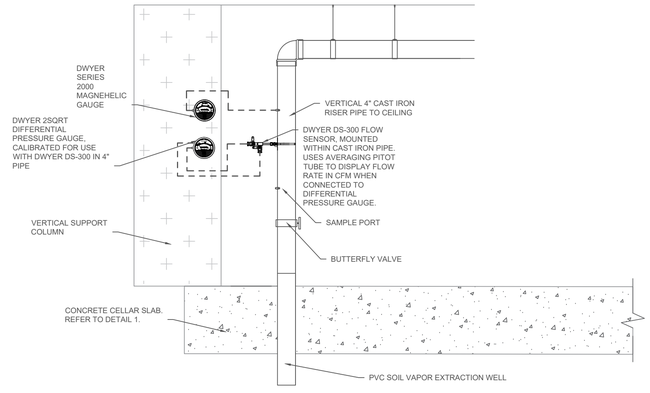

2 ENV-7 **SOIL VAPOR EXTRACTION WELL DETAILS**
SCALE: N.T.S.



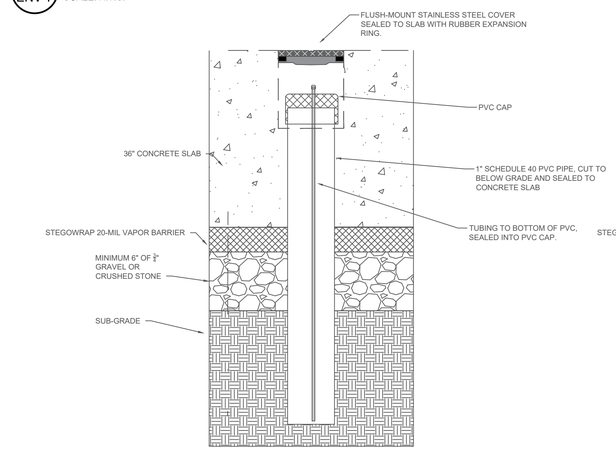

3 ENV-7 **OFFSET SOIL VAPOR EXTRACTION WELL DETAILS**
SCALE: N.T.S.



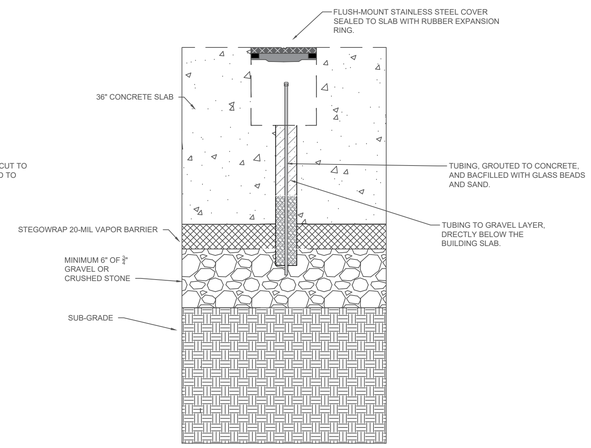

4 ENV-7 **SVE PIPING DETAILS**
SCALE: N.T.S.



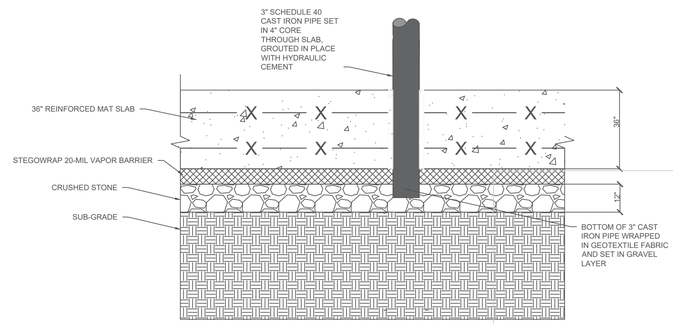

5 ENV-7 **RISER PIPE AND SVE EQUIPMENT DETAILS**
SCALE: N.T.S.




6 ENV-7 **SVE MONITORING POINT DETAILS**
SCALE: N.T.S.




7 ENV-7 **SUB-SLAB MONITORING POINT DETAILS**
SCALE: N.T.S.




8 ENV-7 **SSDS EXTRACTION WELL DETAILS**
SCALE: N.T.S.

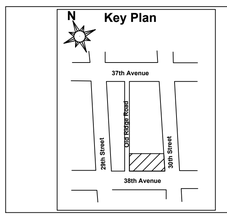
RESERVED FOR PLAN EXAMINER

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## General Notes

| No. | Revision/Issue | Date |
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ASTORIA, NEW YORK 11106


Drawn By: Evan Greenberg, E.I.T.

Checked By: Spiro Dongaris, P.E.

29-05 38th Avenue BCP Site

Drawing Title: SVE SYSTEM DETAILS

Address: 37-42 30th Street Long Island City New York 11101

Drawing No.: ENV-7

Date: 2/20/24

Project No. 21-134-0741

Prepared for: FH2BRO Builder Corp.

Scale N.T.S.

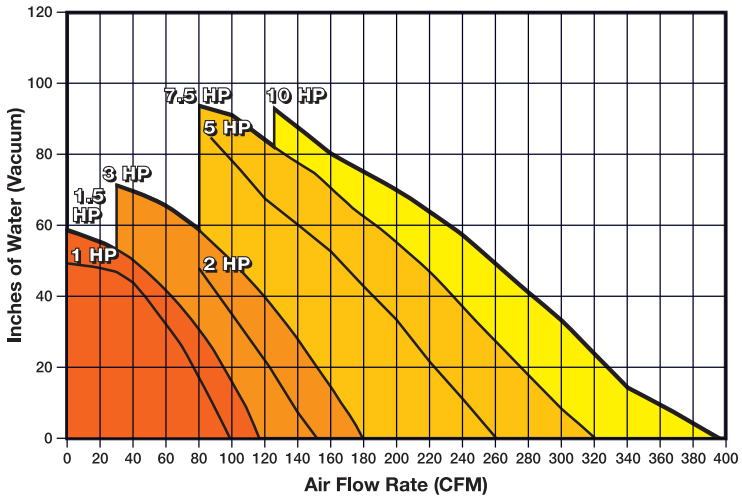
Certification

STATE OF NEW YORK · SPIRO I DONGARIS · LICENSED PROFESSIONAL ENGINEER · 095954



# Soil Vapor Extraction Systems

## *Geotech SVE*




**Regenerative Type Blower**
**Soil Vapor Extraction System**
**Selection Curve 1 through 10 HP**

**Note:** Higher flow and vacuum versions are available.



**Regenerative Blower SVE**
**with optional Geotech Environmental Control Module**

## SPECIFICATIONS

| | |
|---|---|
| **Applications:** | Well point or trench type vapor barriers |
| **Product Recovery:** | Volatile Organic Compounds (VOCs) |
| **Dimensions:** | 40" L x 48" W x 65" H<br>(101.6 cm L x 121.9 cm W x 165.1 cm) |
| **Options:** | Geotech Environmental Control Module<br>Telemetry package<br>Influent or effluent silencer<br>Effluent sample port<br>Effluent temperature gauge<br>Local CFM display<br>Auto-Drain (this option features automatic water level control inside the moisture separator with an effluent transfer pump) |

**Power Requirements:**

| HP | Voltage | Phase | CFM/CMM | Inches $H_2O$ Vacuum |
|---|---|---|---|---|
| 1 | 115/230 | 1 | 0-95/0-2.7 | 50" |
| 1.5 | 230 | 1 | 0-115/0-3.3 | 58" |
| 2 | 230 | 1 | 80-145/2.3-4.1 | 55" |
| 2 | 230 | 3 | 80-145/2.3-4.1 | 55" |
| 3 | 230 | 1 or 3 | 30-185/.85-5.2 | 72" |
| 5 | 230 | 3 | 85-280/2.4-7.9 | 82" |
| 7.5 | 230 | 3 | 80-325/2.3-9.2 | 93" |
| 10 | 230 | 3 | 125-380/3.5-10.8 | 93" |

## CALL GEOTECH TODAY (800) 833-7958

**Geotech Environmental Equipment, Inc.**
2650 East 40th Avenue • Denver, Colorado 80205
(303) 320-4764 • **(800) 833-7958** • FAX (303) 322-7242
email: sales@geotechenv.com website: www.geotechenv.com

geotech

# Soil Vapor Extraction & Air Sparge Systems

Installation and Operation Manual




Rev 02/21/2013 Part # 10804

# Table of Contents


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# DOCUMENTATION CONVENTIONS

This manual uses the following conventions to present information:



**WARNING**

An exclamation point icon indicates a **WARNING** of a situation or condition that could lead to personal injury or death. You should not proceed until you read and thoroughly understand the **WARNING** message.



**CAUTION**

A raised hand icon indicates **CAUTION** information that relates to a situation or condition that could lead to equipment malfunction or damage. You should not proceed until you read and thoroughly understand the **CAUTION** message.



**NOTE**

A note icon indicates **NOTE** information. Notes provide additional or supplementary information about an activity or concept.

This manual contains the information required to deploy, operate and maintain the Soil Vapor Extraction and/or Air Sparge System supplied. Its use is intended for field technicians, project engineers or anyone responsible for installing, operating or maintaining site remediation equipment.

## Section 1: System Description

### Function and Theory

### Soil Vapor Extraction System

The Geotech Soil Vapor Extractor (SVE) System is designed for soil degassing and subsurface ventilation applications in the unsaturated zone (above the water table) where the contaminates have a tendency to volatize or evaporate easily.

SVE, sometimes called *in-situ* volatilization or enhanced volatilization, works by pulling air through ground that has been saturated with hydrocarbon (Figure 1-1). This causes volatile organic compounds (VOC's) and some semi-volatile compounds (SVOC's) to vaporize. These vapors are then carried through the extraction well ductwork to the atmosphere. Often, in addition to vacuum extraction wells, air injection wells are included to increase the air flow and improve the removal rate of the contaminant. An added benefit of introducing air into the soil is that it can stimulate bioremediation of some contaminates. The system is ideal for well point or trench type vapor barriers. If off gas treatment is required, contact Geotech for information on air treatment equipment.

### Air Sparging System

Used alone, the SVE System cannot remove contaminants in the saturated (below the water table) zone (Figure 1-1). The Geotech Air Sparging System uses air to help remove harmful vapors from polluted soil and groundwater below the water table. Air pumped into the wells disturbs the groundwater. This helps the contaminants to phase change into vapors, rise into the unsaturated zone and then be pulled out of the ground via the SVE extraction wells.

When both the SVE and Air Sparging systems are operated in conjunction, the process of soil and groundwater remediation is greatly enhanced.

### Joint Applications

SVE and Air Sparging may be good choices at sites contaminated with solvents and other volatile organic compounds such as trichlorethane, trichloroethylene, benzene toluene, ethyl benzene, xylene and fuels. Because properties of the soil have such an important effect on the movement of soil vapors, the performance and design of the SVE and Air Sparge systems need to take these properties into consideration. A pilot test is strongly recommended to determine air flow, vacuum and pressure required for optimum results. Figure 1-1 contains an example of an SVE and Air Sparge application.



Geotech provides this equipment based on the parameters provided by the customer and does not warranty the merchantability or fitness for a particular purpose or application. The customer is solely responsible for determining the suitability of the product for customer applications which the purchaser designs, assembles, constructs or manufactures.

Both the SVE and Air Sparge System can be hard-wired to a remote power source or both can easily be controlled with the Geotech GECM Control Panel (described later in this section).

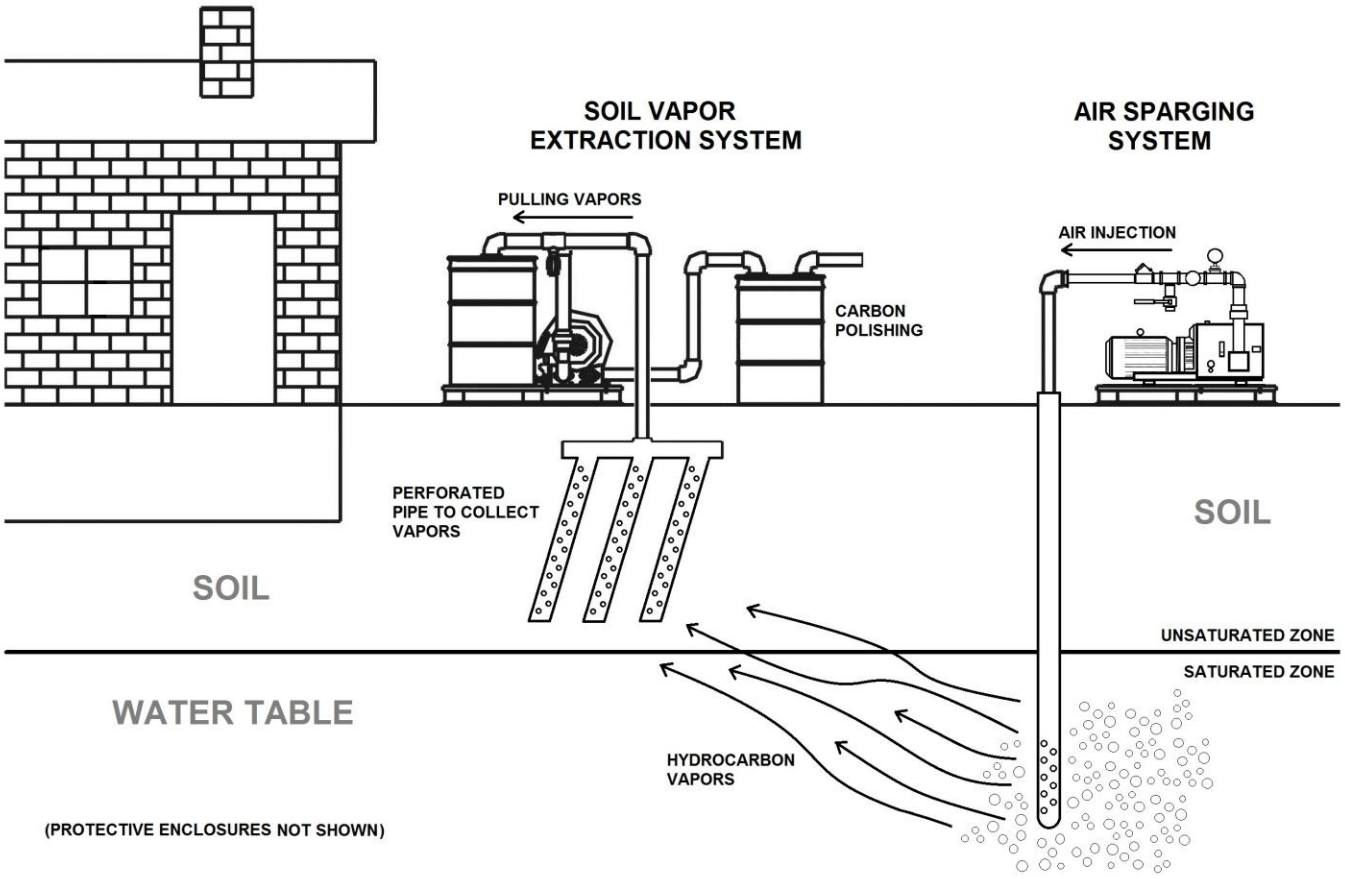



Figure 1-1

**System Descriptions and Components**

**SVE System**

Geotech offers several different types of vacuum pumps/blowers based on air flow, vacuum, electrical voltage and classification requirements.

A typical Geotech supplied SVE system (Figure 1-2) consists of a (regenerative) vacuum pump/blower, inlet and outlet plumbing, integral air filter/moisture separator, ambient air dilution valve and vacuum gauges and a power disconnect. Systems with control panels (XP and non-XP) come with thermal overload protection or high amp circuits and additional instrumentation can be provided as required.

**SVE Components**

**Blowers**

Blowers are available in various sizes. Basic blower specifications and performance curves are provided in Section 6.

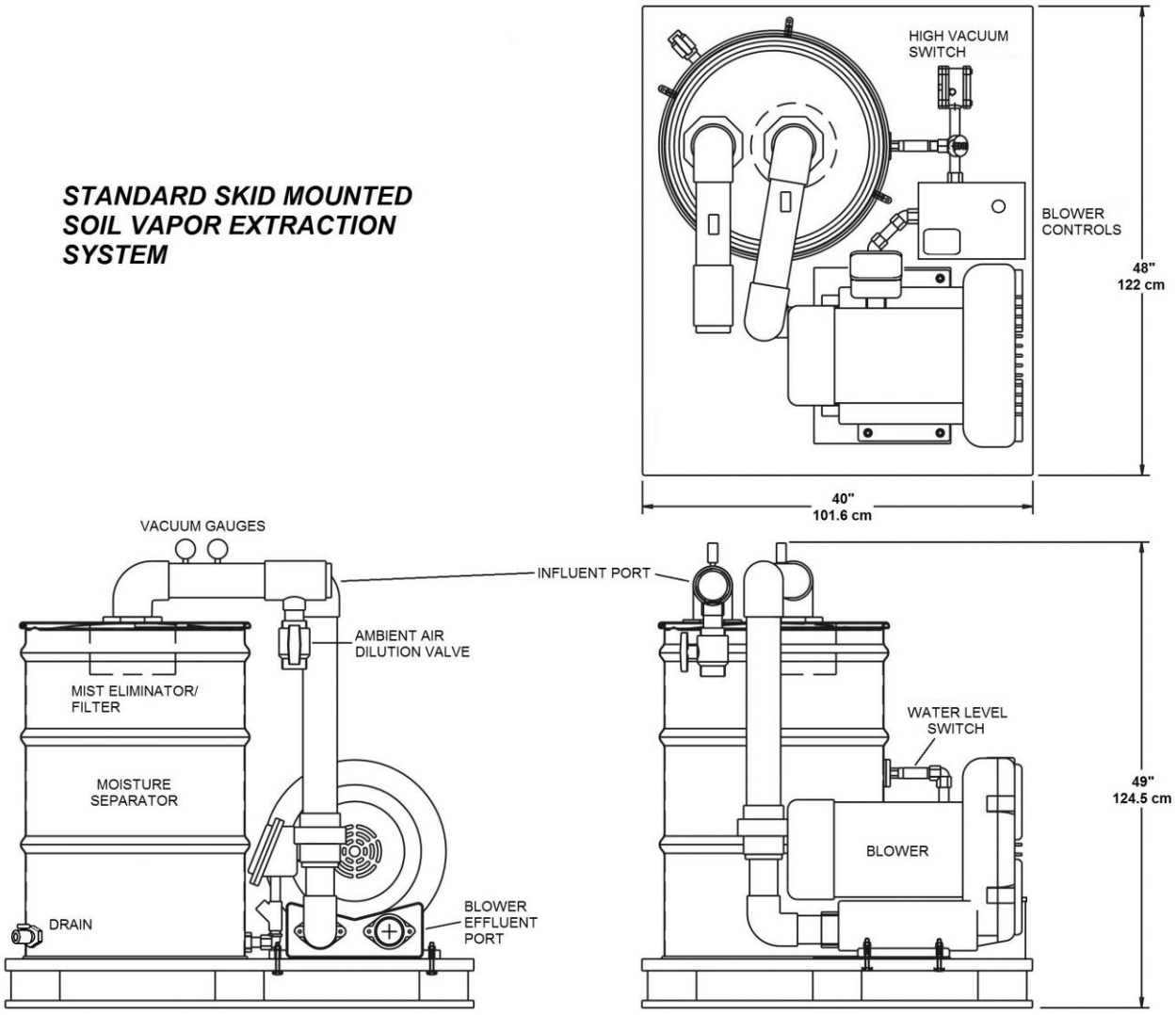



Figure 1-2

**Moisture Separator**

The moisture separator is positioned between the blower and the extraction well to help protect the blower from corrosion damage caused by excess moisture. In addition, it will protect the end treatment from further contamination. Each moisture separator provides the following features:

- 38 gallon (143.8 L) capacity, steel canister with enamel finish and epoxy coated interior.
- High efficiency cyclonic separation.
- Inherent safe collection design.
- Outfitted with drain for convenient removal of fluids.
- A liquid level float switch that will protect the blower from flooding and shut down the system when the moisture separator is full.

### Vacuum Gauges

Vacuum gauges are mounted before and after the air filter for ease of diagnosing a clogged filter. As the filter begins to clog, the difference between gauge readings will increase.

### Ambient Air Dilution Valve

The ambient air ball valve is used to adjust the vacuum on the influent side of the blower.

### Options

- Single-phase SVE blowers may be supplied with optional power cords and explosion proof plugs.
- Effluent silencer (muffler).
- Effluent temperature gauge.
- Effluent pressure gauge.
- CFM gauge.
- Sample ports.

### Air Sparge System

Geotech offers several different types of compressors/blowers based on air flow, PSIG, electrical voltage and classification requirements.

A typical Geotech supplied Air Sparge system (Figures 1-3 and 1-4) consists of a compressor/blower, inlet/outlet piping, air bleed valve, adjustable outlet pressure bleed valve, pressure gauge, temperature gauge and a discharge check valve. Additional instrumentation is provided based on the customer's requirements.

Air Sparge system compressors, depending on the make and model, may come as a rotary claw or rotary vane in design. Figures 1-3 and 1-4 represent a standard rotary claw Air Sparge design with basic factory installed plumbing (control panel not shown).



Rotary Vane compressors usually have one distinct characteristic and that is that they can only operate (rotate) one direction. Damage can occur when running a rotary vane the wrong direction. When using a rotary vane compressor, observe all warnings and procedures for connecting power and establishing the rotation of the unit prior to placing it into service. Most rotary claw models, when determining the flow direction during installation, can run either direction without damage.

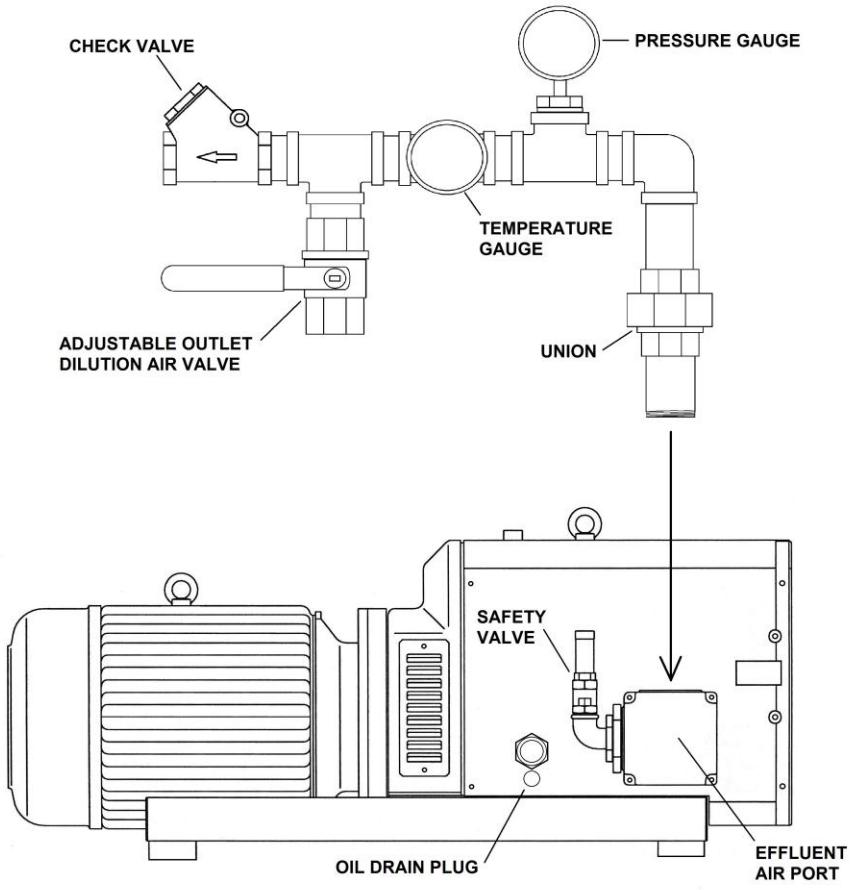



Figure 1-3 – Example of output side of rotary claw sparge with a standard plumbing configuration.

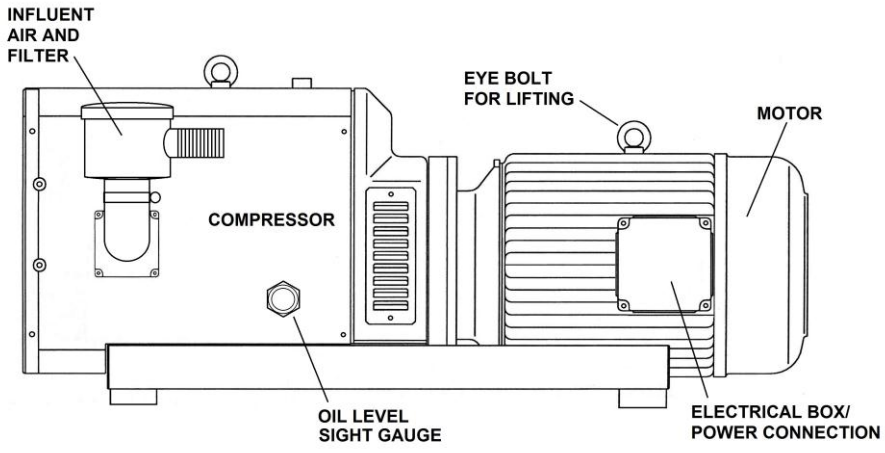



Figure 1-4 – Example of input side of rotary claw sparge.

**Options**

- Single-phase Air Sparge systems may be supplied with optional power cords and explosion proof plugs.
- Influent silencer (muffler).
- Effluent temperature switch.
- CFM gauge.
- Multi-port plumbing with control solenoids, valves, fittings and flow gauges.

**Control Panel**

A basic Geotech supplied SVE or Air Sparge system will have a standard ON/OFF/Reset Motor Starter box with auxiliary contacts for alarm switches. These components are housed within a NEMA 4 (non-explosion proof) or a NEMA 7 (explosion proof) enclosure.

When additional controls and logic are required or when interfacing the SVE and Air Sparge equipment, Geotech will supply a NEMA 4, GECM Control Panel, designed to operate both the SVE and Air Sparge systems along with all alarm circuits and fault switches.



A qualified electrician is strongly recommended to provide wiring to and from the remote mount control panel and the systems.

## Section 2: System Installation



Disconnect power before opening any enclosure on any system. Only explosion proof systems may be deployed in hazardous locations.

### Installation

### Location

- Locate and position the unit as desired. Secure the unit to a solid floor or other stable surface keeping the unit relatively level (within 1/8”/3.2 mm per 12”/30.5 cm run.)

- When bolting the unit down all mounting points are to be solidly in contact with the floor before the anchor bolts are tightened. The use of vibration isolators is not required with SVE or Air Sparge blowers less than 25 HP in size.

- There should be adequate room around the unit to perform regular maintenance. Adequate ventilation should also be available; Blower(s) generate BTU’s per hour per motor horsepower in heat which needs to be removed. Geotech recommends a 3’ (1 m) space around the skids for heat rejection and ease of maintenance.

### Plumbing

- Plumb in the inlet and outlet piping. Size the piping such that the pressure drop encountered during maximum air usage is within an acceptable range.

- Utilize piping materials that are rated for pressure and temperature at which the blowers/compressors will be operating.

- Route the piping such that any moisture that condenses in the piping will run to a low point drain.

- Confirm the installed pipe system meets all applicable building codes.

- SVEs are to be manifolded to the vapor source and the effluent vapor plumbed to a desired location.

### Control Valves

- All rotary vane Air Sparge units need to have discharge check valves to protect the blower from reverse rotation upon shutdown.

- Units are to have a pressure/vacuum relief valve or switch to protect the blower/compressor from over pressure/vacuum or high amps.

**Power**

- An adequate power source should be available. A qualified electrician is strongly recommended to wire all blower motors and their control panels. Wire power to the power disconnect switch inside the motor starter box, or plug the unit into an explosion-proof receptacle.

- With three phase power systems, jog the motor and determine the rotation; if rotation is incorrect, switch any two leads of the incoming power.



**Some rotary vane units will be labeled from the factory noting that the blower should be detached from the motor when determining the rotation. This is important since some units can be damaged with just a slight bit of power applied with an incorrect rotation.**

- Confirm all wiring conforms to the National Electrical Code and any other government codes which apply in your area.

## Section 3: System Operation

### SVE Operation

To ensure proper operation of the system, the vacuum on the influent air should not exceed the manufacturer's high vacuum switch setting. An adjustable high vacuum switch (shown in Figure 1-2) is pre-set at the factory to shut down the blower when the vacuum exceeds the blower rating or nameplate full load amps. Vacuum in excess of the specified values can over heat and damage the blower motor. Monitor the vacuum by referring to the vacuum gauge mounted closest to the blower (or the piping between the drum and AIR IN port of the blower as shown in Figure 1-2.)

The specified maximum vacuum indicated on the blower identification plate assumes an open discharge. Any pressure drop associated with inlet or discharge piping or discharge treatment will also affect blower motor running amperage. Therefore, maximum allowable vacuum will decrease with an increase in discharge pressure requirements (such as use with vapor treatment equipment, i.e.: carbon vessels.)

An adjustable PVC inlet air valve is also provided. This valve should be open on startup and slowly closed until the desired vacuum is attained or maximum recommended vacuum is attained.

### System Faults (SVE)

To prevent equipment damage, the SVE System will automatically shut down due to the following conditions:

#### High Vacuum

- Clogged demister.
- Obstructions (water or debris) in the influent or effluent plumbing.

#### High Water Level in the Moisture Separator Drum

- Water level in the moisture separator drum has reached capacity.
- Optional transfer pump not removing water.

#### Blower Motor Thermal Overload (overheating)

- Incorrect setting of vacuum switch.
- Motor failure or fatigue.
- Electrical service providing excess or insufficient voltage.

#### Current Overload (High Amps)



Motor starters provided with factory control panels will shut the system down when the amp range is exceeded.

- Incorrect setting of vacuum switch.
- Motor failure fatigue.
- Electrical service providing excess or insufficient voltage.
- Amp range setting on motor starter has been altered (consult electrician).

### Restarting the Blower

To restart the system after one of the above faults has occurred; first identify and rectify the condition that caused the fault (see Section 5, System Troubleshooting). Once the problem has been corrected restart the blower:

1. Set the switch on the control panel to OFF, or set the main switch to OFF.

    - Systems with an ON/OFF/RESET switch require a RESET.
    - Systems using a GECM Control Panel (optional) require that the HOA (HAND/OFF/AUTO) switch be set to OFF and the RESET button depressed to clear the fault.

2. Set the switch on the control panel to ON, or set the main switch to ON.

    - With a GECM, set the HOA switch to AUTO.

### Air Sparge Operation

To ensure proper operation of the system, the discharge pressure on the effluent side should not exceed the maximum full load amps of the motor or maximum pressure rating of compressor.

An adjustable discharge bleed air valve is provided. Open the valve ½ way upon start up and slowly close the valve until the pressure desired is attained. Pressure in excess of the specified values can damage the blower motor.

An optional High Temperature or Pressure Switch can be provided to protect the blower from over-heating. The temperature switch is pre-set at the factory based on anticipated compressor temperature rise for the operating pressure and when the ambient inlet air temperature is 100°F (37°C). Pressure switches are set based on the maximum full load Amps of the motor.

Monitor blower discharge pressure by referring to the discharge pressure gauge. This gauge should be placed as close to the discharge of the Air Sparge compressor as possible for the most accurate readings.

Pressure or temperature in excess of the specified values can damage the compressor/motor. A pressure relief valve should be provided to protect the blower from over-pressurizing. This valve should be tested at start up to ensure functionality.

Pressure drops associated with inlet and discharge piping, valves, and instrumentation will also affect compressor motor running amperage.

### System Faults (Air Sparge)

To prevent equipment damage, the Air Sparge System will automatically shut down due to the following conditions:

### High Temperature

- Temperature has exceeded the setting on the optional High Temperature Switch.
- Obstructions (water or debris) in the effluent plumbing.

**High Pressure**

- Pressure has exceeded the setting on the optional Pressure Switch.
- Obstructions (water or debris) in the effluent plumbing.

**Compressor Motor Thermal Overload (overheating)**

- Motor failure or fatigue.
- Electrical service providing excess or insufficient voltage.

**Current Overload (High Amps)**



Motor starters provided with factory control panels will shut the system down when the amp range is exceeded. Amp range rises with pressure, or blockage of effluent air flow.

- Motor failure fatigue.
- Electrical service providing excess or insufficient voltage.
- Amp range setting on motor starter has been altered (consult electrician).

**Restarting the Compressor**

To restart the system after one of the above faults has occurred; first identify and rectify the condition that caused the fault (see Section 5, System Troubleshooting). Once the problem has been corrected restart the compressor:

1. Set the switch on the control panel to OFF, or set the main switch to OFF.

    - Systems with an ON/OFF/RESET switch require a RESET.
    - Systems using a GECM Control Panel (optional) require that the HOA (HAND/OFF/AUTO) switch be set to OFF and the RESET button depressed to clear the fault.

2. Set the switch on the control panel to ON, or set the main switch to ON.

    - With a GECM, set the HOA switch to AUTO.

## Control Panel Operation



Before wiring the control panel, check to make sure the electrical supply matches the specifications of the system and components. Utilize a volt meter to verify the **actual power** supplied. Do not rely on the power supply stated on the electrical supply panel since actual voltage provided can vary widely.

- Wire in all associated motors and control instruments with the proper gauge wire recommend by NEC handbook.
- Double check for correct rotation on all equipment prior to putting the equipment into service.
- Activate all control instrumentation to ensure functionality of switches and equipment protection prior to full operation of the system.

## Single System Unit (Basic ON/OFF/RESET Controls)

On stand-alone SVE or Air Sparge systems, Geotech may provide an ON/OFF/RESET motor starter (within a NEMA 4 or NEMA 7 enclosure) with auxiliary contacts to operate high temperature switches, high pressure/vacuum switches, a water high level switch, thermal overload, etc. For these systems, turn ON/OFF the system via the ON/OFF/RESET switch.

A system may shut down in the event of an alarm condition. On panels with an alarm light, the alarm light will illuminate when any of these conditions exist. Simply turn OFF the switch, then set the switch to RESET to reset the system. Prior to turning the system back on, identify and rectify the alarm condition. Turning the system on and having repeated shut downs due to alarm conditions may harm the motor and other electrical components of the system.

## Single and Dual System Controls (GECM Control Panel)

Geotech can provide you with a GECM control panel to operate and monitor all equipements at one site. Each device is controlled with a HAND/OFF/AUTO (HOA) switch. During normal operation, all devices are set to AUTO for continuous run time. Should a system fault (alarm condition) occur, a RESET of the panel will be needed prior to turning the equipment back on. The HAND position is used to temporarily apply power to a system, such as to verify rotation or when trouble shooting a problem.

If your system comes with the Geotech GECM Control Panel, the following description is a typical logic process for SVE and Air Sparge operating conditions:

- The standard GECM controller has an LCD screen to identify operating and alarm conditions.
- When the SVE is running, the Sparge system can operate.
- When the SVE is not operating, the Sparge system will not operate, except in HAND mode.
- On the SVE portion, a Water High Level Switch will shut down the SVE and the optional alarm light will illuminate, and the Air Sparge motor will shut down. The alarm condition is set up as a latching control, i.e.; a manual reset is required.
- On the SVE portion a High Vacuum Switch will shut down the SVE, the optional alarm light will illuminate and the Air Sparge motor will shut down. The alarm condition is set up as a latching control, i.e.; a manual reset is required. In addition, the SVE motor thermal overloads are tied to this alarm switch. Therefore, the alarm switch will illuminate and shutdown the system in the event of a blower motor thermal overload.

- An optional High Temperature Switch or Pressure Switch will shut down the Air Sparge motor and the alarm light will illuminate. However, the SVE can continue to operate. The alarm condition is set up as a latching control, i.e.; a manual reset is required.
- An optional Run Light will illuminate when a respective system is operating.
- Optional Elapsed Time Meters can monitor run time for each of the respective systems.



The SVE and Air Sparge system can operate independently of each other when the HOA switches are in the HAND mode.

For additional information refer to the Geotech GECM User Manual and Field Wiring Diagram along with the SVE and Air Sparge User Manual and system wiring diagrams provided with new installations.

## Section 4: System Maintenance

### SVE Maintenance

The SVE is designed to provide you years of trouble-free operation when the equipment is properly maintained. Some basic maintenance items are listed in the following table:

| Frequency of Maintenance Tasks/Monthly Calendar | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| Check vacuum gauges to ensure that max. vacuum is not exceeded. | | ● | | ● | | ● | | ● | | ● | | ● |
| Inspect air filter on optional CFM gauge for moisture. Drain high vacuum switch. | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Check motor amp draw. Check all switches for proper operation. Check all wiring for loose connections. | | | ● | | | ● | | | ● | | | ● |
| Check water level within the moisture separator drum. Check operation of optional transfer pump. | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Check for loose fittings and bolts. | | | ● | | | ● | | | ● | | | ● |
| Check moisture separator for pressure drop across filter/moisture demister (pressure drop should not exceed 6” $H^2O$ (0.44 in Hg). under normal operating conditions.) | | | ● | | | ● | | | ● | | | ● |

**Cleaning the intake filter/demister assembly (for standard 55 gallon drum)**

Optimum performance of the SVE system is possible only with regular maintenance of the intake filter/demister. Clean the filter/demister assembly inside the moisture separator whenever the vacuum gauge readings indicate significant clogging has occurred. Refer to Figure 4-1 and the following outlined procedure:

1. Loosen and remove the drum lid retaining clamp.

2. Loosen and disconnect the 3 inch union between the moisture separator drum and the blower.

3. Mark and detach any CFM lines (when applicable).

4. Lift the cover off the drum and lay it down with the demister assembly facing up.

5. Remove the demister from the holding tube.

6. Shake excess liquid from the demister unit and wash with warm soap and water.

7. Reassemble the moisture separator.

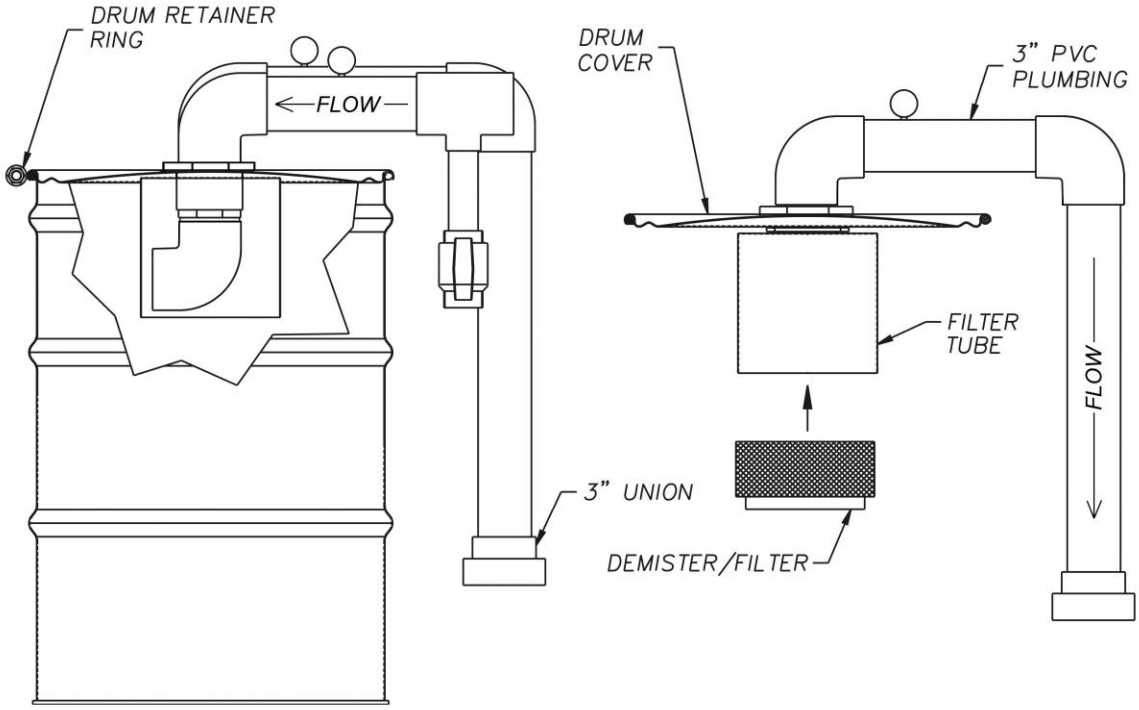



Figure 4-1

**Drain Vacuum (Pressure) Switch**

The SVE HI vacuum switch should be drained on a regular basis. This is particularly important in applications where excessive condensation may cause a buildup of moisture within the switch. To drain the switch, rotate the vent drain plug (underneath) one turn in a clockwise direction and then return the plug to its original position.

**Drain CFM Gauge Air Filter**

The filter on the CFM gauge should be checked on a regular basis and drained if necessary. Drain the filter by turning the drain screw (underneath) in a clockwise direction (when viewed from the bottom of the filter) Close the drain by turning the screw counter-clockwise.

**Check Poly Tubing**

Regularly check the condition of the poly tubing going from CFM gauge to Pitot tube and between the HI vacuum switch and the quick connect fitting on the influent air piping. A cut, kink or loose tubing connection can cause operational problems with the SVE.

**Operation of the High Vacuum Switch**

Though the High Vacuum switch is called out as a "pressure" switch, and can be used as such, its application on the SVE system is to be used as a “vacuum” (negative pressure) switch. When you see the word "pressure", assume "vacuum" unless the step is defining a physical port on the switch itself, in which case the word "pressure" is used.

**SVE “High Vacuum” (pressure) switch**

The High Vacuum switch used is always wired for "normally closed". The switch will remain closed until you adjust the vacuum setting screw to have the switch “open” at a specific vacuum (negative pressure) reading (in inches) as shown on the vacuum gauge (normally the gauge on the influent piping closest to the blower AIR IN port.) This is achieved by turning the set screw clockwise (CW) for a higher setting, counter-clockwise (CCW) for a lower setting. When this setting is reached, the electrical contact will “open”, breaking the circuit (and in most applications, shutting the system down).

**High Vacuum Switch Setting**

High Vacuum switch is pre-set at the factory. It is normally set 2” $H^2O$ (0.15 in Hg) below the vacuum gauge reading for the maximum amps called out on the blower nameplate. The purpose of this setting is to shut down the system and prevent over-amping of the blower (in case of clogging to the influent air path) while maximizing the air flow, or CFM. Before proceeding with an adjustment, read the literature provided that came with the switch from the manufacturer.

When adjusting the HI vacuum switch, use the following steps either to verify the current setting, or to make an adjustment to the HI vacuum switch (such as after replacing a faulty switch):

1. Turn off the blower.
2. Disconnect the influent air connection to the lid, usually right before the ball valve in place.
3. Disconnect the effluent air connection to the blower (AIR OUT connection.)
4. Close the PVC valve to the influent air pipe. Close any openings to the top of the drum and to the PVC drain valve at the bottom of the drum.
5. Disconnect the two wires within the High Vacuum switch and connect them together. This will prevent the system from shutting down while setting the switch.
6. Attach an ohm meter to the two points on the switch to verify when it is open or closed.



If over-amping is a concern then it may be necessary to have an electrician open the blower motor electrical box and attach an amp probe to each power leg to verify that the name plate amps are not exceeded while adjusting High Vacuum switch.

7. Turn on the blower. Proceed with one of the following options:

**Option 1 - Verifying the current setting of an existing High Vacuum switch**

1. With the blower running, gradually cover the 3" inlet pipe with a hard flat object (not your hand) and monitor the increase in vacuum on the vacuum gauge closest in-line to the blower AIR IN port. Keep an eye on the amp reading while doing so.
   When the ohm meter shows "open" the inches shown on the gauge will be your current setting. If the ohm meter does not show an "open" after reaching the correct inch setting or upon reaching the name plate high amps, then the switch is either set too high or the switch is stuck (a stuck switch needs to be replaced.)
2. Adjust the switch by turning the Set Range screw on top CCW for fewer inches, CW for more inches.
3. The switch will be set when the circuit "opens" at the correct setting **(without over amping the blower.)**
4. Turn the blower off and restore all electrical connections.
5. If you have a GECM Control Panel, turn the unit back on and cover the inlet pipe to verify that the GECM will turn off the system with the high vacuum setting (this will activate after 5 seconds.)
6. Re-connect all piping and restore the system for operation.

**Option 2 - Adjusting the setting for a new High Vacuum switch**

1. Turn the set screw all the way CCW. The switch will show "closed" on the ohm meter.
2. With the blower running, gradually cover the 3" inlet pipe with a hard flat object (not your hand) until the Vacuum gauge reaches the desired setting **(do not let the amps exceed the blower specifications).** With the switch all the way CCW, the meter should already show an "open" circuit.
3. Leave the cover in place on the inlet pipe. Using a flathead screwdriver, turn the set screw CW until the switch "closes". This will "ball park" the adjustment. Turn the set screw back a few turns and continue to "fine-tune" the switch by removing and **slowly covering** the inlet pipe to verify the current setting. Repeat and adjust the set screw as necessary.
4. The switch will be set when the circuit "opens" at the correct setting **(without over amping the blower.)**
5. Turn the blower off and restore all electrical connections.
6. If you have a GECM Control Panel, restore the power and cover the inlet pipe to verify that the GECM will turn off the system with the high vacuum condition (this will activate after 5 seconds.)
7. Re-connect all piping and restore the system for operation.

**Transfer Pump**

If SVE system includes an optional transfer pump, the following routine maintenance tasks will help to ensure continuous service from the pump. Read the manufacturer supplied User Manual before proceeding.

- Check the flow rate weekly to ensure that the cycling frequency is minimized.
- Inspect hoses and wiring quarterly for cracks, cuts or abrasions.

**Air Sparge Maintenance**

Your Geotech Air Sparge System is designed to provide years of trouble-free operation when the equipment is appropriately maintained.



**During operation, the surface temperature of the compressor and discharge piping can be very hot. Let the unit cool down before doing maintenance to the unit.**

| Frequency of Maintenance Tasks/Monthly Calendar | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| Check pressure gauge to ensure that max. pressure is not exceeded. | | ● | | ● | | ● | | ● | | ● | | ● |
| Check optional temperature switch for proper setting and operation. | | | ● | | | ● | | | ● | | | ● |
| Inspect intake filter and muffler (pressure drop should not exceed 6“ W.C. under normal operating conditions.) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Check motor amp draw. Check all switches for proper operation. Check all wiring for loose connections. | | | ● | | | ● | | | ● | | | ● |
| Check for loose fittings and bolts. | | | ● | | | ● | | | ● | | | ● |
| Check functionality of check valve. | | | ● | | | ● | | | ● | | | ● |
| If applicable, check oil level and condition. Replace as recommended by manufacturer. | | ● | | ● | | ● | | ● | | ● | | ● |

## Section 5: System Troubleshooting

Your SVE and Air Sparge systems are designed for years of continuous trouble free operation. If you encounter problems when using either system, use the following guidelines before contacting Geotech for service.



These procedures are meant to be carried out by personnel qualified to work on electrical circuitry. If in doubt, obtain the services of a qualified electrician.

### Getting Help

- Read the entire manual and become thoroughly familiar with all system components before intitiating any of the following troubleshooting procedures.

- If the troubleshooting procedures in this section indicate a component failure, prepare a written list of all problems encountered while operating the equipment, then call Geotech Environmental Equipment for assistance.

### Service Locations

Geotech Service personnel are trained on all aspects of the equipment and are dedicated to help you maximize the efficiency and cost effectiveness of your SVE or Sparge system. For technical support call our Geotech Service office.

**Geotech Environmental Equipment, Inc.**
**2650 East 40th Avenue**
**Denver, CO 80205**
**Toll Free Phone: (800) 833-7958**
**Commercial Phone: (303) 320-4764**
**Fax: (303) 322-7242**
**www.geotechenv.com**

**Troubleshooting Procedures - SVE**

**If the blower will not run:**

1. Confirm that power is reaching the motor.
   - Check all wiring and connections for breaks, faults, or abrasions.
   - Check for power outages at the service.
   - Check fuses.
   - Check for a tripped motor starter.

Use the following steps to determine if the motor/blower has shut down due to any of the fault conditions discussed in Section 3:

2. Check for high liquid level in the moisture separator drum. If the High Liquid Level switch has engaged and has shut down the system, drain the drum by opening the valve located at the base (see Figure 1-2). Restart the blower using the procedures outlined in Section 3. If an optional transfer pump is included with the SVE, verify functionality of the pump and the optional level control probe. Check for any potential plugging due to sediment around the discharge piping from the vessel.

3. Inspect the demister filter inside the moisture separator drum. A blocked filter will engage the High Vacuum switch. If the filter is dirty, clean as indicated in Section 4.

4. If the High Vacuum switch setting is shutting the system off prematurely, then adjust the setting as described in Section 4.

5. If an optional vapor phase carbon is utilized in the process flow, verify the carbon vessel's pressure drop is not in excess of the vessel manufacturer's performance guide and does not exceed the blower's differential pressure capability.

6. Restart the blower (as described in Section 3). Monitor the current draw using a voltmeter and compare your reading with the motor nameplate amps. Verify that the current is within acceptable limits. If the motor is drawing excess current, please contact Geotech.

If your system does not respond to any of the procedures above, the motor has probably shut down due to thermal overload. Overworking the blower can cause thermal overload; or it may be a symptom of motor fatigue. Allow the motor to cool, and then restart the system using the steps outline in Section 3.

If the blower continues to overheat, monitor the vacuum gauges and determine if the blower is exceeding its maximum vacuum limit. If the blower has not exceeded its vacuum limit, please contact Geotech for further assistance.

**Troubleshooting Procedures – Air Sparge**

If the compressor will not run:

1. Confirm that power is reaching the motor.

    - Check all wiring and connections for breaks, faults, or abrasions.
    - Check for power outages at the service.
    - Check fuses.
    - Check for a tripped motor starter.

Use the following steps to determine if the motor/compressor has shut down due to any of the fault conditions discussed in Section 3:

2. If a high temperature or high pressure fault is in alarm condition, check all discharge piping for blocks or partially closed valves. A high water level in a recovery well can create additional resistance and a higher discharge pressure condition. Frozen lines can also increase added resistance.

3. If the influent air filter is dirty, a higher differential pressure condition can occur causing the compressor to indicate a high temperature and high amp condition and not show a higher discharge pressure on the pressure gauge. Clean or replace the element.

4. If applicable, check the unit for proper oil level and condition. Add or replace oil as necessary.

5. Restart the compressor. Partially open the bleed valve and monitor the current draw using a voltmeter and compare your reading with the motor nameplate amps. Slowly close the bleed valve until the desired pressure is attained. If the motor is drawing excessive current, please contact Geotech.

**Temperature and thermal conditions for the Air Sparge system.**

An Air Sparge unit with a temperature switch installed can have a range setting anywhere 100°F (37°C) to 400°F (204°C). A unit with a temperature switch will be factory set to shut off with an air temperature of 200° (93°C) (or per customer requirments.

The motor on an Air Sparge may also be equipped with thermals. The thermals will shut down power to the motor should the motor over heat.

Though a shutdown can occur from other circumstances; i.e., lack of power, blown fuse, etc., perform the following for a high temperature or thermal shutdown:

1. If the temperature on the temperature gauge is satisfactory, set the ON/OFF/RESET switch to RESET, then turn the switch to ON to turn the unit back on. (If necessary, remove the cover to the temperature switch and adjust the shutdown temperature.)
2. If the unit does not power up, then it may be possible that there has been a thermal overload to the motor. Set the main switch to RESET then OFF. When the motor has cooled down turn the main switch back to ON.

Verify all equipment connections and conditions whenever a thermal overload occurs to prevent damage to the motor itself.

## Section 6: System Specifications

### SVE

**Applications:** Well point or trench type vapor barriers.
**Product Recovery:** Volatile Organic Compounds
**Dimensions:** 40” L x 48” W x 65” H (101.6cm L x 121.9cm W x 165.1cm H)
**Blower:**

| | |
|---|---|
| Type: | Regenerative blower |
| Flow Rate: | Up to 250 CFM (7.1 CMM) |
| Voltage: | 115/230/460 |
| Phase: | single or three phase |
| HP: | 1 – 75 (standard is 1 – 10) |

**New SVE Specification Sheet**

**Blower/Motor Type:**

Model: _____ S/N: _____

**Power Requirements:**

_____ Voltage _____ Phase _____ HP _____ Hz

High Vacuum Switch set to: _____ inches (2” $H^2O$ / 0.15 in Hg) under motor nameplate amps)

High Amp on Motor Nameplate: _____

**Standard Accessories:**

Water Level Switch Y / N High Vacuum Switch Y / N

Thermal Over Loads on Blower Y / N Vacuum Gauges Y / N

**Options:**

Temperature Gauge Y / N CFM Gauge w/Pitot Tube Y / N

Transfer Pump Y / N Water Level Probe Y / N

GECM Control Panel Y / N GECM S/N: _____

**Cable Length:**

Power Cord Length: _____ ft./m

## Air Sparge

**Applications:** Well point or trench type vapor barriers.
**Dimensions:** 40” L x 27” W x 36” H (101.6cm L x 68.6cm W x 91.4cm H)
(height is specific to model type and plumbing)

**Compressor:**

| | |
|---|---|
| Type: | Rotary Claw or Rotary Vane |
| Flow Rate: | Up to 250 CFM (7.1 CMM) |
| Voltage: | 115/230/460 |
| Phase: | single or three phase |
| HP: | 1 – 7.5 (Rotary claw available up to 40HP) |

**New Air Sparge Specification Sheet**

**Compressor/Motor Type:**

Model: _____ S/N: _____

**Power Requirements:**

_____ Voltage _____ Phase _____ HP _____ Hz

High Amp on Motor Nameplate: _____

**Standard Accessories:**

PSI Gauge Y / N

Temperature Gauge Y / N

Thermal Over Loads on Blower Y / N

Check Valve Y / N

**Options:**

Temperature Switch Y / N

Temperature Switch set to: _____ degrees F/C

Pressure Switch Y / N

Pressure Switch set to: _____ psi/bar

CFM Gauge w/Pitot Tube Y / N

GECM Control Panel Y / N

GECM S/N: _____

**Cable Length:**

Power Cord Length: _____ ft./m

**Power requirements SVE:**

| HP | VOLTAGE | PHASE | ICFM / CMM | INCHES $H_2O$ / INCHES OF MERCURY |
|---|---|---|---|---|
| 1 | 115/230 | 1 | 0-95 / 0-2.7 | 50 / 3.68 |
| 1.5 | 230 | 1 | 0-115 / 0-3.3 | 58 / 4.27 |
| 2 | 230 | 1 | 30-145 / .8-4.1 | 70 / 5.15 |
| 2 | 230/460 | 3 | 80-145 / 2.3-4.1 | 50 / 3.68 |
| 3 | 230/460 | 1 or 3 | 30-185 / .8-5.2 | 72 / 5.30 |
| 5 | 230/460 | 3 | 85-280 / 2.4-7.9 | 82 / 6.03 |
| 7.5 | 230/460 | 3 | 80-325 / 2.3-9.2 | 93 / 6.84 |
| 10 | 230/460 | 3 | 125-380 / 3.5-10.8 | 93 / 6.84 |

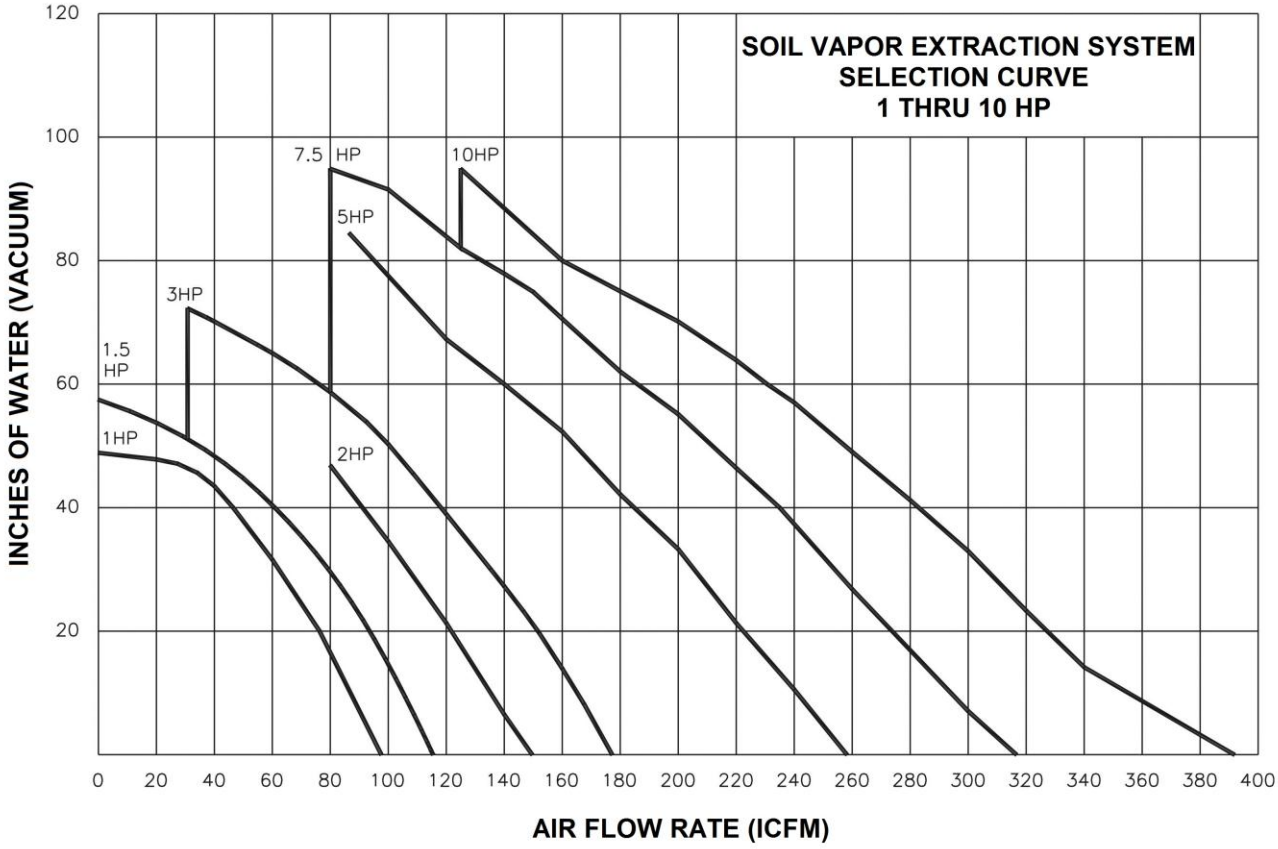



Figure 6-1

**SVE and Sparge Wiring Diagrams**

All SVE and Sparge systems using a GECM Control Panel will have a GECM Field Wiring Diagram provided detailing all wire connections to the unit. This diagram can be updated or replaced as needed by Geotech.

Without the use of a GECM Control Panel, the on-site electrician will need to wire the air pump/blower motor to an appropriate motor starter and power service. Systems with a basic motor starter box will have wiring diagrams detailing the component wiring.

The wiring from the SVE vacuum switch and water level switch, along with the motor thermals (when supplied) and the high amp circuit from the motor starter, must be integrated as a system shutdown component to the motor starter circuit in order to terminate power in the event of equipment failure.

Geotech can also build unit specific start boxes for use with the SVE, Sparge, transfer pump, and accessories. Contact Geotech for more information on system requirements. Figure 6-2 contains basic wiring for single and three phase blowers (examples do not include junction box integration).

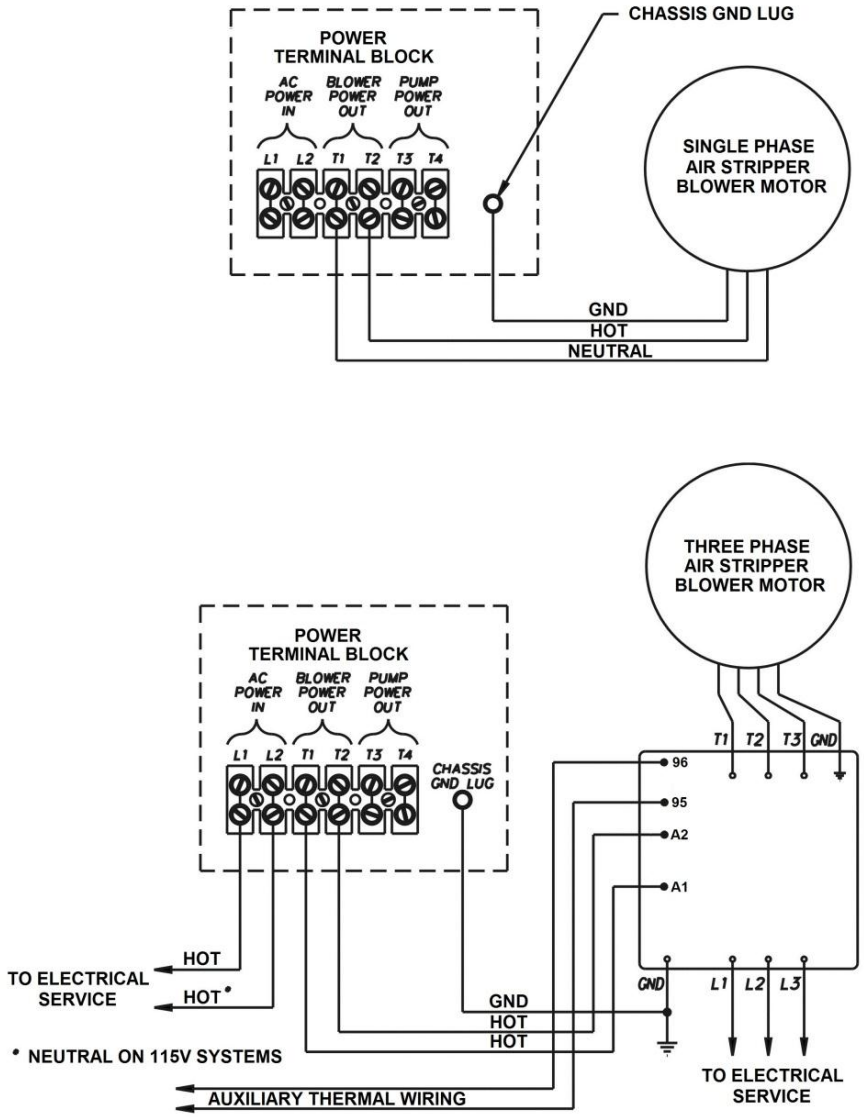



Figure 6-2 – Basic Single and Three Phase Wiring Diagrams

## Section 7: System Schematics

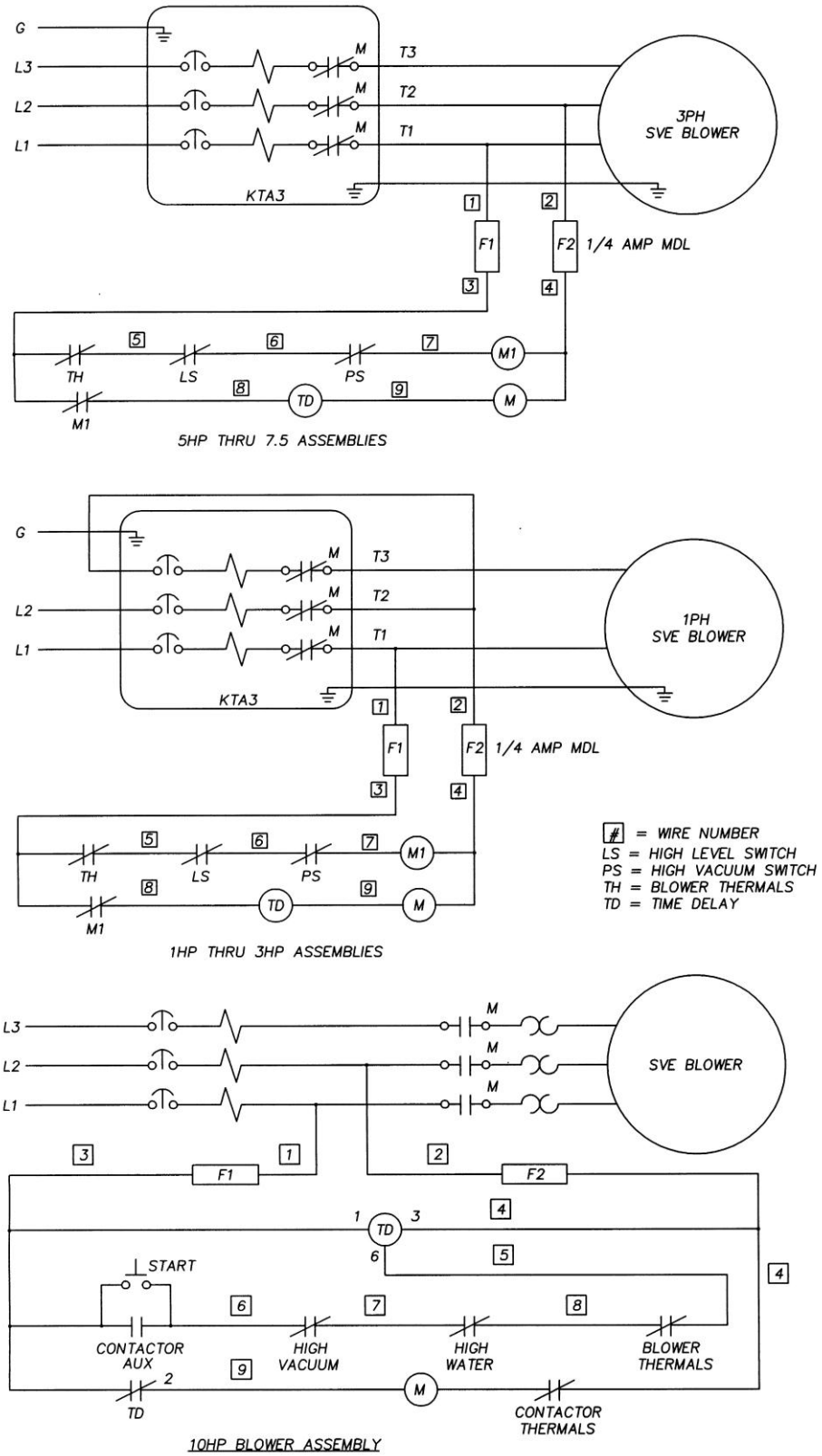



Figure 7-1

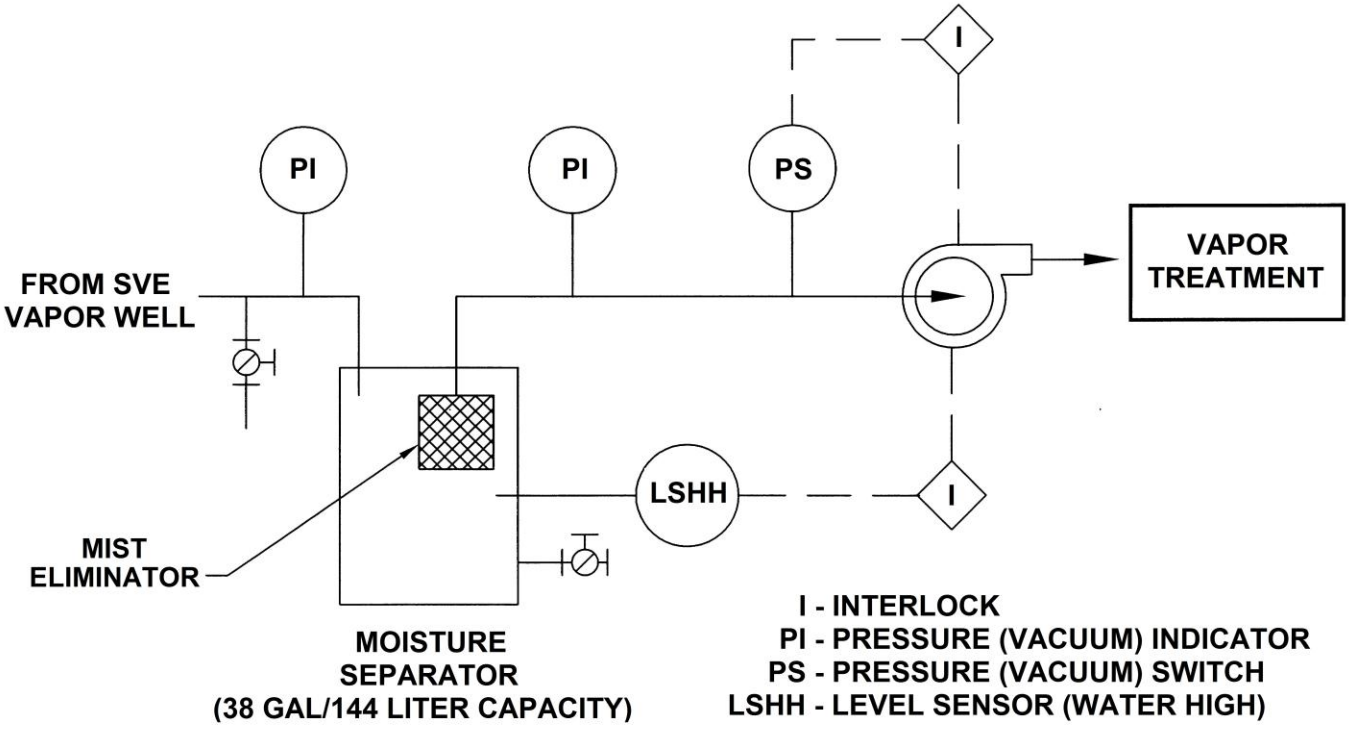



Figure 7-2 The Soil Vapor Extractor P & ID showing optional controls and accessories.

## Section 8: Replacement Parts

### SVE Parts Listing

| Parts Description | Parts List |
|---|---|

### System Hardware

A variety of system blowers are available through your Geotech Sales Representative.

| | |
|---|---|
| DRUM,55GAL,STEEL,EPOXY LINED,BLUE,W/2&3/4 BUNG | 10759 |
| TUBE,MIST ELIMATOR,PAINTED | 10760 |
| MIST ELIM,9"DX4"THK,POLY | 10252 |
| CLAMP,DRUM BASE,1/2"COND | 10749 |
| SWITCH,LIQ LVL,SPDT,EP,SIDE | 10746 |

### Plumbing

| | |
|---|---|
| FTG,BHD,PVC80,3",FPTxS | PPP088009 |
| FTG,BHD,PVC80,1",FPTxFPT | 10748 |
| PIPE,PVC40,3" | PPP035016 |
| PIPE,PVC40,2" | 10767 |
| UNION,PVC40,3",SXS | 16090006 |
| ELBOW,PVC40,3",SXS | 16090005 |
| VALVE,BALL,PVC40,1.5"NPT | 10757 |
| VALVE,BALL,PVC40/EPDM,1",TxT | 10798 |
| NIPPLE,PVC80,1.5”xCLOSE | 00192 |
| NIPPLE,PVC80,1"xCLOSE | PPP009030 |

In addition to these parts Geotech can provide you with a variety of galvanized pipe and fittings in 1”, 1.5” and 2” sizes.

### Air Flow and Vaccum

| | |
|---|---|
| SWITCH,PRESS,SPDT,1.5-8 PSIG 1950P-8-2F | 10745 |
| SWITCH,PRESS,0.5-2.0PSI,EP | PPE080017 |
| SWITCH,PRESS,0.4-1.6"WC | PPE080006 |
| SWITCH,PRESSURE,DIFF,10-180"WC EXPL PROOF, H3 SER,H3A-1SL,DWY | 16090265 |
| GAUGE,FLOW,0-225 CFM @ 0-3",WC | PPP082020 |
| GAUGE,FLOW,0-325CFM,7.97"WC | 10506 |
| FILTER,AIR,.175"NPT,20CFM | 10315 |
| GAUGE,VACUUM,0-100",1/4" | PPP092007 |
| QCK CNCT,NCKL,1/4X1/8MPT,PUSH/ PULL | PPP103001 |
| ELBOW,BRS,1/8",MxF,SQUARE | PPP003061 |
| TUBING,PE,.170x1/4,FT POLYETHYLENE | 87050501 |

**Non-XP Electrical Components**

| | |
|---|---|
| ENCLOSURE,PIANO HINGE,JIC | 16090095 |
| CONN,HUB,3/4"CONDUIT,AL | PPP019022 |
| TRANSFORMER,50V,460 TO 230 | 16090100 |
| RELAY,110V,DPDT,10 AMP | PPE014090 |
| RELAY,TIMER,120VAC,PC MNT | PPE014094 |
| FUSE HOLDER ASSEMBLY | 2010029 |
| FUSE,1A,250V,SLO-BLO | PPE011026 |
| FUSE,.5A,250V,SLO-BLO | PPE011016 |
| SELECTOR SWITCH | 17250035 |
| INDICATOR LIGHT,RED,GECM | 16110088 |
| INDICATOR LIGHT,GREEN,GECM | 16110112 |
| TIMER,EM,1 POLE,120V,24 HOUR 2A517 | 16110138 |

**XP Electrical Components**

| | |
|---|---|
| SWITCH,OPER,3 POS,EP | PPE015025 |
| LIGHT,IND,RED,120V | PPE102002 |

| | |
|---|---|
| MOTOR STARTER | (contact your Geotech Sales Representitive to spec out this item) |
| BLOWER | (contact your Geotech Sales Representitive to spec out this item) |
| TRANSFER PUMP | (contact your Geotech Sales Representitive to spec out this item) |

| | |
|---|---|
| MANUAL,SVE AND AIR SPARGE | 10804 |
| MANUAL,GECM | 16110163 |

## Air Sparge Parts Listing

### System Hardware

A variety of system compressors, from rotary claw to rotary vane, are available through your Geotech Sales Representative.

### Plumbing

Plumbing accessories vary and are dependent upon the plumbing/pipe size of the system (1”, 1.5” and 2”). Contact Geotech Sales for your system specific parts.

| Parts Description | Parts List |
|---|---|

### Air Flow and Vaccum

Temp switch
Pressure switch
Temp gauge
Pressure gauge
CFM gauge w/ Pitot Tube (contact your Geotech Sales Representitive to spec out this item)

### Non-XP Electrical Components

| | |
|---|---|
| ENCLOSURE,PIANO HINGE,JIC | 16090095 |
| CONN,HUB,3/4"CONDUIT,AL | PPP019022 |
| TRANSFORMER,50V,460 TO 230 | 16090100 |
| RELAY,110V,DPDT,10 AMP | PPE014090 |
| RELAY,TIMER,120VAC,PC MNT | PPE014094 |
| FUSE HOLDER ASSEMBLY | 2010029 |
| FUSE,1A,250V,SLO-BLO | PPE011026 |
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| INDICATOR LIGHT,GREEN,GECM | 16110112 |
| TIMER,EM,1 POLE,120V,24 HOUR 2A517 | 16110138 |

### XP Electrical Components

| | |
|---|---|
| SWITCH,OPER,3 POS,EP | PPE015025 |
| LIGHT,IND,RED,120V | PPE102002 |

| | |
|---|---|
| MOTOR STARTER | (contact your Geotech Sales Representitive to spec out this item) |
| BLOWER | (contact your Geotech Sales Representitive to spec out this item) |
| TRANSFER PUMP | (contact your Geotech Sales Representitive to spec out this item) |

| | |
|---|---|
| MANUAL,SVE AND AIR SPARGE | 10804 |
| MANUAL,GECM | 16110163 |

## Appendix A - Decontamination Procedures

**Some common decontamination solutions are listed below along with the contaminants they are effective against:**

| Solution | Effective Against |
|---|---|
| Water | Short-chain hydrocarbons, inorganic compounds, salts, some organic |
| acids, other polar | compounds. |
| Dilute Acids | Basic (caustic or alkaline) compounds, amines, hydrazines. |
| Dilute Bases | Acidic compounds, phenols thiols, some nitro- and sulfonic compounds. |
| Organic solvents | Non-polar compounds (such as some organic compounds) |

The use of organic solvents is not recommended because:

1) Organic solvents can permeate and/or degrade the protective clothing and

2) They are generally toxic and may result in unnecessary employee exposure to hazardous chemicals.

When in doubt, use a dish washing liquid detergent. As a decontamination solution, it is readily available, is the safest of all the above, and is usually strong enough if used generously.

The use of steam can also be effective for decontamination. A water-lazer (pressurized water) is exceptionally valuable.

The following substances are noted for their particular efficiency in removing certain contaminants or for decontaminating certain types of equipment.

| Solution | Effective Against |
|---|---|
| Penetone | PCB Contamination (since penetone may also remove paint, it is a good idea to spot-test before use) |
| Phosphate free detergent | Contaminated pumps |
| Ivory liquid | Oils |
| Diluted HTH | Cyanides |
| Radiac | Low level radioactivity |
| Isopropanol | Biological agents (should not be used on rubber products since it will break down rubber) |
| Hexane | Certain types of lab or sampling equipment (use of hexane is discouraged due to its flammability and toxicity |
| Zep | General purpose cleaning |
| Phosphate free detergent | General purpose cleaning |

**Decontamination Solutions to Avoid**

Some decontamination solutions should be avoided because of their toxicity, flammability, or harmful effects to the environment. Halogenated hydrocarbons, such as carbon tetrachloride, should not be used because of their toxicity, possible incompatibility, and some because of their flammability.

Organic decontamination solutions should not be used on personal protective equipment (PPE) because they may degrade the rubber or other materials comprising the PPE.

Mercurials are sometimes used for sterilization. They should be avoided because of their toxicity.

Chemical leaching, polymerization, and halogen stripping should all be avoided because of possible complications during decontamination.

Sand-blasting, a method of physical removal, should be avoided because the sand used on the contaminated object usually needs to be disposed of as hazardous waste, a very costly proposition. Also, sand-blasting exposes personnel to silica, a carcinogen.

Freon is known to be particularly effective for the cleansing of PCB's but its effect on the ozone layer is extremely harmful. Its use is discouraged.
Strong acids or bases should not be used when cleaning metals and gaskets or tools or other equipment because of the possibility of corrosion.

**Disposal of Decontamination Solutions and Waste Water**

All solutions and water used for decontamination must be collected. If lab analysis indicates that the water and/or solutions exceed allowable contamination levels, they must be treated as hazardous waste. Alternatively, the solutions and water may be treated on-site to lower the contamination levels and render them non hazardous.

Containers such as 55-gallon drums should be available for storage of wastes.

Spent decontamination solutions can be collected by using heavy-duty plastic sheets, visqueen sheets, kiddie pools, or if needed, a larger containment basin. The decontamination of equipment must be performed on the sheets or in the basins. They could be placed on a slight angle so that the spent decontamination solutions drain into a collection basin or drum.

**Recommended Supplies for Decontamination of Personnel, Clothing and Equipment**

The list below contains recommendations for supplies which would be on hand for the decontamination of personnel, clothing and equipment. Depending on the site activities, not all of these items may be needed. Alternatively, some additional items not listed here may be required.

- Drop cloths of plastic or other suitable material, such as visqueen, for heavily contaminated equipment.

- Disposal collection containers, such as drums or suitably lined trash cans for disposable clothing and heavily contaminated personal protective clothing or equipment to be discarded.

- Lined box with adsorbent for wiping or rinsing off gross contaminants and liquid contaminants.

- Wash tubs of sufficient size to enable workers to place booted foot in and wash off contaminants (without a drain or with a drain connected to a collection tank or appropriate treatment system).
- Rinse tubs of sufficient size to enable workers to place booted foot in and wash off contaminants (without a drain or with a drain connected to a collection tank or appropriate treatment system
- Wash solutions selected to wash off and reduce the hazards associated with the contaminated wash and rinse solutions.
- Rinse solution (usually water) to remove contaminants and contaminated wash solutions
- Long-handled, soft-bristled brushes to help wash and rinse off contaminants.
- Lockers and cabinets for storage of decontaminated clothing and equipment.
- Storage containers for contaminated wash and rinse solutions.
- Plastic sheeting, sealed pads with drains, or other appropriate method for containing and collecting contaminated wash and rinse water spilled during decontamination.
- Shower facilities for full body wash or at a minimum, personal wash sinks (with drains connected to a collection tank or appropriate treatment system).
- Soap or wash solution, wash cloths and towels.
- Clean clothing and personal item storage lockers and/or closets.

## The Warranty

For a period of one (1) year from date of first sale, product is warranted to be free from defects in materials and workmanship. Geotech agrees to repair or replace, at Geotech's option, the portion proving defective, or at our option to refund the purchase price thereof. Geotech will have no warranty obligation if the product is subjected to abnormal operating conditions, accident, abuse, misuse, unauthorized modification, alteration, repair, or replacement of wear parts. User assumes all other risk, if any, including the risk of injury, loss, or damage, direct or consequential, arising out of the use, misuse, or inability to use this product. User agrees to use, maintain and install product in accordance with recommendations and instructions. User is responsible for transportation charges connected to the repair or replacement of product under this warranty.

## Equipment Return Policy

A Return Material Authorization number (RMA #) is required prior to return of any equipment to our facilities, please call our 800 number for appropriate location. An RMA # will be issued upon receipt of your request to return equipment, which should include reasons for the return. Your return shipment to us must have this RMA # clearly marked on the outside of the package. Proof of date of purchase is required for processing of all warranty requests.

This policy applies to both equipment sales and repair orders.

FOR A RETURN MATERIAL AUTHORIZATION,
PLEASE CALL OUR SERVICE DEPARTMENT AT 1-800-833-7958

Model Number: _____

Serial Number: _____

Date of Purchase: _____

## Equipment Decontamination

Prior to return, all equipment must be thoroughly cleaned and decontaminated. Please make note on RMA form, the use of equipment, contaminants equipment was exposed to, and decontamination solutions/methods used.

Geotech reserves the right to refuse any equipment not properly decontaminated. Geotech may also choose to decontaminate equipment for a fee, which will be applied to the repair order invoice.

**Geotech Environmental Equipment, Inc**
2650 East 40th Avenue Denver, Colorado 80205
(303) 320-4764 ● **(800) 833-7958** ● FAX (303) 322-7242
email: sales@geotechenv.com website: www.geotechenv.com

# SERVICE AND PARTS MANUAL FOR BLOWER MODEL

# EN707 – EN808 THREE PHASE

AMETEK Dynamic Fluid Solutions
100 East Erie St., Kent, Ohio 44240
Telephone: 330-673-3452 Fax: 330-677-3306
email: dfs.information@ametek.com
internet: www.ametekdfs.com

**Your Choice. Our Commitment.™**

# WARRANTY, INSTALLATION, MAINTENANCE AND TROUBLESHOOTING INSTRUCTIONS

**AMETEK Dynamic Fluid Solutions**
**100 East Erie St., Kent, Ohio 44240**
**Telephone: 330-673-3452 Fax: 330-677-3306**
**email: dfs.information@ametek.com**
**internet: www.ametekdfs.com**

1. AMETEK Rotron DR, EN and HiE regenerative direct drive blowers are guaranteed for one full year from the date of installation (limited to 18 months from the date of shipment) to the original purchaser only. Should the blower fail we will evaluate the failure If failure is determined to be workmanship or material defect related, we will at our option repair or replace the blower.

2. AMETEK Rotron Minispiral, Revaflow, Multiflow, Nautilair, remote drive blowers, moisture separators, packaged units, CP blowers, Nasty Gas™ models and special built (EO) products are guaranteed for one full year from date of shipment for workmanship and material defect to the original purchaser only. Should the blower fail, If failure is determined to be workmanship or material defect related, we will at our option repair or replace the blower.

3. **Parts Policy** - AMETEK Rotron spare parts and accessories are guaranteed for three months from date of shipment for workmanship and material defect to the original purchaser only. If failure is determined to be workmanship or material defect related we will at our option repair or replace the part.

**Corrective Action** - A written report will be provided indicating reason(s) for failure, with suggestions for corrective action. Subsequent customer failures due to abuse, misuse, misapplication or repeat offense will not be covered. AMETEK Rotron will then notify you of your options. Any failed unit that is tampered with by attempting repair or diagnosis will void the warranty, unless authorized by the factory.

**Terms and Conditions** - Our warranty covers repairs or replacement of regenerative blowers only, and will not cover labor for installation, outbound and inbound shipping costs, accessories or other items not considered integral blower parts. Charges may be incurred on products returned for reasons other than failures covered by their appropriate warranty. Out-of-warranty product and in warranty product returned for failures determined to be caused by abuse, misuse, or repeat offense will be subject to an evaluation charge. Maximum liability will in no case exceed the value of the product purchased. Damage resulting from mishandling during shipment is not covered by this warranty. It is the responsibility of the purchaser to file claims with the carrier. Other terms and conditions of sale are stated on the back of the order acknowledgement.

*Installation Instructions for SL, DR, EN, CP, and HiE Series Blowers*

1. **Bolt It Down** - Any blower must be secured against movement prior to starting or testing to prevent injury or damage. The blower does not vibrate much more than a standard electric motor.

2. **Filtration** - All blowers should be filtered prior to starting. Care must be taken so that no foreign material enters the blower. If foreign material does enter the blower, it could cause internal damage or may exit at extremely high velocity.

   Should excessive amounts of material pass through the blower, it is suggested that the cover(s) and impeller(s) be removed periodically and cleaned to avoid impeller imbalance. Impeller

imbalance greatly speeds bearing wear, thus reducing blower life. Disassembling the blower will void warranty, so contact the factory for cleaning authorization.

3. **Support the Piping** - The blower flanges and nozzles are designed as connection points only and are not designed to be support members.

   Caution: Plastic piping should not be used on blowers larger than 1 HP that are operating near their maximum pressure or suction point. Blower housing and nearby piping temperatures can exceed 200ºF. Access by personnel to the blower or nearby piping should be limited, guarded, or marked, to prevent danger of burns.

4. **Wiring** - Blowers must be wired and protected/fused in accordance with local and national electrical codes. All blowers must be grounded to prevent electrical shock. Slo-Blo or time delay fuses should be used to bypass the first second of start-up amperage.

5. **Pressure/Suction Maximums** - The maximum pressure and/or suction listed on the model label should not be exceeded. This can be monitored by means of a pressure or suction gage (available from Rotron), installed in the piping at the blower outlet or inlet. Also, if problems do arise, the Rotron Field representative will need to know the operating pressure/suction to properly diagnose the problem.

6. **Excess Air** - Bleed excess air off. DO NOT throttle to reduce flow. When bleeding off excess air, the blower draws less power and runs cooler.

   **Note:** Remote Drive (Motorless) Blowers - Properly designed and installed guards should be used on all belts, pulleys, couplings, etc. Observe maximum remote drive speed allowable. Due to the range of uses, drive guards are the responsibility of the customer or user. Belts should be tensioned using belt gauge.

*Maintenance Procedure*

**When properly piped, filtered, and applied, little or no routine maintenance is required. Keep the filter clean. Also, all standard models in the DR, EN, CP, and HiE series have sealed bearings that require no maintenance. Bearing should be changed after 15,000 to 20,000 hours, on average. Replacement bearing information is specified on the chart below.**

| Bearing Part Number | Size | Seal Material | Grease | Heat Stabilized |
|---|---|---|---|---|
| 510217<br>510218<br>510219 | 205<br>206<br>207 | Polyacrylic | Nye Rheotemp 500<br>30% +/- 5% Fill | Yes – 325 F |
| 510449<br>516440<br>516648 | 203<br>202<br>307 | Buna N | Exxon Polyrex Grease | NO |
| 516840<br>516841<br>516842<br>516843<br>516844<br>516845<br>516846<br>516847 | 206<br>207<br>208<br>210<br>309<br>310<br>311<br>313 | Buna N | Exxon Polyrex Grease | NO |

## ***Troubleshooting***

| | | POSSIBLE CAUSE | OUT OF WARRANTY REMEDY *** |
|---|---|---|---|
| IMPELLER DOES NOT TURN | Humming Sound | 1. * One phase of power line not connected<br>2. * One phase of stator winding open<br>3. Bearings defective<br>4. Impeller jammed by foreign material<br>5. Impeller jammed against housing or cover<br>6. ** Capacitor open | 1. Connect<br>2. Rewind or buy new motor<br>3. Change bearings<br>4. Clean and add filter<br>5. Adjust<br>6. Change capacitor |
| | No Sound | 1. * Two phases of power line not connected<br>2. * Two phases of stator winding open | 1. Connect<br>2. Rewind or buy new motor |
| IMPELLER TURNS | Blown Fuse | 1. Insufficient fuse capacity<br>2. Short circuit | 1. Use time delay fuse of proper rating<br>2. Repair |
| | Motor Overheated Or Protector Trips | 1. High or low voltage<br>2. * Operating in single phase condition<br>3. Bearings defective<br>4. Impeller rubbing against housing or cover<br>5. Impeller or air passage clogged by foreign material<br>6. Unit operating beyond performance range<br>7. Capacitor shorted<br>8. * One phase of stator winding short circuited | 1. Check input voltage<br>2. Check connections<br>3. Check bearings<br>4. Adjust<br>5. Clean and add filter<br>6. Reduce system pressure/vacuum<br>7. Change capacitor<br>8. Rewind or buy new motor |
| | Abnormal Sound | 1. Impeller rubbing against housing or cover<br>2. Impeller or air passages clogged by foreign material<br>3. Bearings defective | 1. Adjust<br>2. Clean and add filter<br>3. Change bearings |
| | Performance Below Standard | 1. Leak in piping<br>2. Piping and air passages clogged<br>3. Impeller rotation reversed<br>4. Leak in blower<br>5. Low voltage | 1. Tighten<br>2. Clean<br>3. Check wiring<br>4. Tighten cover, flange<br>5. Check input voltage |

*** 3 phase units**

**** 1 phase units**

***** Disassembly and repair of new blowers or motors will void the Rotron warranty. Factory should be contacted prior to any attempt to field repair an in-warranty unit.**

### *Blower Disassembly:*

**WARNING: Attempting to repair or diagnose a blower may void Rotron's warranty. It may also be difficult to successfully disassemble and reassemble the unit.**

**1)** Disconnect the power leads. **CAUTION:** Be sure the power is disconnected before doing any work whatsoever on the unit.

2) Remove or separate piping and/or mufflers and filters from the unit.

3) Remove the cover bolts and then the cover. **NOTE:** Some units are equipped with seals. It is mandatory that these seals be replaced once the unit has been opened.

4) Remove the impeller bolt and washers and then remove the impeller. **NOTE:** Never pry on the edges of the impeller. Use a puller as necessary.

5) Carefully note the number and location of the shims. Remove and set them aside. NOTE: If the disassembly was for inspection and cleaning the unit may now be reassembled by reversing the above steps. If motor servicing or replacement and/or impeller replacement is required the same shims may not be used. It will be necessary to re-shim the impeller according to the procedure explained under assembly.

6) Remove the housing bolts and remove the motor assembly (arbor/.housing on remote drive models).

7) Arbor disassembly (Applicable on remote drive models only):
   a) Slide the bearing retraining sleeve off the shaft at the blower end.
   b) Remove the four (4) screws and the bearing retaining plate from the blower end.
   c) Lift the shaft assembly far enough out of the arbor to allow removal of the blower end snap ring.
   d) Remove the shaft assembly from the arbor.
   e) If necessary, remove the shaft dust seal from the pulley end of the arbor.

*Muffler Material Replacement:*

1) Remove the manifold cover bolts and them manifold cover.

2) The muffler material can now be removed and replaced if necessary. On blowers with fiberglass acoustical wrap the tubular retaining screens with the fiberglass matting before sliding the muffler pads over the screens.

3) Reassemble by reversing the procedure.

**NOTE: On DR068 models with tubular mufflers it is necessary to remove the cover and impeller accessing the muffler material from the housing cavity.**

*Blower Reassembly:*

1) Place the assembled motor (assembled arbor assembly for remote drive models) against the rear of the housing and fasten with the bolts and washer.

2) To ensure the impeller is centered within the housing cavity re-shim the impeller according to the procedure outlined below.

3) If blower had a seal replace the seal with a new one.

4) Place the impeller onto the shaft making sure the shaft key is in place and fasten with the bolt, washer and spacer as applicable. Torque the impeller bolt per the table below. Once fastened carefully rotate the impeller to be sure it turns freely.

5) Replace the cover and fasten with bolts.

6) Reconnect the power leads to the motor per the motor nameplate.

| Bolt Size | Torque<br>Pound-Force-Foot |
|---|---|
| 1/4-20 | 6.25 +/- 0.25 |
| 5/16-18 | 11.5 +/- 0.25 |
| 3/8-16 | 20.0 +/- 0.5 |
| ½-13 | 49.0 +/- 1 |
| 5/8 –11 | 90.0 +/- 2 |

*Impeller Shimming Procedure:*

WARNING: This unit may be difficult to shim. Extreme care may be exercised.

Tools Needed: Machinist's Parallel Bar
Vernier Caliper with depth measuring capability
Feeler gauges or depth gauge

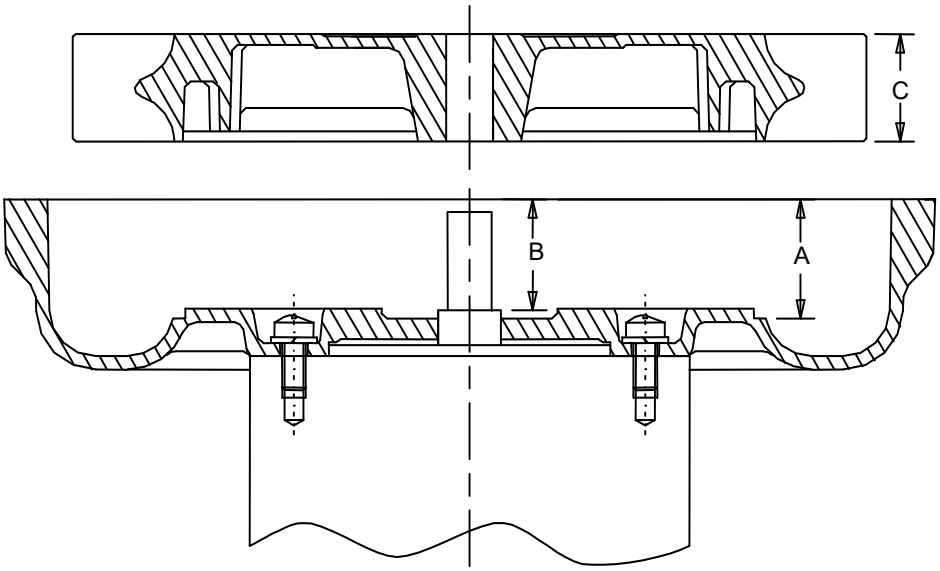
Measure the Following:

Distance from the flange face to the housing (A)
Distance from the flange face to the motor shaft shoulder (B)
Impeller Thickness (C)

Measurements (A) and (B) are made by laying the parallel bar across the housing flange face and measuring to the proper points. Each measurement should be made at three points, and the average of the readings should be used.

Shim Thickness = B – (A+C)/2

After the impeller installation (step #4 above) the impeller/cover clearance can be checked with feeler gauges, laying the parallel bar across the housing flange face. This clearance should nominally be (A-C)/2.



AMETEK Dynamic Fluid Solutions.
100 East Erie St., Kent, Ohio 44240
Telephone: 330-673-3452 Fax: 330-677-3306
email: dfs.information@ametek.com
internet: www.ametekdfs.com

# EXPLOSION-PROOF BLOWERS

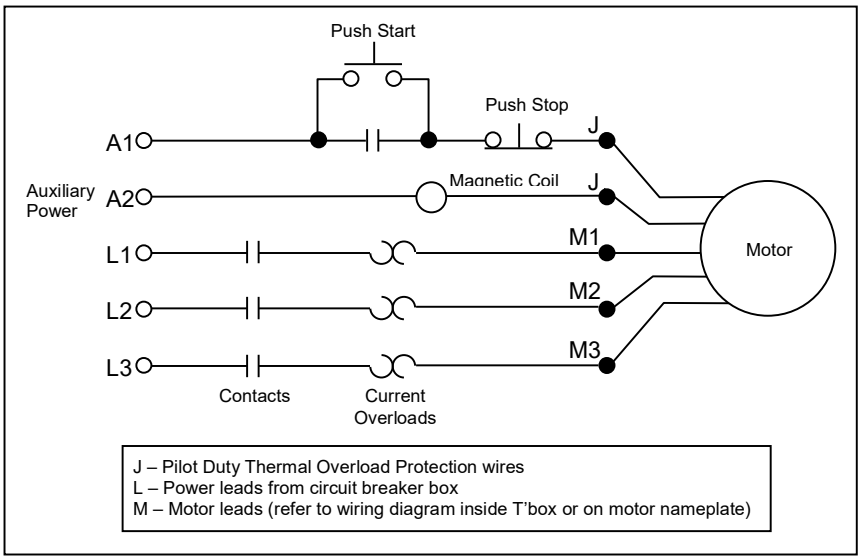
IMPORTANT: Read before wiring this Explosion-proof Blower

This AMETEK Rotron Explosion-proof Regenerative Blower may be equipped with Pilot Duty Thermal Overload (PDTO) or Automatic Thermal Overload (ATO) protection. When properly wired to a motor starter, this protection limits the motor winding temperature rise per the National Electric Code (NEC) article 500. Failure to properly wire this blower is an NEC violation and could cause an explosion. AMETEK Rotron assumes no responsibilities for damages incurred by negligent use of this product, and will not warranty a blower on which the PDTO is not properly connected. Some blowers 1 HP and under do not require PDTO and have built in ATO. Consult the factory if verification of wiring connections is required.

In all cases, follow the motor controller manufacturer's instructions. The following schematic is for conceptual understanding only, and may not apply to all motor/controller combinations.

The manufacturer's wiring diagram found on the motor takes precedent over reference diagrams supplied by AMETEK Rotron Technical Motor Division.

**Schematic**




The schematic is shown for a three phase motor. For a single phase motor disregard L3 and M3. Pushing the START button completes the auxiliary control circuit, allowing current to flow through the magnetic coil. The contacts are magnetically closed, starting the motor and latching the auxiliary circuit. The motor will continue to run until the STOP push button is depressed, the motor reaches the overload temperature, or the current sensing overloads trip out.

If you have any questions, contact AMETEK Rotron at 914-246-3401 for the location of your area representative.

# POLICY REGARDING INSTALLATION OF AMETEK ROTRON REGENERATIVE BLOWERS IN HAZARDOUS LOCATIONS

AMETEK Rotron will not knowingly specify, design or build any regenerative blower for installation in a hazardous, explosive location without the proper NEMA motor enclosure. AMETEK Rotron does not recognize sealed blowers as a substitute for explosion-proof motors. Sealed units with standard TEFC motors should never be utilized where local, state, and/or federal codes specify the use of explosion-proof equipment.

AMETEK Rotron has a complete line of regenerative blowers with explosion-proof motors. Division 1 & 2, Class I, Group D; Class II, Groups F & G requirements are met with these standard explosion-proof blowers.

AMETEK Rotron will not knowingly specify, design or build any regenerative blower for installation in a hazardous, corrosive environment without the proper surface treatment and sealing options.

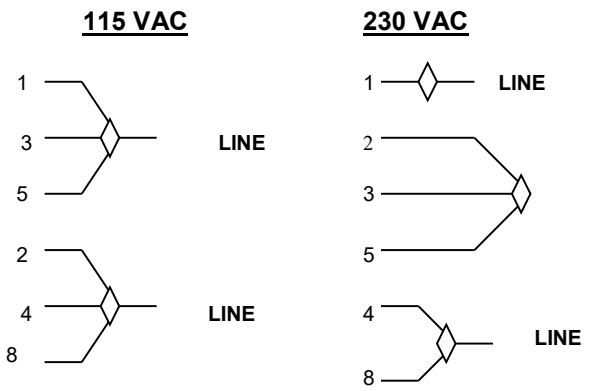
AMETEK Rotron has a complete line of Chemical Processing and Nasty Gas™ regenerative blowers with Chem-Tough™, stainless steel parts, and seals.

AMETEK Rotron offers general application guidance; however, suitability of the particular blower selection is ultimately the responsibility of the purchaser, not the manufacturer of the blower.

FS2 Rev B 3/10/98

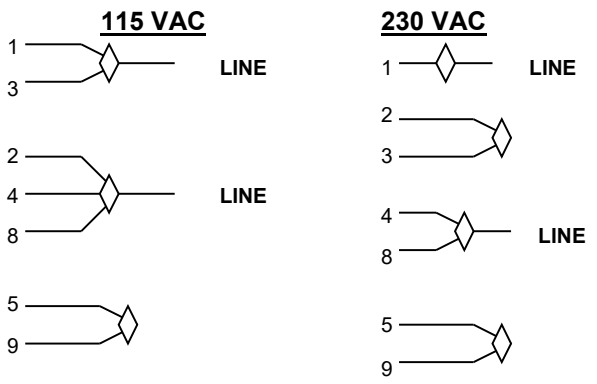
# WIRING DIAGRAMS, XP MOTORS

## H. 1Ø, 6 WIRE



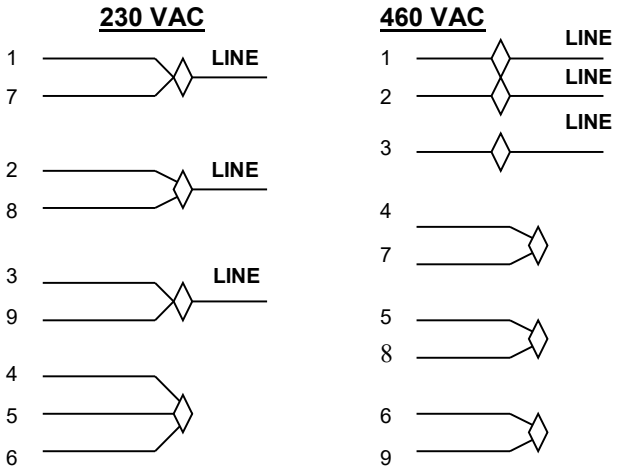

INTERCHANGE LEADWIRES 5 & 8 to REVERSE ROTATION

## I. 1Ø, 7 WIRE



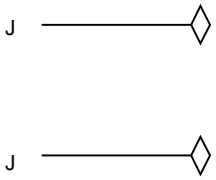

INTERCHANGE LEADWIRES 5 & 8 to REVERSE ROTATION

## K. 3Ø, 9 WIRE




INTERCHANGE ANY TWO LEAD LINES TO REVERSE ROTATION

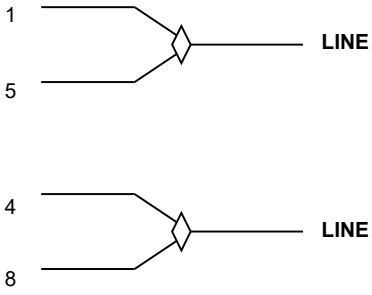
## L. PILOT DUTY THERMAL OVERLOADS




HOOK J LEADS TO CONTROL CIRCUITRY

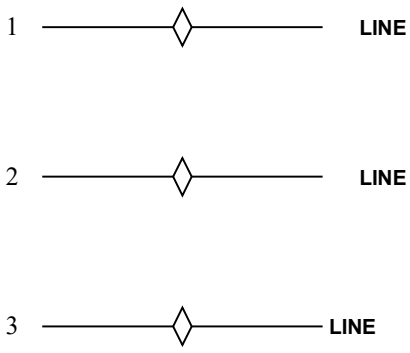
## M. 1Ø 230 VAC

SINGLE VOLTAGE



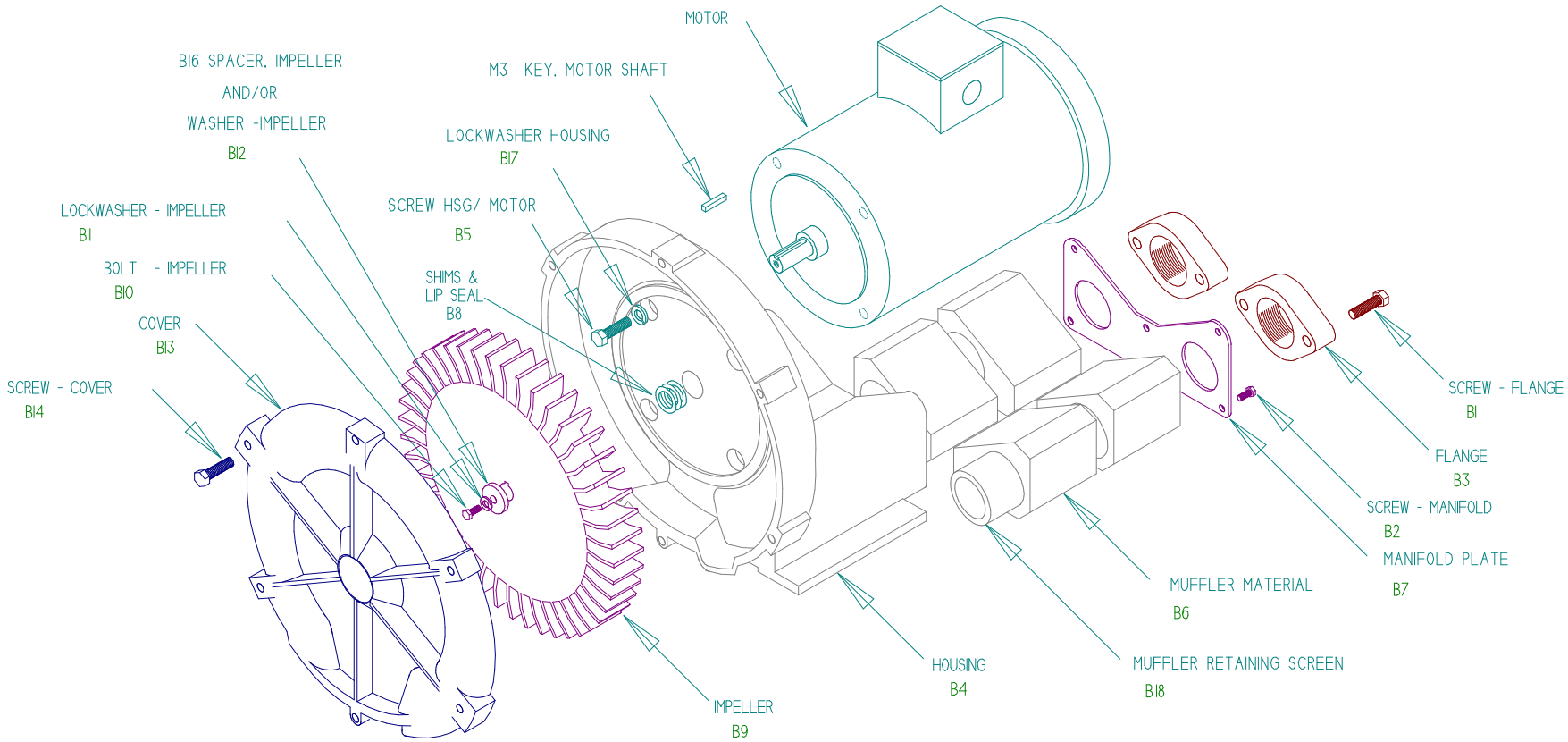

INTERCHANGE LEADWIRES 5 & 8 TO REVERSE ROTATION

## N. 3Ø 575 VAC




INTERCHAGE ANY TWO LEAD LINES TO REVERSE ROTATION

# ASSEMBLY DIAGRAM
# EN707 – EN808 THREE PHASE



## Parts Breakdown

| Item No. | Qty. Req'd | Description | EN707 | EN808 | EN707F_MXL | EN757 | EN757 | EN808BA_MXL | EN808BA__MXL |
|---|---|---|---|---|---|---|---|---|---|
| | | *Model:* | | | | | | | |
| | | *Part No.:* | *038181* | *038182* | 038710 | 081176 | 081174 | *038729* | 081229 |
| | | | *038439* | *038440* | 038711 | 081177 | | *038731* | 081230 |
| | | | *OBSOLETE* | *OBSOLETE* | | | | *OBSOLETE* | |
| M3 | 1 | Key Motor Shaft | 510212 | 511532 | 510212 | 510629 | 510212 | 511532 | 511532 |
| B1 | 4 | Screw, Flange | 155095 | 155025 | 155067 | 155067 | 155067 | 155067 | 155067 |
| B2 | | Screw, Manifold | (13 pcs) 120214 | 120214 | Not Used | Not Used | Not Used | Not Used | Not Used |
| B3 | 2 | Flange | 511480 | 511614 | 511614 | 511614 | 511614 | 511614 | 511614 |
| | | Screen, Flange Guard | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used |
| B4 | 1 | Housing | 516752 | 516758 | 516752 | 552021 | 552037 | 550081 | 516764 |
| B5 | 4 | Screw, Hsg /Motor | 251792 | 140014 | 251792 | 251791 | 251792 | 140014 | 155034 |
| B6 | 36 | Muffler Material (Gray) | (40 pcs) 515493 | 515405 | (7) 551720 | (7 pcs) 552044 | (7 pcs) 552044 | (7 pcs) 551736 | (7 pcs) 551736 |
| | 1 | Muffler Material (White) | Not Used | Not Used | 551721 | (2 pcs) 552045 | (2 pcs) 552045 | (2) 551737 | (2 pcs) 551737 |
| B7 | | Manifold Plate | 551264 | 523432 | Not Used | Not Used | Not Used | Not Used | Not Used |
| B8 | * | Shim .002" | 272703 | 511547 | 272703 | 510356 | 272703 | 511547 | 511547 |
| | * | Shim .005" | 272704 | 511548 | 272704 | 510357 | 272704 | 511548 | 511548 |
| | * | Shim .010" | 272705 | 511549 | 272705 | 510358 | 272705 | 511549 | 511549 |
| | * | Shim .020" | 272706 | 511550 | 272706 | 510359 | 272706 | 511550 | 511550 |
| | * | Shim .030" | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used |
| B9 | 1 | Impeller | 515461 | 516452 | 515461 | 552035 | 552036 | 550071 | 552062 |
| B10 | 1 | Bolt, Impeller | 251791 | 155068 | 251791 | 120215 | 120007 | 155068 | 120210 |
| B11 | 1 | Lockwasher, Impeller | 251787 | 251788 | 251787 | 120203 | 251787 | 251788 | 251788 |
| B12 | | Washer, Impeller | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used | 511529 |
| B13 | 1 | Cover | 515462 | 516447 | 515462 | 552023 | 552023 | 516447 | 552061 |
| B14 | 7 | Screw, Cover | (7 pcs) 120215 | 140016 | 155236 | (9 pcs) 155236 | (9 pcs) 155236 | (8 pcs) 140016 | (8 pcs) 140016 |
| B15 | | Eye Bolt | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used |
| B16 | 1 | Spacer, Impeller Bolt | 478336 | 511529 | 478336 | 510355 | 478336 | 511529 | 515555 |
| B17 | | Lockwasher, Housing | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used |
| B18 | 1 | Screen, Muffler Retaining, Right (**) | 515492 | 515408 | 551723 | 552046 | 552046 | 551723 | 551723 |
| | 1 | Screen, Muffler Retaining, Left (**) | 515491 | 515407 | 551723 | 552046 | 552046 | 551723 | 551723 |
| B19 | 6 | Bolt, Muffler Hsg/Hsg | 120251 | 155025 | 120251 | 120007 | 120007 | 155025 | 155025 |
| B19A | 4 | Bolt, Muffler Hsg/Hsg | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used |
| B20 | 1 | Muffler Housing | 515480 | 515370 | 550023 | 552017 | 552017 | 550017 | 550017 |
| | | Muffler Discrete | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used |
| | 2 | Bolt, Motor/Muffler | Not Used | 120325 | Not Used | Not Used | Not Used | Not Used | Not Used |
| | 2 | Lockwasher, Motor/Muffler | Not Used | 120203 | Not Used | Not Used | Not Used | Not Used | Not Used |
| | 2 | Washer, Motor/Muffler | Not Used | 155029 | Not Used | Not Used | Not Used | Not Used | Not Used |
| B25 | | Nut, Rail | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used |
| B26 | | Rail Mounting | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used |
| | 1 | Lip Seal | 516691 | 516693 | 516691 | 516587 | 516691 | 516693 | 516693 |

*As needed **Viewed looking at inlet/outlet ports

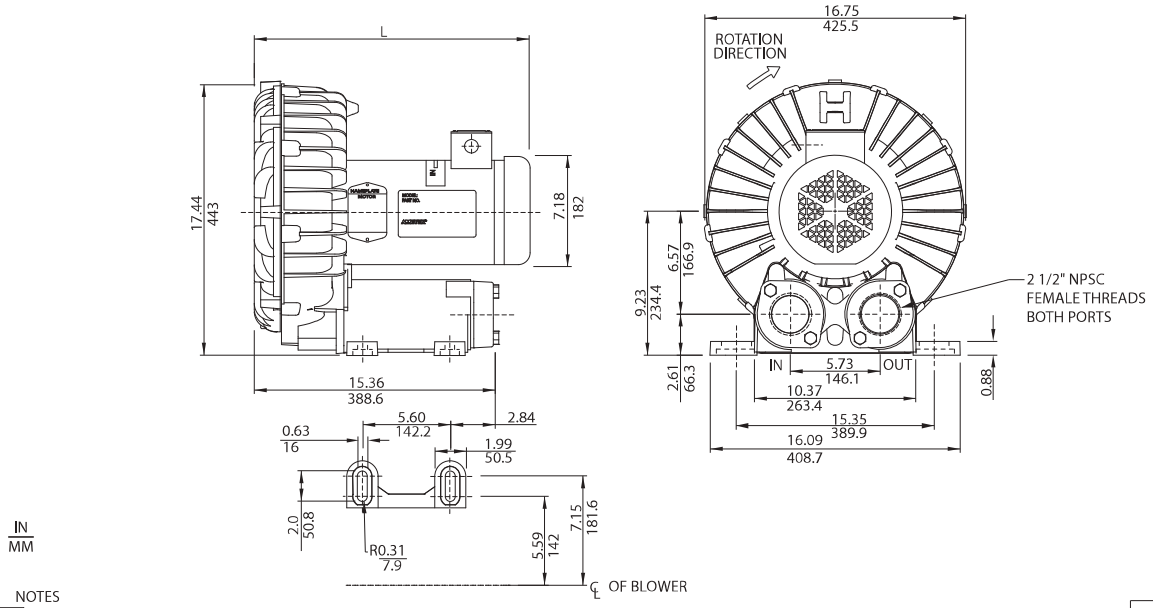
| Model | Part No. | Motor | Wiring Diagram | Specific Parts | Bearing, Rear (M1) | Bearing, Impeller End (M2) |
|---|---|---|---|---|---|---|
| EN707F72MXL | 038710 | 515552 | K + L | | 510217 | 510218 |
| EN707F86MXL | 038711 | 529633 | N + L | | | |
| EN757M72XL | 081176 | 516687 | K + L | | 510449 | 510217 |
| EN757M86XL | 081177 | 529630 | N + L | | | |
| EN757F72XL | 081174 | 515552 | K + L | | 510217 | 510218 |
| EN808BA86MXL | 081230 | 529626 | N + L | | 516840 | 516844 |
| EN808BA72MXL | 081229 | 515558 | K + L | | | |
| ***Discontinued*** | | | | | | |
| EN707F72XL | 038181 | 515552 | K + L | | 510217 | 510218 |
| EN707F86XL | 038439 | 529633 | N + L | | | |
| EN808BA72XL | 038182 | 515558 | K + L | | 510840 | 516844 |
| EN808BA86XL | 038440 | 529626 | N + L | | Call Factory | Call Factory |
| EN808BA86MXL | 038731 | 529626 | N + L | | 516840 | 516844 |
| EN808BA72MXL | 038729 | 515558 | K + L | | | |

*As needed **Viewed looking at inlet/outlet ports

# EN 757 & CP 757

# ROTRON®

3.0 / 5.0 HP Sealed Regenerative w/Explosion-Proof Motor




NOTES
1. TERMINAL BOX CONNECTOR HOLE .75 NPT.
2. DRAWING NOT TO SCALE, CONTACT FACTORY FOR SCALE CAD DRAWING.
3. CONTACT FACTORY FOR BLOWER MODEL LENGTHS NOT SHOWN.

| MODEL | L (IN/MM) |
|---|---|
| EN757M72XL | 19.72/500.9 |
| EN757F72XL | 21.00/533.4 |

| | | Part/Model Number | | | | |
|---|---|---|---|---|---|---|
| | | EN757M72XL | EN757M86XL | EN757F72XL | CP757FW72XLR | CP757FU72XLR |
| Specification | Units | 081176 | 081177 | 081174 | 081180 | 081181 |
| Motor Enclosure - Shaft | - | XP-CS | XP-CS | XP-CS | CHEM XP-SS | CHEM XP-SS |
| Mtl. Horsepower | - | 3.0 | 3.0 | 5.0 | 5.0 | 3.0 |
| Voltage | AC | 208-230/460 | 575 | 208-230/460 | 208-230/460 | 208-230/460 |
| Phase - Frequency | - | Three-60 Hz | Three-60 Hz | Three - 60 Hz | Three-60 Hz | Three - 60 Hz |
| Insulation Class | - | B | B | B | B | B |
| NEMA Rated Motor Amps | Amps (A) | 7.2/3.6 | 3.0 | 14/7 | 14/7 | 7.2/3.6 |
| Service Factor | - | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Maximum Blower Amps | Amps (A) | 10/5 | 4.0 | 15/7.5 | 15/7.5 | 10/5 |
| Locked Rotor Amps | Amps (A) | 54/47 | 22 | 152/76 | 152/76 | 54/27 |
| Starter Size | - | 0/0 | 0 | 1/1 | 1/1 | 0/0 |
| Shipping Weight | Lbs | 158 | 158 | 158 | 158 | 158 |
| | Kg | 71.7 | 71.7 | 71.7 | 71.7 | 71.7 |

**Voltage** - ROTRON motors are designed to handle a broad range of world voltages and power supply variations. Our dual voltage 3 phase motors are factory tested and certified to operate on both: **208-230/415-460 VAC-3 ph-60 Hz** and **190-208/380-415 VAC-3 ph-50 Hz**. Our dual voltage 1 phase motors are factory tested and certified to operate on both: **104-115/208-230 VAC-1 ph-60 Hz** and **100-110/200-220 VAC-1 ph-50 Hz**. All voltages above can handle a ±10% voltage fluctuation. Special wound motors can be ordered for voltages outside our certified range.

**Operating Temperatures** - Maximum operating temperature: Motor winding temperature (winding rise plus ambient) should not exceed 140°C for Class F rated motors or 120°C for Class B rated motors. Blower outlet air temperature should not exceed 140°C (air temperature rise plus inlet temperature). Performance curve maximum pressure and suction points are based on a 40°C inlet and ambient temperature. Consult factory for inlet or ambient temperatures above 40°C.

**Maximum Blower Amps** - Corresponds to the performance point at which the motor or blower temperature rise with a 40°C inlet and/or ambient temperature reaches the maximum operating temperature.

**XP Motor Class - Group** - See Explosive Atmosphere Classification Chart in Section I

*This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. AMETEK is not responsible for blowers driven beyond factory specified speed, temperature, pressure, flow or without proper alignment. Actual performance will vary depending on the operating environment and application. AMETEK products are not designed for and should not be used in medical life support applications. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For product designed to meet specific applications, contact AMETEK Technical & Industrial Products Sales department.*

**AMETEK DYNAMIC FLUID SOLUTIONS**
**75 North Street, Saugerties, NY 12477**
**USA: +1 215-256-6601 - Europe: +49 7703 930909 - Asia: +86 21 5763 1258**
**Customer Service Fax: +1 215.256.1338**
**www.ametekdfs.com**



AMETEK®
PRECISION MOTION CONTROL
DYNAMIC FLUID SOLUTIONS

## Environmental / Chemical Processing Blowers

# EN 757 & CP 757

ROTRON®

3.0 / 5.0 HP Sealed Regenerative w/Explosion-Proof Motor

## FEATURES

- Manufactured in the USA - ISO 9001 and NAFTA compliant
- Maximum flow: 310 SCFM
- Maximum pressure: 80 IWG
- Maximum vacuum: 75 IWG
- Standard motor: 5.0 HP, explosion-proof
- Cast aluminum blower housing, impeller , cover & manifold; cast iron flanges (threaded); teflon® lip seal
- UL & CSA approved motor with permanently sealed ball bearings for explosive gas atmospheres Class I Group D minimum
- Sealed blower assembly
- Quiet operation within OSHA standards

## MOTOR OPTIONS

- International voltage & frequency (Hz)
- Chemical duty, high efficiency, inverter duty or industry-specific designs
- Various horsepowers for application-specific needs

## BLOWER OPTIONS

- Corrosion resistant surface treatments & sealing options
- Remote drive (motorless) models
- Slip-on or face flanges for application-specific needs

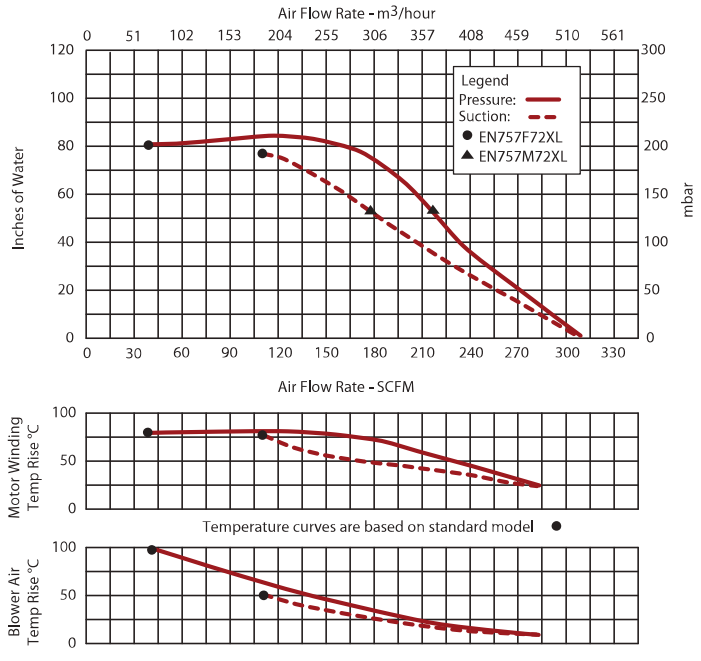
## ACCESSORIES

- Flowmeters reading in SCFM
- Filters & moisture separators
- Pressure gauges, vacuum gauges, & relief valves
- Switches - air flow, pressure, vacuum, or temperature
- External mufflers for additional silencing
- Air knives (used on blow-off applications)
- Variable frequency drive package

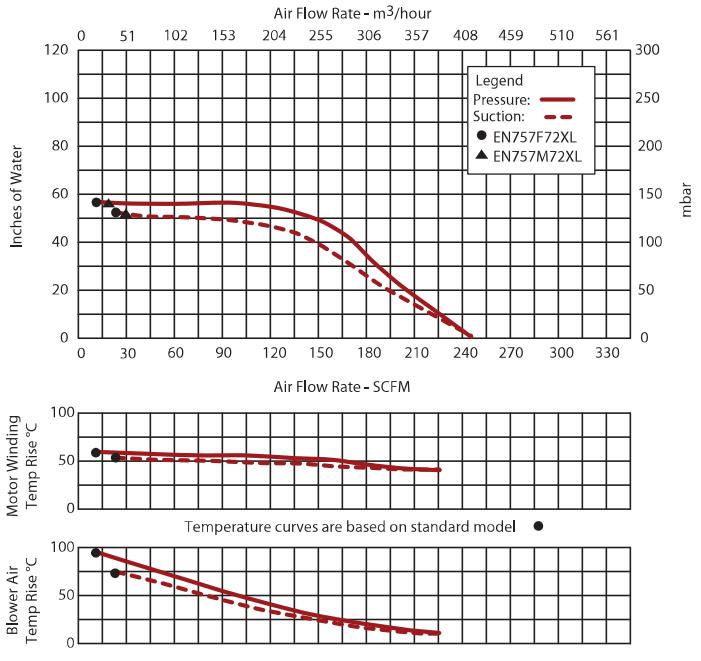



## Blower Performance at Standard Conditions

### 60 Hz




### 50 Hz




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**www.ametekdfs.com**



AMETEK®
PRECISION MOTION CONTROL
DYNAMIC FLUID SOLUTIONS

# SERIES 2000 | MAGNEHELIC® DIFFERENTIAL PRESSURE GAGES




**Standard Magnehelic® gage**




**High Accuracy Magnehelic® gage**
**Shown with optional -SS bezel**

## BENEFITS/FEATURES

- **Easy to read gage through undistorted plastic face permits viewing from far away**
- **Patented design provides quick response to pressure changes means no delay in assessing critical situations**
- **Durable and rugged housing and high-quality components combine to provide long service life and minimized down-time**

## APPLICATIONS

- Filter monitoring
- Air velocity with Dwyer® pitot tube
- Blower vacuum monitoring
- Fan pressure indication
- Duct, room, or building pressures
- Clean room positive pressure indication

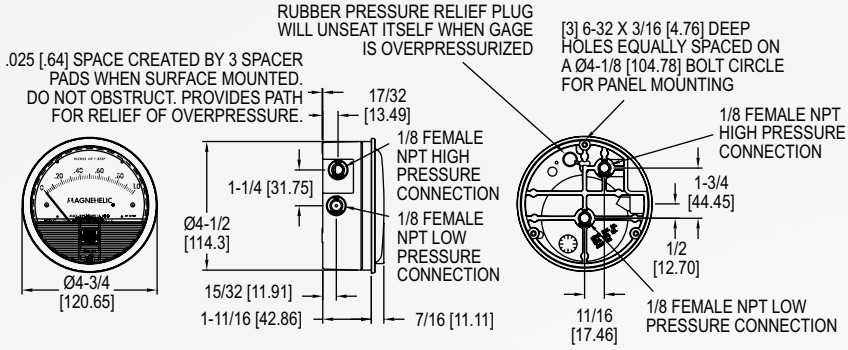
## DESCRIPTION

Select the **Series 2000 Magnehelic® Differential Pressure Gages** for a versatile low differential pressure gauge with a wide choice of 81 models and 27 options to choose from. Using Dwyer's simple, frictionless Magnehelic® gage movement, it quickly indicates air or noncorrosive gas pressures - either positive, negative (vacuum) or differential. The design resists shock, vibration, over-pressures and is weatherproof to IP67.

## GAGE SPECIFICATIONS

| | |
|---|---|
| **Service** | Air and non-combustible, compatible gases (natural gas option available). **Note:** May be used with hydrogen. Order a Buna-N diaphragm. Pressures must be less than 35 psi. |
| **Wetted Materials** | Consult factory. |
| **Housing** | Die cast aluminum case and bezel, with acrylic cover, exterior finish is coated gray to withstand 168 hour salt spray corrosion test. |
| **Accuracy** | ±2% of FS (±3% on -0, -100 Pa, -125 PA, -10 mm and ±4% on -00, -60 Pa, -6 mm ranges), throughout range at 70°F (21.1°C). |
| **Pressure Limits** | 20 in Hg to 15 psig (-0.677 bar to 1.034 bar); MP option; 35 psig (2.41 bar), HP option; 80 psig (5.52 bar). |
| **Enclosure Rating** | IP67. |
| **Overpressure** | Relief plug opens at approximately 25 psig (1.72 bar), standard gages only. See Overpressure Protection note on catalog page. |
| **Temperature Limits** | 20 to 140°F (-6.67 to 60°C). -20°F (-28°C) with low temperature option. |
| **Size** | 4″ (101.6 mm) diameter dial face. |
| **Mounting Orientation** | Diaphragm in vertical position. Consult factory for other position orientations. |
| **Process Connections** | 1/8″ female NPT duplicate high and low pressure taps - one pair side and one pair back. |
| **Weight** | 1 lb 2 oz (510 g); MP and HP 2 lb 2 oz (963 g). |
| **Standard Accessories** | Two 1/8″ NPT plugs for duplicate pressure taps, two 1/8″ pipe thread to rubber tubing adapters and three flush mounting adapters with screws. (Mounting and snap ring retainer substituted for three adapters in MP and HP gage accessories). |
| **Compliance** | Meets the technical requirements of EU Directive 2011/65/EU (RoHS II). **Note:** -SP models not RoHS approved. |
| **Note:** For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Options page. | |

## DIMENSIONS




## HOW TO ORDER

Use the **bold** characters from the chart below to construct a product code.

**2002** **-ASF**

### SERIES

(in w.c./mm w.c.)
**2000-00:** 0-0.25 in w.c.
**2000-00N:** 0.5-0-0.2 in w.c.
**2000-0:** 0-0.5 in w.c.
**2001:** 0-1 in w.c.
**2002:** 0-2 in w.c.
**2003:** 0-3 in w.c.
**2004:** 0-4 in w.c.
**2006:** 0-6 in w.c.
**2010:** 0-10 in w.c.
**2000-6MM:** 0-6 mm w.c.
**2000-50MM:** 0-50 mm w.c.
**2300-12MM:** 6-0-6 mm w.c.

(Pa)
**2000-60NPA:** 10-0-50 Pa
**2000-60PA:** 0-60 Pa
**2000-100PA:** 0-100 Pa
**2000-125PA:** 0-125 Pa
**2000-250PA:** 0-250 Pa
**2000-300PA:** 0-300 Pa
**2000-500PA:** 0-500 Pa
**2300-60PA:** 30-0-30 Pa
**2300-100PA:** 50-0-50 Pa
**2300-120PA:** 60-0-60 Pa

(kPa)
**2000-1KPA:** 0-1 kPa
**2000-1.5KPA:** 0-1.5 kPa
**2000-2KPA:** 0-2 kPa
**2000-3KPA:** 0-3 kPa

### OPTIONS

**-ASF:** Adjustable signal flag
**-AHU1:** Mounting plate
**-AHU2:** Mounting plate with A-481 accessory kit
**-BUNA:** Buna-N elastomers
**-CB:** Chrome bezel
**-FC:** Factory calibration
**-HA:** High accuracy
**-M:** Mirrored scale overlay
**-SB:** 304 SS bezel
**-SS:** Brushed 304 SS bezel

**Note:** Only our most popular models and options are listed. For additional available models, please visit:
https://www.dwyer-inst.com/Product/Pressure/DifferentialPressure/Gages/Series2000

## ACCESSORIES

| Model | Description |
|---|---|
| **A-320-A** | Enclosure for Series 2000 Magnehelic® gages, DM-2000 differential pressure transmitter, 4-9/16″ (115.89 mm) |
| **A-464** | Flush Mount kit for Magnehelic® gages |
| **A-610** | Pipe mounting kit for 1-1/4″ to 2″ pipe. 5.6″ x 4.6″ x 1.4″, 1.0 lb |
| **A-300** | Flat aluminum bracket for flush mounting Magnehelic® gage. 6.8″ x 6.0″ x .1″, .35 lb |
| **A-299** | Mounting bracket flush mount Magnehelic® gage in bracket. Bracket is then surface mounted. Steel with gray hammertone epoxy finish. 6.3″ x 7.7″ x 4.0″, 1.30 lb |

## ORDER ONLINE TODAY!

dwyer-inst.com

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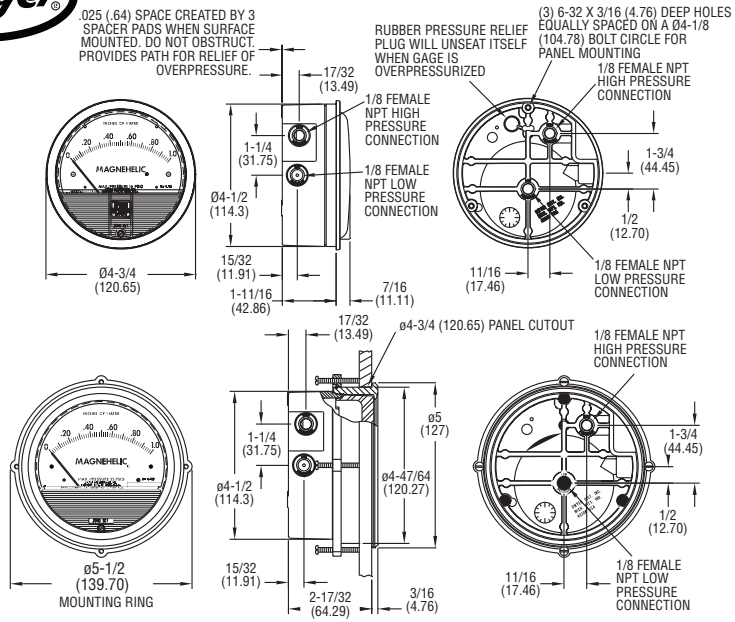
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DS-2000 Rev. 2

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Bulletin A-27

# Magnehelic® Differential Pressure Gage




**The blowout plug is not used on models above 180 inches of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm.*

**STANDARD GAGE ACCESSORIES:** Two 1/8″ NPT plugs for duplicate pressure taps, two 1/8″ pipe thread to rubber tubing adapters and three flush mounting adapters with screws.

**MP AND HP GAGE ACCESSORIES:** Mounting ring and snap ring retainer substituted for 3 adaptors, 1/4" compression fittings replace 1/8" pipe thread to rubber tubing adaptors.

**OVERPRESSURE PROTECTION:** Standard Magnehelic® Differential Pressure Gages are rated for a maximum pressure of 15 psig and should not be used where that limit could be exceeded. Models employ a rubber plug on the rear which functions as a relief valve by unseating and venting the gage interior when over pressure reaches approximately 25 psig (excludes MP and HP models). To provide a free path for pressure relief, there are four spacer pads which maintain .023″ clearance when gage is surface mounted. Do not obstruct the gap created by these pads.

## SPECIFICATIONS

**Service:** Air and non-combustible, compatible gases. (Natural Gas option available.)
**Wetted Materials:** Consult factory.
**Housing:** Die cast aluminum case and bezel, with acrylic cover. (MP model has polycarbonate cover).
**Accuracy:** 2% of full scale (±3% on -0, -100PA, -125PA, -10MM and ±4% on -00, -60PA, -6MM), throughout range at 70°F (21.1°C); High accuracy version: ±1% on full scale (±1.5% on -0, -100PA, -125PA, -10MM and ±2% on -00, -60PA, -6MM).
**Pressure Limits:** -20″ Hg to 15 psig.† (-0.677 bar to 1.034 bar); MP option: 35 psig (2.41 bar), HP option: 80 psig (5.52 bar).
**Enclosure Rating:** IP67.
**Overpressure:** Relief plug opens at approximately 25 psig (1.72 bar), standard gages only. The blowout plug is not used on models above 180 inches of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm.
**Temperature Limits:** 20 to 140°F (-6.67 to 60°C). *Low temperature models available as special option.
**Size:** 4″ (101.6 mm) diameter dial face.
**Mounting Orientation:** Diaphragm in vertical position. Consult factory for other position orientations.
**Process Connections:** 1/8″ female NPT duplicate high and low pressure taps - one pair side and one pair back.
**Weight:** 1 lb 2 oz (510 g), MP & HP 2 lb 2 oz (963 g).
**Agency Approvals:** RoHS.

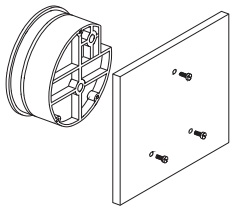
†For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options.

**Note:** May be used with hydrogen when ordering Buna-N diaphragm. Pressure must be less than 35 psi.

## INSTALLATION

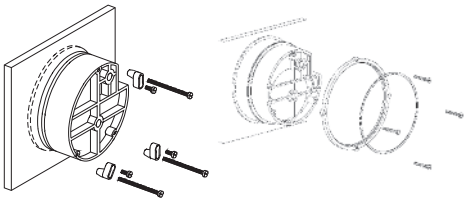
Select a location free from excessive vibration and where the ambient temperature will not exceed 140°F (60°C). Also, avoid direct sunlight which accelerates discoloration of the clear plastic cover. Sensing lines may be run any necessary distance. Long tubing lengths will not affect accuracy but will increase response time slightly. Do not restrict lines. If pulsating pressures or vibration cause excessive pointer oscillation, consult the factory for ways to provide additional damping.
All standard Magnehelic® Differential Pressure Gages are calibrated with the diaphragm vertical and should be used in that position for maximum accuracy. If gages are to be used in other than vertical position, this should be specified on the order. Many higher range gages will perform within tolerance in other positions with only rezeroing. Low range models of 0.5" w.c. plus 0.25" w.c. and metric equivalents must be used in the vertical position only.

## SURFACE MOUNTING



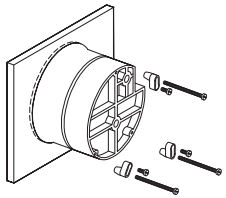
Locate mounting holes, 120° apart on a 4-1/8" dia. circle. Use No. 6-32 machine screws of appropriate length.

## FLUSH MOUNTING



Provide a 4-9/16" dia. (116 mm) opening in panel. Provide a 4-3/4" dia. (120 mm) opening for MP and HP models. Insert gage and secure in place with No. 6-32 machine screws of appropriate length, with adapters, firmly secured in place.

## FOR -SS BEZEL INSTALLATION



Provide a 4-9/16″ opening in panel. Insert gage and secure with supplied mounting hardware.

## PIPE MOUNTING

To mount gage on 1-1/4" - 2" pipe, order optional A-610 pipe mounting kit.

## TO ZERO GAGE AFTER INSTALLATION

Set the indicating pointer exactly on the zero mark, using the external zero adjust screw on the cover at the bottom. Note that the zero check or adjustment can only be made with the high and low pressure taps both open to atmosphere.

## OPERATION

**Positive Pressure:** Connect tubing from source of pressure to either of the two high pressure ports. Plug the port not used. Vent one or both low pressure ports to atmosphere.
**Negative Pressure:** Connect tubing from source of vacuum or negative pressure to either of the two low pressure ports. Plug the port not used. Vent one or both high pressure ports to atmosphere.
**Differential Pressure:** Connect tubing from the greater of two pressure sources to either high pressure port and the lower to either low pressure port. Plug both unused ports.
When one side of the gage is vented in dirty, dusty atmosphere, we suggest an A-331 Filter Vent Plug be installed in the open port to keep inside of gage clean.

**A.** For portable use of temporary installation use 1/8" pipe thread to rubber tubing adapter and connect to source of pressure with flexible rubber or vinyl tubing.
**B.** For permanent installation, 1/4" O.D., or larger, copper or aluminum tubing is recommended.

## MAINTENANCE

No lubrication or periodic servicing is required. Keep case exterior and cover clean. Occasionally disconnect pressure lines to vent both sides of gage to atmosphere and re-zero. Optional vent valves should be used in permanent installations. The Series 2000 is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

## WARNING

Attempted field repair may void your warranty. Recalibration or repair by the user is not recommended.

## TROUBLE SHOOTING TIPS

**Gage won't indicate or is sluggish.**

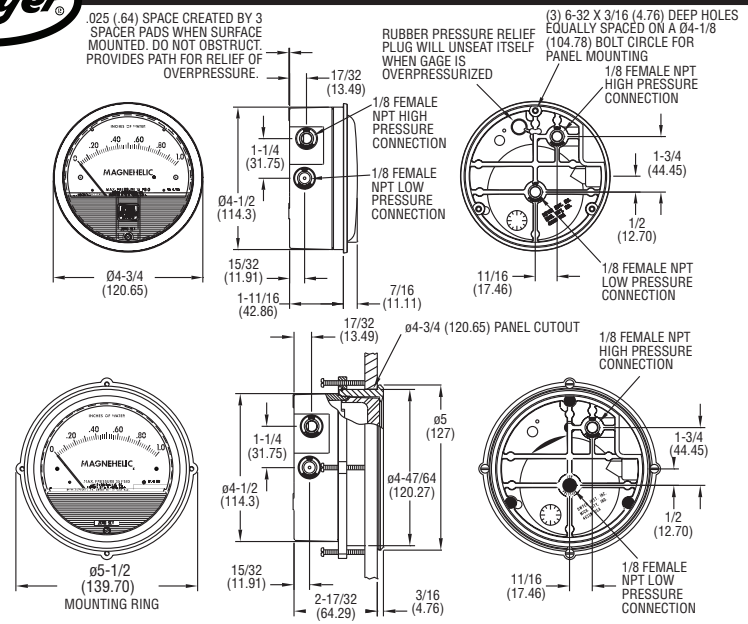
1. Duplicate pressure port not plugged.
2. Diaphragm ruptured due to overpressure.
3. Fittings or sensing lines blocked, pinched, or leaking.
4. Cover loose or "O"ring damaged, missing.
5. Pressure sensor, (static tips, Pitot tube, etc.) improperly located.
6. Ambient temperature too low. For operation below 20°F (-7°C), order gage with low temperature, (LT) option.


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# Magnehelic® Differential Pressure Gage
## INSTRUCCIONES Y LISTA DE PARTES




*(El tapón de goma no es usado en los modelos sobre 180 pulgadas de presión de agua, modelos de presión media o alta, o en instrumentos que requieren un elastizado en cualquier otro material que no sea silicona para el diafragma.)*

**Accesorios:** Tapones 1/8" NPT para las conexiones duplicadas, dos adaptadores de rosca 1/8" NPT a tubo de goma; y tres adaptadores para montaje al ras y tornillos.

**Accesorios para Los Modelos MP y HP:** El anillo de montaje y el retensor del anillo de presión son substituidos por 3 adaptadores, accesorios de compresión de 1/4" remplazan a los adaptadores de rosca 1/8" a tubo de goma.

**Protección Para Sobrepresión:** Los Manómetros Diferenciales Magnehelic Estándar están clasificados para una presión máxima de 15 psi y no se deberían de usar donde el límite puede excederse. Los modelos emplean un tapón de goma en el trasero que funciona como una válvula de alivio desmontándose y ventilando el interior del instrumento cuando la sobrepresión alcanza aproximadamente 25 psig. (Los modelos MP y HP son excluidos) Para proveer un camino libre para el alivio de presión, el instrumento viene con rodilleras que mantienen un espacio de .023" cuando el instrumento es montado en superficie. No bloque el espacio creado por estas rodilleras.

† Para aplicaciones con alto ciclo de velocidad dentro de la clasificación de presión total del instrumento, la próxima clasificación mas alta es recomendada. Vea las opciones de media y alta presión.

El instrumento puede ser usado con hidrogeno cuando se ordena con diafragma de Buna-N. La presion tiene que ser menos de 35 psi.

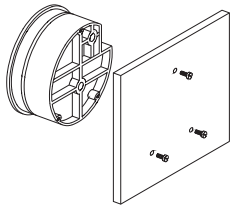
**ESPECIFICACIONES**

**Servicio:** aire y gases no combustibles, gases compatibles. (ópcion disponible para uso con gas natural).
**Materiales Mojados:** Consulte con la fábrica.
**Carcasa:** Caja y anillo de retención de aluminio fundido a presión con tapadera de acrílico. (El modelo MP tiene la tapadera de policarbonato.)
**Exactitud:** ±2% de la escala completa (±3% en los márgenes de -0, -100PA, -125PA y -10MM y ±4 % en los márgenes de -00, -60PA y -6MM), en todo el margen a 21.1 °C (70 °F); Versión de alta precisión: ±1% de la escala completa (±1.5% en los márgenes de -0, -100PA, -125PA, -10MM y ±2% en los márgenes de -00, -60PA, -6MM).
**Límite de Presión:** -20 Hg. a 15 psig. † (-0.677 bar a 1,034 bar); opción MP: 35 psig (2.41 bar), opción HP: 80 psig (5.52 bar).
**Clasificación de gabinete:** IP67.
**Sobrepresión:** El tapón de alivio se abre aproximadamente a los 25 psig, modelos estandard únicamente. El tapón de goma no es usado en los modelos sobre 180 pulgadas de presión de agua, modelos de presión media o alta, o en instrumentos que requieren un elastizado en cualquier otro material que no sea silicio para el diafragma.
**Límite de Temperatura:** -6.67 a 60ºC. * Modelos de baja temperatura disponibles como opción especial.
**Dimensiones:** diám. 120,65 mm x 55,6 prof.
**Orientación de Montaje:** El diafragma debe ser usado solo en posición vertical. Consulte con la fábrica para otras orientaciones de posición.
**Conexiones:** 1/8" NPT para alta y baja presión, duplicadas (atrás, a los lados).
**Peso:** 510 g, MP y HP 963 g.
**Aprobación de la agencia:** RoHS.

**Instalacion**

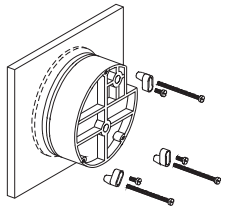
Seleccione un lugar libe de exceso de vibraciones, y donde la temperatura ambiente no supere los 60°C. Evite luz solar directa, para evitar decoloración de la cubierta plástica. Las conexiones de proceso pueden tener cualquier longitud sin afectar la exactitud, pero pueden extender el tiempo de respuesta del instrumento. Si hay pulsación de presión o vibración, consulte a fábrica sobre medios de amortiguación.
Los MAGNEHELIC han sido calibrados con el diafragma vertical, y deben ser usados en esas condiciones. Para otras posiciones, se debe especificar en la orden de provisión. Los de rango elevado pueden ser usados en diversas posiciones, pero se debe reajustar el cero. Los modelos de la serie 2000-00 y equivalentes métricos deben ser usados solo verticalmente.

**Montaje en Superficie**



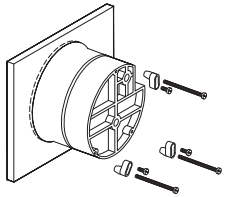
Perfore tres orificios separados 120° sobre una circunferencia de 105 mm de diám. y sostenga el instrumento con tres tornillos 6-32 de long. apropiada.

**Montaje alineado**



Perfore un circulo de 115 mm de diám. en el panel, y sostenga el instrumento mediante los.

**Para instalar el bisel de acero inoxidable**



Haga una apertura de 4-9/16 pulgadas en el panel. Inserte el medidor y asegure con los herrajes de montaje provistos.

**Montaje Sobre Pipa**

Para montar el instrumento sobre pipas de 32 a 50 mm de diám., ordene el adaptador opcional A-610.

**Puesta a Cero Después de Instalar**

Deje las conexiones de presión abiertas a atmósfera y ajuste a cero desde tornillo del panel frontal.

**Operacion**

**Presión Positiva:** Conecte la tubería desde la fuente de presión a cualquiera de las dos conexiones de alta presión (HIGH), bloqueando la no usada; Las conexiones de baja (LOW) presión pueden dejarse uno o los dos abiertos a la atmósfera.
**Presión Negativa:** Repita el procedimiento anterior, conectado en este caso las conexiones de baja presión (LOW). Deje las otras conexiones abiertas.
**Presión diferencial:** Conecte el tubo correspondiente a la presión más positiva al cualquiera de los conectores de alta presión (HIGH) bloqueando el no usado, y la más baja presión o presión negativa (vacío) al conector de baja presión (LOW). Puede usarse cualquier conector de cada par, dejando siempre uno bloqueado. Si se deja una conexión abierta a la atmósfera, se recomienda el uso de un filtro tipo A-331 en el lugar correspondiente para mantener limpio el interior del instrumento. Para uso portable, o instalación temporaria, uso adapta dores para rosca de tubo de 1/89 a tubo flexible, y conecte a proceso mediante una tubería de goma, o equivalente. Para instalación permanente, se recomienda el uso de tubo de cobre o aluminio de por lo menos 1/4" de diám. exterior.

No se requiere mantenimiento específico alguno, ni lubricación. Periódicamente, desconecte el instrumento, ventee la presión acumulada, y reajuste el cero. Para instalaciones permanentes, se debe usar un juego de válvulas de montaje permanente para el venteo.
El instrumento de Serie 2000 no puede ser re parado en el campo y debería de ser regresado si reparos son necesarios (Reparos en el campo no deben de ser intentados y pueden cancelar la garantía.). Asegurarse de incluir una descripción breve del problema más cualquier notas pertinentes a la aplicación para devolución de productos antes de enviar el instrumento.

**Cuidado! : La recalibración en campo puede invalidar la garantía. No se recomienda la recalibracion por parte del usuario. En caso necesario envie el instrumento con transporte pago a:**

**Localización De Fallas**

• *El instrumento no indica, o es lento en reacción.*
1. Conexión duplicada abierta.
2. Diafragma roto por sobrepresión.
3. Tubería de conexión perforada, con pérdidas o pinchazos.
4. Anillo de retención flojo, u "O " ring dañado.
5. Conexión a proceso indebida o inadecuada.
6. Temperatura muy baja. Para este caso ordene tipos LT (baja temperatura).

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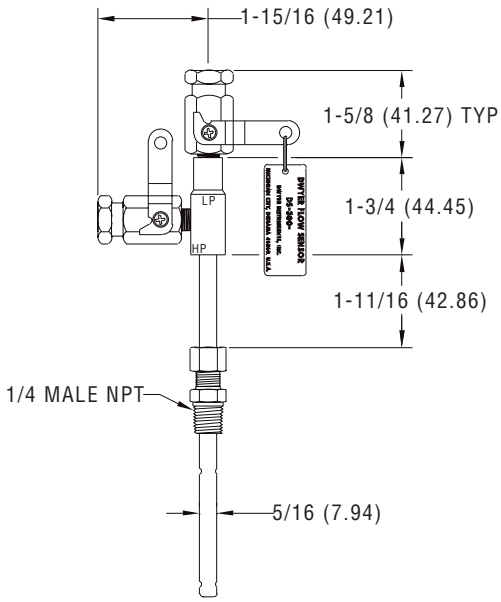
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# Series DS-300 Flow Sensors

## Installation and Operating Instructions Flow Calculations




**Series DS-300 Flow Sensors** are averaging pitot tubes that provide accurate, convenient flow rate sensing. When purchased with a Dwyer Capsuhelic® for liquid flow or Magnehelic® for air flow, differential pressure gage of appropriate range, the result is a flow-indicating system delivered off the shelf at an economical price. Series DS-300 Flow Sensors are designed to be inserted in the pipeline through a compression fitting and are furnished with instrument shut-off valves on both pressure connections. Valves are fitted with 1/8″ female NPT connections. Accessories include adapters with 1/4″ SAE 45° flared ends compatible with hoses supplied with the Model A-471 Portable Capsuhelic® kit. Standard valves are rated at 200°F (93.3°C). Where valves are not required, they can be omitted at reduced cost. Series DS-300 Flow Sensors are available for pipe sizes from 1″ to 10″.

### INSPECTION

Inspect sensor upon receipt of shipment to be certain it is as ordered and not damaged. If damaged, contact carrier.

### INSTALLATION

**General -** The sensing ports of the flow sensor must be correctly positioned for measurement accuracy. The instrument connections on the sensor indicate correct positioning. The side connection is for total or high pressure and should be pointed upstream. The top connection is for static or low pressure.

**Location -** The sensor should be installed in the flowing line with as much straight run of pipe upstream as possible. A rule of thumb is to allow 10 - 15 pipe diameters upstream and 5 downstream. The table below lists recommended up and down piping.

### PRESSURE AND TEMPERATURE

Maximum: 200 psig (13.78 bar) at 200°F (93.3°C).

**Upstream and Downstream Dimensions in Terms of Internal Diameter of Pipe***

| Upstream Condition | Minimum Diameter of Straight Pipe | | |
|---|---|---|---|
| | Upstream | | Downstream |
| | In-Plane | Out of Plane | |
| One Elbow or Tee | 7 | 9 | 5 |
| Two 90° Bends in Same Plane | 8 | 12 | 5 |
| Two 90° Bends in Different Plane | 18 | 24 | 5 |
| Reducers or Expanders | 8 | 8 | 5 |
| All Valves** | 24 | 24 | 5 |

* Values shown are recommended spacing, in terms of internal diameter for normal industrial metering requirements. For laboratory or high accuracy work, add 25% to values.

** Includes gate, globe, plug and other throttling valves that are only partially opened. If valve is to be fully open, use values for pipe size change. **CONTROL VALVES SHOULD BE LOCATED AFTER THE FLOW SENSOR.**

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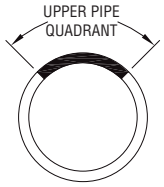
## POSITION

Be certain there is sufficient clearance between the mounting position and other pipes, walls, structures, etc, so that the sensor can be inserted through the mounting unit once the mounting unit has been installed onto the pipe.

Flow sensors should be positioned to keep air out of the instrument connecting lines on liquid flows and condensate out of the lines on gas flows. The easiest way to assure this is to install the sensor into the pipe so that air will bleed into, or condensate will drain back to, the pipe.

**For Air or Gas Flow**

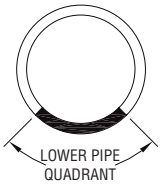
Install in upper quadrant of pipe




Condensate drains back to pipe

**For Liquid or Steam Flow**

Install in lower quadrant of pipe




Air bleeds back to pipe

## INSTALLATION

1. When using an A-160 thred-o-let, weld it to the pipe wall. If replacing a DS-200 unit, an A-161 bushing (1/4˝ x 3/8˝) will be needed.

2. Drill through center of the thred-o-let into the pipe with a drill that is slightly larger than the flow sensor diameter.

3. Install the packing gland using proper pipe sealant. If the packing gland is disassembled, note that the tapered end of the ferrule goes into the fitting body.

4. Insert sensor until it bottoms against opposite wall of the pipe, then withdraw 1/16˝ to allow for thermal expansion.

5. Tighten packing gland nut finger tight. Then tighten nut with a wrench an additional 1-1/4 turns. Be sure to hold the sensor body with a second wrench to prevent the sensor from turning.

## INSTRUMENT CONNECTION

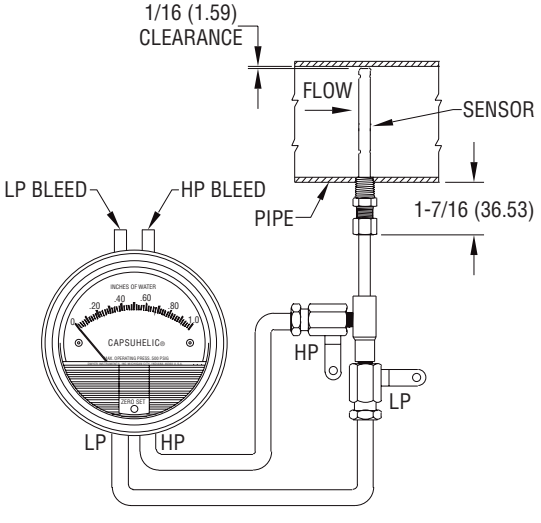
Connect the slide pressure tap to the high pressure port of the Magnehelic® (air only) or Capsuhelic® gage or transmitting instrument and the top connection to the low pressure port.

See the connection schematics below.

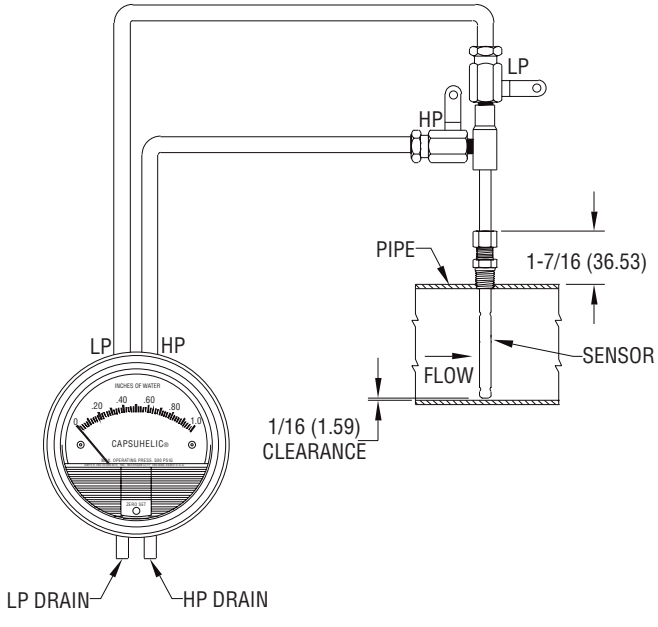
Bleed air from instrument piping on liquid flows. Drain any condensate from the instrument piping on air and gas flows.

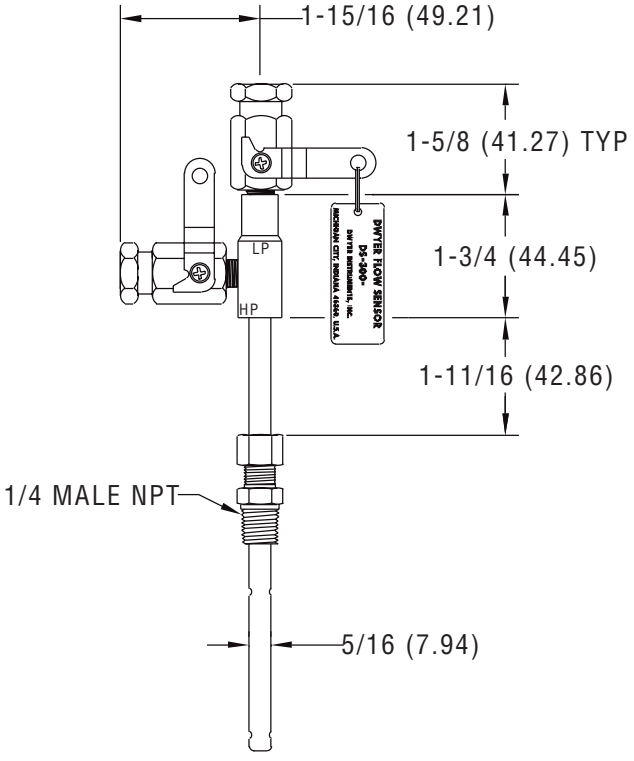
Open valves to instrument to place flow meter into service. For permanent installations, a 3-valve manifold is recommended to allow the gage to be zero checked without interrupting the flow. The Dwyer A-471 Portable Test Kit includes such a device.

**Water Flow**




**Air or Gas Flow**






**Flow Calculations and Charts**

The following information contains tables and equations for determining the differential pressure developed by the DS-300 Flow Sensor for various flow rates of water, steam, air or other gases in different pipe sizes.

This information can be used to prepare conversion charts to translate the differential pressure readings being sensed into the equivalent flow rate. When direct readout of flow is required, use this information to calculate the full flow differential pressure in order to specify the exact range of Dwyer Magnehelic® or Capsuhelic® gage required. Special ranges and calculations are available for these gages at minimal extra cost. See bulletins A-30 and F-41 for additional information on Magnehelic® and Capsuhelic® gages and DS-300 flow sensors.

For additional useful information on making flow calculations, the following service is recommended: Crane Valve Co. Technical Paper No. 410 “Flow of Fluids Through Valves, Fittings and Pipe.” It is available from Crane Valve Company, www.cranevalve.com.

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Using the appropriate differential pressure equation from Page 4 of this bulletin,calculate the differential pressure generated by the sensor under normal operating conditions of the system. Check the chart below to determine if this value is within the recommended operating range for the sensor. Note that the data in this chart is limited to standard conditions of air at 60°F (15.6°C) and 14.7 psia static line pressure or water at 70°F (21.1°C). To determine recommended operating ranges of other gases, liquids an/or operating conditions, consult factory.

**Note:** the column on the right side of the chart which defines velocity ranges to avoid. Continuous operation within these ranges can result in damage to the flow sensor caused by excess vibration.

| Pipe Size (Schedule 40) | Flow Coefficient “K” | Operating Ranges Air @ 60°F & 14.7 psia (D/P in. W.C.) | Operating Ranges Water @ 70°F (D/P in. W.C.) | Velocity Ranges Not Recommended (Feet per Second) |
|---|---|---|---|---|
| 1 | 0.52 | 1.10 to 186 | 4.00 to 675 | 146 to 220 |
| 1-1/4 | 0.58 | 1.15 to 157 | 4.18 to 568 | 113 to 170 |
| 1-1/2 | 0.58 | 0.38 to 115 | 1.36 to 417 | 96 to 144 |
| 2 | 0.64 | 0.75 to 75 | 2.72 to 271 | 71 to 108 |
| 2-1/2 | 0.62 | 1.72 to 53 | 6.22 to 193 | 56 to 85 |
| 3 | 0.67 | 0.39 to 35 | 1.43 to 127 | 42 to 64 |
| 4 | 0.67 | 0.28 to 34 | 1.02 to 123 | 28 to 43 |
| 6 | 0.71 | 0.64 to 11 | 2.31 to 40 | 15 to 23 |
| 8 | 0.67 | 0.10 to 10 | 0.37 to 37 | 9.5 to 15 |
| 10 | 0.70 | 0.17 to 22 | 0.60 to 79 | 6.4 to 10 |

## FLOW EQUATIONS

1. Any Liquid

$$Q\ (GPM) = 5.668 \times K \times D^2 \times \sqrt{\Delta P / S_f}$$

2. Steam or Any Gas

$$Q\ (lb/Hr) = 359.1 \times K \times D^2 \times \sqrt{p \times \Delta P}$$

3. Any Gas

$$Q\ (SCFM) = 128.8 \times K \times D^2 \times \sqrt{\frac{P \times \Delta P}{(T + 460) \times S_s}}$$

## DIFFERENTIAL PRESSURE EQUATIONS

1. Any Liquid

$$\Delta P\ (in.\ WC) = \frac{Q^2 \times S_f}{K^2 \times D^4 \times 32.14}$$

2. Steam or Any Gas

$$\Delta P\ (in.\ WC) = \frac{Q^2}{K^2 \times D^4 \times p \times 128{,}900}$$

3. Any Gas

$$\Delta P\ (in.\ WC) = \frac{Q^2 \times S_s \times (T + 460)}{K^2 \times D^4 \times P \times 16{,}590}$$

## Technical Notations

The following notations apply:

$\Delta P$ = Differential pressure expressed in inches of water column
Q = Flow expressed in GPM, SCFM, or PPH as shown in equation
K = Flow coefficient— See values tabulated on Pg. 3.
D = Inside diameter of line size expressed in inches.

For square or rectangular ducts, use: $D = \sqrt{\frac{4 \times \text{Height} \times \text{Width}}{\pi}}$

P = Static Line pressure (psia)
T = Temperature in degrees Fahrenheit (plus 460 = °Rankine)
p = Density of medium in pounds per square foot
$S_f$ = Sp Gr at flowing conditions
$S_s$ = Sp Gr at 60°F (15.6°C)

## SCFM TO ACFM EQUATION

$$SCFM = ACFM \times \left(\frac{14.7 + PSIG}{14.7}\right) \left(\frac{520^*}{460 + °F}\right)$$

$$ACFM = SCFM \times \left(\frac{14.7}{14.7 + PSIG}\right) \left(\frac{460 + °F}{520}\right)$$

$$\text{POUNDS PER CUBIC FOOT STD.} = \text{POUNDS PER CUBIC FOOT ACT.} \times \left(\frac{14.7}{14.7 + PSIG}\right) \left(\frac{460 + °F}{520^*}\right)$$

$$\text{POUNDS PER CUBIC FOOT ACT.} = \text{POUNDS PER CUBIC FOOT STD.} \times \left(\frac{14.7 + PSIG}{14.7}\right) \left(\frac{520^*}{460 + °F}\right)$$

1 Cubic foot of air = 0.076 pounds per cubic foot at 60° F (15.6°C) and 14.7 psia.
* (520°= 460 + 60°) Std. Temp. Rankine

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# APPENDIX L
# RESPONSIBILITIES of
# OWNER and REMEDIAL PARTY

**Responsibilities**

The responsibilities for implementing the Site Management Plan ("SMP") for the 29-05 38th Avenue site (the "Site"), Index No. C241250-04-21, are the responsibility of the Site Owner/Remedial Party (FH 2BRO Builders Corp.), as defined below. The owner is currently listed as:
FH 2BRO Builders Corp. - (the "owner").

**Solely for the purposes of this document and based upon the facts related to a particular site and the remedial program being carried out,** the term Remedial Party ("RP") refers to any of the following: certificate of completion holder, volunteer, applicant, responsible party, and, in the event the New York State Department of Environmental Conservation ("NYSDEC") is carrying out remediation or site management, the NYSDEC and/or an agent acting on its behalf. The RP is:
FH 2BRO Builders Corp – Jack Fang, (646) 533-2801, reobuddy@gmail.com.

Nothing on this page shall supersede the provisions of an Environmental Easement, Consent Order, Consent Decree, agreement, or other legally binding document that affects rights and obligations relating to the site.

**Site Owner's Responsibilities:**

1) The owner shall follow the provisions of the SMP as they relate to future construction and excavation at the site.

2) In accordance with a periodic time frame determined by the NYSDEC, the owner shall periodically certify, in writing, that all Institutional Controls set forth in an Environmental Easement remain in place and continue to be complied with. The owner shall provide a written certification to the RP, upon the RP's request, in order to allow the RP to include the certification in the site's Periodic Review Report (PRR) certification to the NYSDEC.

3) In the event the site is delisted, the owner remains bound by the Environmental Easement and shall submit, upon request by the NYSDEC, a written certification that the Environmental Easement is still in place and has been complied with.

4) The owner shall grant access to the site to the RP and the NYSDEC and its agents for the purposes of performing activities required under the SMP and assuring compliance with the SMP.

5) The owner is responsible for assuring the security of the remedial components located on its property to the best of its ability. If damage to the remedial components or vandalism is evident, the owner shall notify the site's RP and the NYSDEC in accordance with the timeframes indicated in Section 7-Notifications.

6) If some action or inaction by the owner adversely impacts the site, the owner must notify the site's RP and the NYSDEC in accordance with the time frame indicated in Section 7- Notifications and coordinate the performance of necessary corrective actions with the RP.

7) The owner must notify the RP and the NYSDEC of any change in ownership of the site property (identifying the tax map numbers in any correspondence) and provide contact information for the new owner of the site property. 6 NYCRR Part contains notification requirements applicable to any construction or activity changes and changes in ownership. Among the notification requirements is the following: Sixty days prior written notification must be made to the NYSDEC. Notification is to be submitted to the NYSDEC Division of Environmental Remediation's Site Control Section. Notification requirements for a change in use are detailed in Section 1.3 of the SMP. A change of use includes, but is not limited to, any activity that may increase direct human or environmental exposure (e.g., day care, school or park). A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.

8) If an owner has a written agreement to perform work for the RP, a description of the activities may be inserted here. (The corresponding agreement should also be included in the SMP.) The RP remains ultimately responsible for maintaining the engineering controls.

9) If the site remedy requires the installation, operation, and/or maintenance of an on-site vapor intrusion mitigation system insert the following: Until such time as the NYSDEC deems the vapor mitigation system unnecessary, the owner shall operate the system, pay for the utilities for the system's operation, and report any maintenance issues to the RP and the NYSDEC.

10) If the site remedy requires the installation, operation, and/or maintenance of a drinking water treatment system, insert the following: Until such time as the NYSDEC deems the drinking water treatment system unnecessary, the owner shall operate the drinking water treatment system, pay for the utilities and report any maintenance issues to the RP and the NYSDEC.

11) In accordance with the tenant notification law, within 15 days of receipt, the owner must supply a copy of any vapor intrusion data, that is produced with respect to structures and that exceeds NYSDOH or OSHA guidelines on the site, whether produced by the NYSDEC, RP, or owner, to the tenants on the property. The owner must otherwise comply with the tenant and occupant notification provisions of Environmental Conservation Law Article 27, Title 24.

**Remedial Party Responsibilities**

1) The RP must follow the SMP provisions regarding any construction and/or excavation it undertakes at the site.

2) The RP shall report to the NYSDEC all activities required for remediation, operation, maintenance, monitoring, and reporting. Such reporting includes, but is not limited to, periodic review reports and certifications, electronic data deliverables, corrective action work plans and reports, and updated SMPs.

3) Before accessing the site property to undertake a specific activity, the RP shall provide the owner advance notification that shall include an explanation of the work expected to be completed. The RP shall provide to (i) the owner, upon the owner's request, (ii) the NYSDEC, and (iii) other entities, if required by the SMP, a copy of any data generated during the site visit and/or any final report produced.

4) If the NYSDEC determines that an update of the SMP is necessary, the RP shall update the SMP and obtain final approval from the NYSDEC. Within 5 business days after NYSDEC approval, the RP shall submit a copy of the approved SMP to the owner(s).

5) The RP shall notify the NYSDEC and the owner of any changes in RP ownership and/or control and of any changes in the party/entity responsible for the operation, maintenance, and monitoring of and reporting with respect to any remedial system (Engineering Controls). The RP shall provide contact information for the new party/entity. Such activity constitutes a Change of Use pursuant to 375-1.11(d) and requires 60-days prior notice to the NYSDEC. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html .

6) The RP shall notify the NYSDEC of any damage to or modification of the systems as required under Section 7- Notifications of the SMP.

7) The RP is responsible for the proper maintenance of any installed vapor intrusion mitigation systems associated with the site, as required in Section 5 or Appendix K (Operation, Monitoring and Maintenance Manual) of the SMP.

8) Prior to a change in use that impacts the remedial system or requirements and/or responsibilities for implementing the SMP, the RP shall submit to the NYSDEC for approval an amended SMP.

9) Any change in use, change in ownership, change in site classification (*e.g.*, delisting), reduction or expansion of remediation, and other significant changes related to the site may result in a change in responsibilities and, therefore, necessitate an update to the SMP and/or updated legal documents. The RP shall contact the NYSDEC project manager to discuss the need to update such documents.

Change in RP ownership and/or control and/or site ownership does not affect the RP's obligations with respect to the site unless a legally binding document executed by the NYSDEC releases the RP of its obligations.

Future site owners and RPs and their successors and assigns are required to carry out the activities set forth above.

# APPENDIX M

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REMEDIAL SYSTEM OPTIMIZATION FOR 29-05 38th Avenue

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