FORMER B.H. AIRCRAFT

SUFFOLK COUNTY

FARMINGDALE, NEW YORK

SITE MANAGEMENT PLAN

NYSDEC Site Number: C152247

Prepared for:

441 Eastern Parkway, LLC

37-14 36th Street

Long Island City, New York 11101

Prepared by:

Goldberg-Zoino Associates of New York P.C. d/b/a
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212-594-8140

Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

DECEMBER 2019

CERTIFICATION STATEMENT

I ERNEST HANNA certify that I am currently a NYS registered professional engineer or Qualified Environmental Professional 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).

ERNEST HANNA P.E. NO. 065440

12/11/2019 DATE

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AS	Air Sparging
ASP	Analytical Services Protocol
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BGS	Below Ground Surface
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
EC	Engineering Control
ECL	Environmental Conservation Law
ELAP	Environmental Laboratory Approval Program
ERP	Environmental Restoration Program
EWP	Excavation Work Plan
GHG	Green House 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
PID	Photoionization Detector
PRP	Potentially Responsible Party
PRR	Periodic Review Report
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
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:

Site Identification: Site No. C152247, 441 Eastern Parkway, Farmingdale, New York

Institutional Controls:	1. The property may be used for restricted commercial use;
	2. An Environmental Easement was filed with the Suffolk County Clerk
	3. All Engineering Controls (ECs) must be inspected at a frequency and in a manner defined in the SMP.
Engineering Controls:	1. Cover system
	2. Ventilation (Air Exchange) System
	3. Soil Vapor Extraction (SVE) System

Inspections:	Frequency
1. Cover Inspection	Annually
2. SVE Inspection	Quarterly
Monitoring:	
1. Groundwater Monitoring Wells MW-1 through MW-6	Annually
2. SVE System Monitoring	Quarterly
Maintenance:	
1. Cap Maintenance	As needed
2. Blower maintenance	As needed

Site Identification: Site No. C152247, 441 Eastern Parkway, Farmingdale, New York

Reporting:	
1. Groundwater Data	Annually
2. SVE System Data	Annually
3. 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 Former B.H. Aircraft Site located in Farmingdale, New York (hereinafter referred to as the "Site"). See Figure 1. The Site is currently in the New York State (NYS) Brownfield Cleanup Program (BCP), Site No. C152247 which is administered by New York State Department of Environmental Conservation (NYSDEC).

441 Eastern Parkway, LLC entered into a Brownfield Cleanup Agreement (BCA), Index Number C-152247-08-17 on August 21, 2017 with the NYSDEC to remediate the site during redevelopment. A copy of the BCA is provided in **Appendix A**. A figure showing the site location and boundaries of this site is provided in Figure 2. 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 B.** The Environmental Easement site survey is provided as **Figure 3**.

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 by 441 Eastern Parkway, LLC to the NYSDEC, and recorded with the Suffolk 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);
- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6 New York Code of Rules and Regulations (NYCRR) Part 375 and the BCA (Index #C152247-08-17; Site #C152247) 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 C** of this SMP.

This SMP was prepared by Goldberg-Zoino Associates of New York P.C. d/b/a GZA GeoEnvironmental of New York (GZA), on behalf of 441 Eastern Parkway, LLC, in accordance with the requirements of the NYSDEC's Division of Environmental Remediation (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

Revisions to this plan will be proposed in writing to the NYSDEC's project manager. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shut-down of a remedial system, post-remedial removal of contaminated sediment or soil, or other significant change to the site conditions. In accordance with the Environmental Easement for the site, the NYSDEC 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:

- 60-day advance notice of any proposed changes in site use that are required under the terms of the BCA, 6NYCRR Part 375 and/or Environmental Conservation Law.
- 7-day advance notice of any field activity associated with the remedial program.
- 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan.
- 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.
- 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.
- 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:

- 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.

- 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 notification. 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 C**.

Table 1: Notifications*

Name	Contact Information
Richard Mustico Project Manager, NYSDEC	Phone: (518) 402-9647 Email: Richard.mustico1@dec.ny.gov
Walter Parish NYSDEC Regional Hazardous Waste Engineer	Phone: (631) 444-0240 Email: Walter.parish@dec.ny.gov
Kelly Lewandowski NYSDEC-DER/BTS Site Control Section	Phone: (518) 402-9543 Email: Kelly.lewandowski@dec.ny.gov
Michael C. Murphy, Esq. NYSDEC OGC Section Chief Remediation Bureau	Phone: (518) 402-8564 Email: Michael.murphy1@dec.ny.gov

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

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The site is located in Farmingdale, Suffolk County, New York and is identified as Section 46 Block 01 and Lot 020 on the Suffolk County Tax Map (see Figure 1). The site is an approximately 3.52-acre area and is bounded by residential homes and apartments across the Long Island Railroad (LIR) to the north, residential homes to the south, a commercial/industrial property that distributes electric wheelchairs to the east, and a commercial/industrial property known as Coastal Materials to the west.The boundaries of the site are more fully described in Appendix B –Environmental Easement. The owner(s) of the site parcel(s) at the time of issuance of this SMP is: 441 Eastern Parkway LLC., which has executed the environmental easement.

2.2 Physical Setting

2.2.1 Land Use

The Site consists of the following: a large asphalt parking lot for storage of vehicles, an approximately 11,500 square-foot building (Building 2) to be used to prepare new cars prior to its delivery, and small landscaped islands on the north/south side of the Site. The Site is zoned commercial and is currently utilized for vehicle storage/maintenance by a Mercedes Dealership. Site occupants include dealership employees and a security guard.

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

2.2.2 Geology

According to the USGS Hydrogeologic Investigations Atlas HA-709, New York, Site overburden soils were deposited during the Pleistocene epoch. The overburden is composed of the Upper Glacial outwash deposits consisting of fine to course quartzose sands and pebble to boulder sized gravel which are expected to extend to a depth of approximately 10 feet below mean sea level (MSL). Beneath this layer, the Cretaceous period Magothy Formation occurs which is in turn, underlain by the Raritan Clay and the Lloyd Sand. The bedrock underlying the Cretaceous deposits is expected to be schist, gneiss and/or amphibolite with pegmatite intrusions typical of the Cambro-Ordovician Hartland Formation at a depth greater than 1,000 feet below MSL.

Subsurface soils at the Site consisted of urban fill and demolition artifacts (concrete etc.) in the upper 1 foot of borings. A mix of medium to coarse sands, gravel and cobbles were present immediately below this layer, extending to 25 below ground surface (bgs). Each of the GZA borings were terminated in this layer. According to the USGS topographic map for the Glenville CT-NY area dated 2012, the elevation of the Site is approximately 75 feet above MSL based on the NAVD-1988. The Site is located south of a terminal moraine and the topography slopes gently down to the south.

Site specific boring logs are provided in **Appendix D**.

2.2.3 Hydrogeology

According to the Suffolk County Department of Health Groundwater Elevation Map, the water table in the area of the Site is expected to be about 20 feet bgs and flow in a southerly direction towards the Massapequa Preserve. During well installation activities by GZA in March of 2019, groundwater was generally encountered between 19 and 23 feet bgs. Groundwater occurs in the Upper Glacial deposit which is expected to have moderate to high hydraulic conductivity.

The data collected during the 2017 Remedial Investigation, indicates the groundwater flows to the south. In March 2019, six groundwater monitoring wells were installed to cover the entire Site. The groundwater elevation data will be collected during

the first round of groundwater sampling and a groundwater contour map will be generated. The groundwater elevation date and contours will be submitted with the annual report. Permanent groundwater monitoring well construction logs are provided in **Appendix E**.

2.3 Investigation and Remedial History

Based on review of historic Sanborn Maps, the Site was used for industrial purposes since as early as 1920. The 1920 Sanborn Map depicts the presence of the Gutta-Percha Rubber MFG Company. Several structures, including a water tower are shown on the 1920 map. In 1929, A.H. Hews & Company, a manufacturer of flower pots was depicted on the Sanborn Map. The 1942 Sanborn map depicts Seeley & Company, an essential oils and aromatic products manufacturer. Items noted on the map include an acid bath tank, a transformer vault and bottled gas storage. The 1964 Sanborn Map shows BH Aircraft, a manufacturer of aircraft engines. Items noted on the map include several machine shops, a press room, paint spraying and a generator. Based on our review of the previous reports listed above, BH Aircraft operated on the Site until at least 2000 at which point operations were moved to another property and the Site was purchased by Baumann & Sons Buses Inc. (school bus company) which stored, maintained and fueled buses until 2016. During this time, a 12,000-gallon diesel underground storage tank (UST) and two dispensers were installed to fuel buses.

All of the former on-Site buildings associated with the former B.H. Aircraft facility were demolished by the BCP Volunteer at the commencement of this remedial project except (Building #2), which is being renovated for a car dealership. Post Site preparation building demolition, a number of interim remedial measures were performed including the removal of the 12,000-gallon diesel tank, confirmation of the removal of two former leaching pools and removal of a number of drywells. The final remedial action was the installation of a Site-wide cover system, consisting of a six-inch asphalt cap overlaying six inches of Dense Graded Aggregate (DGA). The Site will be managed pursuant to implementation of the engineering and institutional controls in this SMP and the environmental easement.

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.

- January 2001 Tyree Brothers Environmental Services Inc. Phase I ESA
- Phase II Environmental Site Assessment – Advanced Cleanup Technologies (ACT) (December 2001)
- Limited Phase II Site Investigation – Preferred Environmental Services (PES) (September 2002)
- September 13, 2016, Phase I Environmental Assessment ("ESA") by Laurel Environmental Associates, Ltd.
- Phase II Site Assessment – Galli Engineering (January 2017)
- Interim Remedial Measures – Leaching Pool and Drywell Closures as discussed in the NYSDEC DER Decision Document (August 2019)
- BCP Remedial Investigation Report/Remedial Action Work Plan – GZA (August 2018)

January 2001 Tyree Brothers Environmental Services Inc. Phase I ESA

In January 2001, Tyree Brothers Environmental Services, Inc. (Tyree) prepared a Phase I report for BH Aircraft as BH Aircraft was departing from the Site. Therefore, it was an "exit" Phase I. The Phase I analyzed the environmental history of each building:

Building 1: Main Factory Building and Offices. This building had been partitioned into office space and had contained a production area consisting of a large open area with smaller perimeter rooms. The building formerly contained an aboveground storage tank ("AST") for process applications including plating, washing and rinsing. A wash room is located in the northwestern portion of the building. This room contained concrete lined trenches for secondary containment and conveyance of wash water, however, the entire floor was not able to be inspected. The building also contained an electrical transformer. Two floor drains were identified in the boiler room and one in the first floor bathroom. A brazing (acid etching) room was formerly located

in building 1. A former laser room was also located in the southwest portion of the building and a portion of the laser was below the floor for vibration control. A metal press room was also in the southwest portion of the building. Other rooms included a boiler room, in the west portion of the building, which stored oils and had two floor drains, an over room along the northern wall, a cooling system along the western wall, and a testing room which used Xyglo as a dye in the black to see cracks in finished products.

Building 2: Former Assembly Welding and Grinding Area Building. This building contained two floor drains in the southern portion of the building, a boiler room, and a generator.

Building 3: Former Waste Water Treatment Building. This building contained two open wooden ASTs utilized for waste water treatment, which appears to have been used for treatment consisted of pH neutralization prior to discharge to the municipal sewer system.

Storage A: This building was reportedly used for storage, office space and for spray painting. Some ACM was observed on piping.

Storage B: This building was reportedly formerly used for storage of parts and electroplating operations. A former compressed gas storage area was also located south of this building.

Storage C: This building was reportedly used for the storage of automobiles but was vacant at the time of inspection.

Storage D: This building was formerly used for the storage of waste drums under Suffolk County Article 12 and contained a secondary containment system.

Storage E: This building formerly contained a compressor and two abandoned 10,000-gallon underground storage tanks (USTs).

Database Review showed that the Site was listed as a small quantity generator in the EPA database and as a PBS facility (U003535200) with numerous tanks listed. The report reviewed and summarized the Suffolk County records. Two 1991 spill events (91-07269 and 91-08067 were identified. The first spill had not been closed as of the preparation of this Phase I but the second spill had been closed on December 24, 1992.

November 2001 – Phase II Site Investigation (ACT)

In October and November of 2001, ACT performed a Phase II site investigation to evaluate specific areas of the Site, such as the former wastewater disposal system. The ACT Phase II included the advancement of 18 soil borings, 9 temporary wells, 5 permanent wells, collection of 2 surface soil samples and 1 sludge sample. Based on laboratory results, an additional 6 soil samples and 7 groundwater samples were collected. Field screening, in addition to laboratory analysis, was used as part of the investigation. Further assessment was performed in an area off the northwest portion of Building 1 where wastewater was discharged into a "former scum box" and two leaching pools.

Based on the findings of the field investigation, the Suffolk County Department of Health Services (SCDHS) required remediation of the two leaching pools and the scum box located off the northwest corner of Building 1. Over 90 yards of contaminated materials were removed in addition to the actual concrete comprising the three structures. Endpoint samples collected under the supervision of SCDHS indicated that compliance with SCDHS Soil Cleanup Objectives were achieved. Additional deeper groundwater sampling was also required by the SCDHS, to evaluate potential impacts. Groundwater was sampled at 30, 45, and 60 feet bgs. The results indicated decreasing concentrations of detected compounds in the groundwater with depth.

Additional remediation was performed by the former owner (B.H. Aircraft) on a voluntary basis at one of the primary leaching pools associated with the southeastern septic system, south of Building 2. Metals, specifically chromium were present in the sediments within the leaching pool. Endpoint soil sampling indicated compliance with SCDHS Soil Cleanup Objectives.

Sampling of groundwater at the Site indicated the presence of volatile organic compounds (VOCs) and metals above NYSDEC Ambient Groundwater Standards. The source area for the VOCs and metals was assumed to be the scum box and leaching pools on the northwest corner of Building 1 and was presumed to be remediated.

According to PES, the SCDHS reviewed the ACT report and SCDHS concluded that no further action relative to the site investigation activities described above was

required as outlined in an August 18, 2002 letter. The letter excluded inaccessible individual leaching pools that were underneath building structures (three leaching pools under the transformers) and no conclusions were made regarding impacts to groundwater.

September 2002 – Limited Phase II Site Investigation (PES)

In September 2002, PES performed a limited Phase II Site Investigation in areas thought to represent a higher risk. PES identified the drum storage area, the former spray booth, the former plating area and the former waste water treatment area to be investigated. PES submitted 5 soil samples and 13 groundwater sample for laboratory analysis. PES identified elevated VOCs in the groundwater (at concentrations lower than those identified by ACT). In addition, PES identified several areas on-site that required remediation: Two grated drywells and associated overflow pools in the southeastern portion of the Site, the northeastern series of septic leaching pools, the western septic leaching pool underneath the former wastewater treatment building, the soils underlying the floor drain in the waste water treatment building, the soils in proximity to the removed Zyglo tank, and soils in proximity to the former vapor degreaser. It does not appear this recommenced work was performed by any prior owner.

September 13, 2016, Phase I Environmental Site Assessment ("ESA") by Laurel Environmental Associates, Ltd.

This update Phase I, prepared for an affiliated company for the BCP Volunteer, revealed six Recognized Environmental Conditions ("RECs") on the Site, in addition to the sixteen potential RECs identified by PES in a previous Phase II.

1. Staining of soil throughout the Site indicates that there were past releases of oil.
2. The Phase I discovered a 55-gallon drum found open, tipped over, and with material partially spilled onto soil, with a label indicating that the drum or its contents were manufactured in 1984.

3. The Site is listed as a Petroleum Bulk Storage ("PBS") facility, and an adjoining site is listed as a PBS and Chemical Bulk Storage ("CBS") facility, which may present a vapor encroachment condition ("VEC").

4. The Site is listed as an onsite RCRA Hazardous Waste Generator, and historic chemical use at the Site was documented. An adjacent property is also a Generator.

5. The onsite structure may contain asbestos, poly chlorinated biphenyls (PCBs), or lead based paint.

6. The Phase I also discovered a historical REC in the listing of 2 closed NYSDEC petroleum spills on the Site, though both spills were remediated to the satisfaction of NYSDEC and were removed from active status.

Based on its findings, LEA recommended characterizing and disposing of oil-impacted soil, unidentified material, and ACM, and recognized that additional information was needed regarding the RECs identified by the prior Phase II.

January 2017 – Phase II Site Assessment (Galli Engineering)

In January 2017, Galli Engineering prepared a Phase II Environmental Site Assessment Report summarizing the results of an environmental site investigation. Ten soil borings were advanced to 10 feet below ground surface (bgs) across the Site; five temporary well points were installed to groundwater and five soil gas samples were collected using a *Geoprobe*. In addition, samples were collected from the bottoms of twelve leaching pools using a hand auger. The soil encountered directly below ground surface was fill material consisting of a heterogeneous mix of fine to medium sand with concrete and gravel. Fill material was observed to a depth between 5 and 6 feet bgs. The fill material is underlain by brown fine to medium sand with some silt and clay.

Based on the analytical data, Galli concluded the following:

- Volatile Organic Compounds (VOCs) were detected in soil samples at concentrations below the Part 375 Commercial Soil Cleanup Objectives. No VOCs were identified above Part 375 Commercial Soil Cleanup Objectives in the soil

samples tested. However, trichloroethene and tetrachloroethene were detected above the Unrestricted Soil Cleanup Objectives in one sample.

- Semi-Volatile Organic Compound (SVOC) Benzo(a)pyrene, exceeded the Commercial Soil Cleanup Objective in one sample. Benzo(a)anthracene, benzo(b)flouranthene, benzo(k)flouranthene, chrysene, and ideno(1,2,3-cd)pyrene exceeded the Unrestricted Soil Cleanup Objectives in one sample.

- No PCBs were detected in any of the soil samples. Pesticides were detected in one sample but were below Unrestricted and Commercial Soil Cleanup Objectives.

- TAL metals were detected in all ten soil samples but only lead exceeded the Commercial SCO in one sample.

- VOCs were detected in three cesspool samples but were not above Part 375 Unrestricted or Commercial values. SVOCs in the cesspool samples had exceedances above the Commercial Soil Cleanup Objectives in three of the cesspool samples for Benzo(a)pyrene. All other SVOCs were below their Commercial Soil Cleanup Objectives. However, several SVOCs exceeded the Unrestricted Soil Cleanup Objective in 6 of the cesspool samples. No PCBs were detected in any of the twelve cesspool samples. Pesticides were detected in five of the cesspools but were below Unrestricted and Commercial values. TAL metals were detected in all twelve cesspools but only one cesspool sample at CP-8 had an exceedance above the Commercial Soil Cleanup Objective for Cadmium.

- Two groundwater samples had exceedances of the NYSDEC Part 703 Groundwater limits for 1,1,1-Trichloroethane and Trichloroethene. Other VOCs were detected but were below the groundwater limits. TAL Metals in the groundwater samples had exceedances above the NYSDEC Part 703 Groundwater limits in three samples for Aluminum and Iron, two samples for Lead and one sample for Chromium. All other TAL Metals were below the Groundwater limits. Three samples had exceedances above the NYSDEC Part 703 Groundwater limits for the Pesticide; Dieldrin. Other Pesticides were detected, but were below the groundwater limits.

No SVOCs were detected in any of the groundwater samples. No PCBs were detected in any of the groundwater samples.

- Two soil vapor samples had exceedances above the NYSDOH Soil Vapor Intrusion Guidance Table 3.1 Air Guideline Values for Tetrachloroethene. Three samples had exceedances for Trichloroethene. Other VOC's were detected but were below the limits.

October 2017 – BCP Interim Remedial Measure Work Plan – Leaching Pool and Drywell Closures (GZA)

In October 2017, GZA reviewed the available historic documents and identified the presence of former sanitary/industrial leaching pool systems and former dry well structures used for Site drainage. GZA prepared and submitted an Interim Remedial Measure Work Plan, dated October 10, 2017 (2017 IRM) to the New York State Department of Environmental Conservation (NYSDEC) to further investigate and remediate the Site in accordance with the NYCRR Part 375. GZA identified the following Areas of Concern (AOCs) at the Site based upon the location of the suspected leaching pools and drywells:

AOC 1A - Former Northeast Industrial Leaching Pool System

AOC 1A is located to the east of Building 2, in the northern portion of the Site. AOC 1A is comprised of leaching pools CP-1 through CP-6, and CP-X. This system received industrial waste discharges via underground piping from the plating/wash/cleaning room and the former plating building (Building B). Liquids were initially discharged to two leaching pools currently under Building 3 (Wastewater Treatment Building). Discharges were then routed to the northeast field.

Leaching pool CP-1 was sampled by ACT in 2002 and exhibited exceedances of chromium and nickel above SCCO. Nickel was also detected above NYSDEC CSCOs. CP-1 was sampled by Galli in 2016 and indicated SVOCs above both SCCOs and NYSDEC CSCOs. Leaching pools CP-2, CP-3 and CP-X were sampled by Galli in 2016 and indicated metals and SVOCs above both SCCOs and NYSDEC CSCOs. Leaching pools CP-4, CP-5 and

CP-6 were sampled by Galli in 2016 and did not exhibit any exceedances of applicable criteria, and therefore did not require remediation.

GZA remediated leaching pools CP-1, CP-2, CP-3 and CP-X. Post excavation samples were collected from each of the leaching pools. The post-excavation sample collected at CP-3 exhibited barium at a concentration (498 mg/kg) above the NYSDEC CSCO of 400 mg/kg, but below the SCCO of 820 mg/kg. The post-excavation sample collected at CP-X of the northeastern leaching pools exhibited silver at a concentration (11 mg/kg) above the SCCO of 10 mg/kg, but below the NYDEC CSCO of 1,500 mg/kg. The remaining post excavation samples indicated no exceedances of SCCOs or NYSDEC CSCOs.

AOC 1B - Former Southeastern Septic Leaching Field

AOC 1B consisted of four leaching pools (CP-1 through CP-4) that received sanitary wastewater from Building 1. All four leaching pools were reportedly primary leaching pools that received discharges directly from the former septic tank, which was also sampled by GZA (GZA-7) as part of AOC 1B investigation. GZA identified three additional leaching pools in AOC 1B (GZA-2, GZA-5 and CP-5) during investigation activities.

GZA unearthed and collected bottom samples from CP-1 through CP-5, GZA-2, GZA-5 and GZA-7. Leaching pools CP-1 through CP-5, GZA-4 and GZA-5 exhibited no exceedances of SCCOs or NYSDEC CSCOs, and therefore did not require remediation. Leaching pool GZA-2 exhibited exceedances of both NYSDEC CSCOs and SCCOs for metals and SVOCs. GZA-7 exhibited exceedances of methylene chloride and chromium above the SCCOs, however below the NYSDEC CSCOs.

GZA remediated leaching pools GZA-2 and GZA-7. Post excavation samples were collected from each of the leaching pools. The post excavation samples indicated no exceedances of SCCOs or NYSDEC CSCOs. CP-5 was mistakenly remediated by GZA, and the post-excavation sample also indicated no exceedances of SCCOs or NYSDEC CSCOs.

AOC 1C - Former Southwestern Sanitary Leaching Pools

Based on the 1948 survey provided in the ACT Phase II ESA, a total of 12 leaching pools were suspected to be present within AOC 1C. This system received sanitary and some noncontact cooling water from the former metal welding shop within Building 1. The historic reports indicate the system was abandoned prior to 1982, however documentation for the closure was not provided to GZA.

In 2001 ACT investigated in the areas of the previously closed leaching pools and collected five confirmatory samples (SD-02, SB-7, SB-12, SB-13 and SB-14) under the oversight of SCDHS. These confirmatory samples did not exhibit exceedances of SCCOs or NYSDEC CSCO. In addition, PES indicated that the remaining seven leaching pools were historically investigated and the soils from the suspected locations were screened. No odors or photoionization detector (PID) responses were noted.

Investigation sample GZA-8 was collected at a former concrete-lined septic tank. GZA collected an investigation sample from the soils within the tank, which exhibited exceedances of benzene (0.1 mg/kg), benzo(b)fluoranthene (1.9 mg/kg), chrysene (1.2 mg/kg), arsenic (6.72 mg/kg), and chromium (37 mg/kg) above SCCOs but not above NYSDEC CSCOs. During remediation, GZA removed the contents within the concrete-lined septic tank and added the contents to the contaminated soil pile. Contaminated soils were subsequently disposed of off-site. An endpoint sample was not collected as the concrete structure was not removed and was observed to be intact.

Investigation samples CP-8 and CP-9 were collected at a previously abandoned septic tank, in the southern portion of the Site. The abandoned septic tank included 2 man-holes, corresponding with samples CP-8 and CP-9. These locations were sampled during the Galli Phase II ESA, with CP-8 exhibiting exceedances of benzo(b)fluoranthene (8,060 mg/kg) and cadmium (24.4 mg/kg) above SCCOs and NYSDEC CSCOs. CP-9 did not exhibit exceedances of SCCOs or NYSDEC CSCOs. GZA uncovered these manholes during the 2017 investigation and observed the concrete-lined septic tank to be filled with sand. During remediation, GZA removed the contents within the septic tank and added the contents to the contaminated soil pile. Contaminated soils were subsequently disposed of

off-site. An endpoint sample was not collected from these locations as the concrete structure was not removed and was observed to be intact.

GZA attempted to locate the remaining seven leaching pools during the 2017 IRM activities using test pit excavations.

AOC 1E – Western Leaching Pool System

Three drywells were identified under the transformer yard to the west of Building 1 on the former Site plans of the 2001 ACT Phase II ESA report, which may have received industrial discharge. A letter from SCHD to BH Aircraft, dated August 19, 2002 references three leaching pools/drywells on the west side of the main building, in the vicinity of the transformers that were required to be accessed and sampled.

As part of the 2017 IRM activities GZA unearthed four drywells (DW-1 through DW-4) instead of three drywells, which were investigated and remediated. GZA also unearthed a fifth drywell in the same vicinity during 2017 IRM activities, which was identified as AOC 3. All of the drywells in AOC 1E exhibited exceedances of SVOCs and metals in the pre-excavation samples. GZA remediated the drywells DW-1 through DW-4, and DW-5 (AOC-3). Post excavation samples were collected from each of the leaching pools. The post excavation samples collected at AOC-3 and DW-1 exhibited concentrations of arsenic (15.5 and 6.4 mg/kg, respectively) above the SCCO of 6 mg/kg, but below the NYSDEC CSCO of 16 mg/kg. The remaining post excavation samples indicated no exceedances of SCCOs or NYSDEC CSCOs.

AOC 1G – Northern Leaching Pools

Based on a 1948 survey two suspected leaching pools between Buildings 1 and 2 were identified. In addition, one leaching pool between the former Building 2 and Building 3 (CP-10) was identified. A letter from SCHD to BH Aircraft, dated August 19, 2002 asked to further investigate these two suspected leaching pools.

Prior to 2017 IRM activities, no investigation had been performed on the two leaching pools between Buildings 1 and 2, and it is unknown what was discharged to these pools. According to the 2001 ACT Phase II ESA, these leaching pools were designated as temporary and were slated for abandonment in 2001. GZA was not provided any documentation related to the abandonment of these leaching pools. GZA attempted to locate these leaching pools during the 2017 IRM activities using test pit excavations. However, no evidence of leaching pools were observed at these locations.

The drywell corresponding with CP-10 was investigated by Galli during the 2016 Phase II ESA, and exhibited exceedances of SVOCs above both the SCCOs and the NYSDEC CSCOs, and chromium above SCCOs. GZA remediated drywell CP-10 and collected a post-excavation sample and the results indicated no exceedances of SCCOs or NYSDEC CSCOs.

Investigation sample GZA-1 was collected at a suspected drywell along the northern portion of the Site, adjacent to wastewater treatment building. During GZA's investigation, this structure was observed to be filled with sand. Based on this observation, it was assumed that this structure was previously closed, therefore sample GZA-1 was not analyzed by the laboratory.

Investigation sample GZA-6 was collected in the central portion of the Site, in the vicinity of AOC 1G, at a man-hole location. This location was determined to be a cleanout for the abandoned sewer line associated with septic tank CP-8 and CP-9. GZA observed this line to be filled with sand. Based on this observation, it was assumed the structure was previously closed, therefore sample GZA-6 was not analyzed by the laboratory.

AOC 2 - Eastern Storm water drywells

AOC 2 consisted of four grated structures suspected to be storm water dry wells. Sampling of these structures indicates the presence of metals and SVOCs above both SCCOs and NYSDEC CSCOs. These grated structures were identified in the 2001 PES Phase II ESA as East Storm Drain, West Storm Drain (CP-7) and their associated overflows (later numbered as GZA-3 and GZA-4, respectively).

During the 2017 investigation GZA collected confirmatory samples from the East Storm Drain, West Storm Drain (CP-7), East Storm Drain Overflow discharge (GZA-3) and West Storm Drain Overflow (GZA-4) because historic exceedances were observed and it was believed that no remediation had occurred at these locations. However, according to a letter from the SCHD to Baumann & Sons Buses, Inc., dated May 2, 2003, the SCHD verified the removal of the contaminated materials and collection of endpoint samples from these four locations. Based on the laboratory data, the SCHD confirmed that no elevated levels were detected in post-excavation samples, and that no further work was required at these storm water dry wells. Samples collected by GZA in 2017 were analyzed, and no exceedances of SCCOs or NYSDEC CSCOs were reported.

During the investigation, the existing pavement and buildings were removed, and the upper foot of soil was removed exposing all historic leaching pools. All of the leaching pools and drywells ranged in depth from 8 to 13 feet below ground surface (bgs) with approximately ten-foot diameters. All pools and tanks were dry and partially filled with sand. GZA excavated these pools, collected end point samples, and closed the pools under SCDOH's oversight.

August 2018 – BCP Remedial Investigation Report/Remedial Action Work Plan (GZA)

GZA prepared a Remedial Investigation Report (RIR) based upon the investigation GZA performed in November of 2017. The RIR investigation consisted of 19 soil gas samples, 18 soil borings, and 18 temporary well points. The RIR also included a sub-slab/indoor air vapor study in Building 2, which is to remain on-Site during redevelopment.

Soil Investigation

Soil testing was completed during the RI at the Site based on historic AOCs, data from previous investigations, and to confirm Site conditions after implementation of prior interim remedial measures. Acetone was detected in multiple soil samples, however, it was considered to be a laboratory contaminant. Tetrachloroethylene (PCE), trichloroethene (TCE), 1,1,1-trichloroethane and toluene was detected in a soil sample collected at 21.5 to 22 ft. bgs from the location of the spray paint booth (Building E) at

concentrations 2.4, 130, 13 and 1 mg/kg, exceeding the Protection of Groundwater Soil Cleanup Objectives (SCO) of 1.3, 0.47, 0.68 and 0.7 mg/kg, respectively. TCE exceeds the Protection of Groundwater SCO by an order of magnitude, however, it is found at deeper depth intervals and the Site is capped to prevent any migration of contaminants into groundwater. No other exceedances of contaminants were identified at any soil sample locations during the RI.

Groundwater Investigation

All groundwater samples collected during the RI were collected at 25 feet bgs. Total metals above the Ambient Water Quality Standards (AWQS) were detected during the RI in many of the temporary well groundwater samples. More specifically; chromium, iron, manganese and sodium were all found exceeding AWQS in groundwater samples. Iron, manganese and sodium are known to be naturally occurring background metals, and their concentrations are most likely attributed to the natural occurring metals and turbidity of the groundwater samples. Trivalent chromium was detected on the eastern portion of the Site in the vicinity of the former leaching pools and UST locations at a maximum concentration of 94.85 µg/L, exceeding its AWQS of 50 µg/L.

Pesticides, including endrin, dieldrin and chlordane were detected at the Site and estimated by the laboratory to be above their respective AWQS. The maximum concentration of a pesticide was 0.223 µg/L, these contaminants are considered to be a lab artifact or originating from an upgradient source as they are found at sample locations at the most upgradient locations of the Site. These pesticides are also difficult to accurately measure at or below the concentration of the AWQS, due to laboratory limitations. TCE was detected in two temporary wells in the southwestern corner of the Site in the vicinity of the former spray paint shop, consistent with the soil exceedances for TCE. TCE was only detected in those two temporary southwestern wells at concentrations of 6.8 and 11 µg/L, slightly exceeding the AWQS of 5 µg/L. 1,1,1-trichloroethane was also detected in one of the southwestern wells at a concentration of 9.2 µg/L, slightly exceeding its AWQS of 5 µg/L.

VOCs were detected in the southwestern corner of the Site at concentrations slightly exceeding AWQS. TCE was detected at concentrations of 6.8 and 11 µg/L at

GZA-3 and GZA-4, respectively, exceeding the AWQS of 5 µg/L. 1,1,1-Trichloroethane was also detected in GZA-4 at a concentration of 9.2 µg/L, exceeding the AWQS of 5 µg/L.

SVOCs were also detected across the Site at estimated concentrations slightly exceeding AWQS. More specifically; benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene and benzo(k)fluoranthene were detected in multiple temporary groundwater well locations, at maximum concentrations of 0.03, 0.03, 0.08 and 0.2 µg/L, respectively. The exceedances of SVOCs may have also been due to high turbidity of the groundwater samples, or difficulty analyzing these compounds at such low concentrations, but will be confirmed during groundwater monitoring as part of the SMP.

Poly and Per-Flouro Alkyl Compounds (PFAS) were detected in the groundwater samples analyzed for these compounds (GZA-1, GZA-3, GZA-18) at concentrations ranging from 2.2 ng/L to 40.2 ng/L. There is no AWQS for PFAS in New York. The United States Environmental Protection Agency (USEPA) has established health advisories of 70 part per trillion (ppt) for summed concentrations of PFOA and PFOS. There were no exceedances of this health advisory criteria in the groundwater data.

Soil Gas and Sub-Slab Soil Vapor Investigation

Soil gas testing was completed during the RI at the Site locations based on suspected former source areas, and data from previous investigations. This should not be confused with sub-slab soil vapor testing that was completed for Building #2. Twelve soil gas points were collected in a grid in the southwestern corner of the Site. All of the soil vapor points in the grid were found to have exceedances of New York State Department of Health (NYSDOH), Air Guidance Values (AGVs) for methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, TCE, PCE, or a combination of multiple compounds. Maximum concentrations were found in the sample located directly under the former spray paint shop (Building E), with concentrations of 64,000 and 4,750 µg/m3 of TCE and PCE, respectively. The maximum concentration locations of PCE and TCE in soil vapor are consistent with both the maximum soil and groundwater concentrations of PCE and TCE. These concentrations prompted a supplemental soil gas investigation, recommended by the NYSDEC to assess offsite migration of the soil gas. Offsite soil gas samples (3) exhibited maximum TCE and PCE concentrations of 2,030 and 698 µg/m3, respectively.

Concentrations of PCE and TCE generally decrease with increasing distance from the former spray both booth in any direction. Four soil gas samples were collected on the eastern portion of the Site in the vicinity of Building #2. These samples exhibited exceedances of the NYSDOH AGVs for just TCE, at a maximum concentration of 74.7 µg/m3. These values prompted the NYSDEC to require sub-slab soil vapor testing on Building #2, due to its proposed use following redevelopment.

Sub-slab soil vapor testing consisted of three sub-slab samples within Building #2, three co-located indoor air samples and one ambient air sample. SS-02 was the only sub-slab sample to exhibit a detectable concentration of Trichloroethene (4.37 $\mu g/m^3$). Tetrachloroethene was detected in SS-02 and SS-03 at concentrations of 1.64 and 1.83 $\mu g/m^3$, respectively. 1,1,1-Trichloroethane was observed in all 3 sub-slab samples, at concentrations ranging from 2.38 to 73.1 $\mu g/m^3$. Carbon Tetrachloride was only detectable in SS-01, at a concentration of 7.61 $\mu g/m^3$. The results were compared in conjunction with the indoor air results against the NYSDOH Vapor Intrusion Decision Matrices A, B, and C. Based on the NYSDOH soil vapor/indoor air decision matrices and guidance for TCE, "no further action" was suggested for Building #2. Based on the NYSDOH soil vapor/indoor air decision matrices and guidance for carbon tetrachloride, "monitoring" was suggested for Building #2. However, carbon tetrachloride was also detected in the ambient air sample. Therefore, GZA concluded that a vapor intrusion condition does not exist in Building #2.

2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed in the Decision Document dated August 16, 2019 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.
- Prevent the discharge of contaminants to surface water.
- Remove the source of ground or surface water contamination.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.
- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

Soil Vapor

RAOs for Public Health Protection

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

2.5 Remaining Contamination

This section provides a summary of contamination remaining at the Site following the remedial action and redevelopment. This information is presented for informational

purposes should future excavations or development be performed at the Site and the disclosed environmental conditions encountered. Please note that temporal changes in concentrations and distributions of contaminants can occur; the party should verify existing and current Site conditions prior to performing any work that disturbs the Site remedial cap.

2.5.1 Soil

Lead exceeded the Commercial Use SCO of 1,000 mg/kg at a concentration of 1,452 mg/kg at boring PES-9 (0 to 4 feet bgs) in the location of a former floor drain in the former wastewater treatment building. Arsenic exceeded the Commercial Use SCO of 16 mg/kg at a concentration of 31.5 mg/kg at boring PES-6 (8 to 10 feet bgs) in the vicinity of a former "Zyglo concrete sump tank" that was previously removed. Barium, lead and copper exceeded their respective Commercial Use SCOs of 400, 1,000 and 270 mg/kg at SB-6, immediately to the west of Building 2. Benzo(a)pyrene exceeded the Commercial Use SCO of 1 mg/kg at SB-7, located in the southwestern corner of the Site.

Barium exceeded the Commercial Use SCO of 400 mg/kg at a concentration of 648 mg/kg at boring SB-5 immediately downgradient of a former on-Site UST. Benzo(a)fluoranthene and copper exceeded their respective Commercial Use SCOs of 5.6 mg/kg and 270 mg/kg at boring CP-12 in the location of a leaching pool in the northwest corner of the Site. The post-excavation sample collected at CP-3 exhibited barium at a concentration (498 mg/kg) above the Commercial Use SCO of 400 mg/kg.

Figure 4 summarizes the results of all soil samples collected that exceed the Unrestricted Use SCOs and the Commercial Use SCOs at the site after completion of remedial action.

2.5.2 Groundwater

Total metals above the Ambient Water Quality Standards (AWQS) were detected during the remedial investigation in many of the temporary well groundwater samples. More specifically: chromium, iron, manganese and sodium were all found exceeding AWQS in groundwater samples. Iron, manganese and sodium are known to be naturally

occurring background metals, and their concentrations are most likely attributed to the turbidity of the groundwater samples. Chromium was detected on the eastern portion of the Site in the vicinity of the former leaching pools and UST locations at a maximum concentration of 94.85 µg/L. Pesticides, including endrin, dieldrin and chlordane were detected at the Site and estimated by the laboratory to be above their respective AWQS. The maximum concentration of a pesticide was 0.223 µg/L. TCE was detected in the southwestern corner of the Site in the vicinity of the former spray paint shop, consistent with the soil exceedances for TCE. TCE was only detected in the southwestern temporary wells at concentrations of 6.8 and 11 µg/L. 1,1,1-trichloroethane was also detected in one of the southwestern wells at a concentration of 9.2 µg/L. SVOCs were also detected across the Site at estimated concentrations slightly exceeding AWQS. More specifically; benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene and benzo(k)fluoranthene were detected in multiple temporary groundwater wells, at maximum concentrations of 0.03, 0.03, 0.08 and 0.2 µg/L, respectively.

While there are some slight groundwater exceedances remaining, based on the planned future Commercial use of the Site and the lack of off-site impacts, monitored natural attenuation is the appropriate final remedy for groundwater. Groundwater will be monitored annually to evaluate if the residual groundwater contamination levels degrade over time.

Figure 5 summarize the results of all samples of groundwater that exceed the SCGs after completion of the remedial action.

2.5.3 Soil Vapor, Sub-Slab and Indoor Air

Soil gas sampling locations in the southwest corner of the Site, over the former location of Building E (Spray Paint shop), V-3, V-6 and V-12, exhibited the highest VOC concentrations; 96,165, 15,855 and 13,798 µg/m^3 of Total VOCs, respectively. Trichloroethene, Tetrachloroethene, 1,1,1-Trichloroethane and Carbon Tetrachloride were the 4 VOCs that were detected across the Site in the soil vapor. All 19 soil gas samples exhibited concentrations of Trichloroethene, ranging from 2.69 to 64,000 µg/m^3. Tetrachloroethene was detected in 14 of the 19 soil gas samples at concentrations ranging

from 35.7 to 1,630 μg/m^3. 1,1,1-Trichloroethane was also detected in 14 of 19 soil gas samples, at concentrations ranging from 119 to 25,700 μg/m^3. Carbon Tetrachloride was observed in 10 of the 19 soil vapor samples, at a range of concentrations from 9.25 to 1,840 μg/m^3. The sub-slab soil vapor concentrations detected during the RI will be left in place following the completion of the remedial action but are being addressed as a result of a ventilation system in the building described in further detail below.

The soil gas concentrations detected during the RI will be addressed as a result of a soil vapor extraction system in the southwestern corner of the site, as described in further detail below.

Sub-slab and indoor air testing consisted of three sub-slab samples within Building #2, three co-located indoor air samples and one ambient air sample. The sub-slab soil vapor concentrations detected during the RI will be left in place following the completion of the remedial action but are being addressed as a result of a ventilation system in the building described in further detail below.

Figures 6 and 7 summarize the results of all samples of soil vapor that exceed the applicable guidance criteria. All soil vapor was compared against the NYSDOH Decision Matrix (Updated May 2017) minimum values for the respective compounds. All indoor air was compared against NYSDOH air guideline values (Updated February 2015). All soil vapor/indoor air data was collected prior to completion of the remedial action.

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

Since remaining contamination exists in groundwater, soil and soil vapor 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.

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 F) 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.

3.2 Institutional Controls

A series of ICs is required by the Decision Document and RAWP 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 commercial and industrial 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. The IC boundaries are shown on **Figure 3**. These ICs are:

- The property may be used for : commercial and industrial uses;
- 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 Suffolk County 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 noted on Figure 3, 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 Cover System

Exposure to remaining contamination at the site is prevented by a cover system placed over the site. This cover system is comprised of a minimum of six inches of dense grade aggregate (DGA), overlaid by three inches of binder asphalt, overlaid by approximately three inches of asphalt. The remaining building onsite (Building #2) consists of an unknown thickness of DGA (estimated to be between 6 and 12-inches) and a six-inch concrete slab, which serves as the cap in the building footprint area. The landscaped islands located to the north and south side of the site consists of a minimum of 12-inches of imported topsoil. **Figure 3 and Figure 10** presents the location of the cover system. The Excavation Work Plan (EWP) provided in **Appendix F** outlines the procedures required to be implemented in the event the cover system is breached, penetrated or temporarily removed, and any underlying remaining contamination is disturbed. Procedures for the inspection of this cover are provided in the Monitoring and Sampling Plan included in Section 4.0 of this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) and associated Community Air Monitoring Plan (CAMP) prepared for the site and provided in **Appendix G** and **Appendix H**, respectively.

3.3.2 Soil Vapor Extraction System

Exposure to remaining contamination in the site soil vapor is prevented by a soil vapor extraction (SVE) system, installed in the southwest corner of the site. The SVE process enhances the volatilization of VOCs in the unsaturated zone and actively removes contaminated soil vapors from the subsurface. The vapors are captured through the SVE system and delivered to the surface for treatment using granular activated carbon (GAC).

The remedial objective of the SVE system is to prevent off-site migration by treating contaminated soil vapors in the southwestern corner of the site and reducing the contaminant mass in the soil vapor to asymptotic levels. Elevated trichloroethylene (TCE),

tetrachloroethylene (PCE) and carbon tetrachloride soil vapor concentrations were identified during the remedial investigation in an approximately 3,300 square foot area of the site. The SVE system was designed to treat a larger area of approximately 10,000 square feet, to address the VOCs in the soil vapors that have migrated off-site and limit further migration.

An SVE pilot test was conducted to assess the feasibility of SVE to treat the contaminated soil vapors at the site. Data from the pilot test was used to obtain design information for a the full-scale SVE system. The pertinent estimated design parameters included:

- Radius of influence (ROI) for the extraction wells;
- Locations of additional extraction wells;
- Optimal soil vapor flow rate;
- Optimal applied vacuum; and
- Contaminant loading rates.

Based upon the iterations summarized above, the design parameters were calculated. The ROI was estimated using a cut-off value of 0.1 inches water (IW). The ROI was estimated at 45 ft., which was adjusted down to 34 ft. after applying a 25% safety factor. This ROI was used to develop the well spacing and to determine the minimum number of wells required to cover the defined treatment area.

The optimal flow rate and vacuum were estimated, as described above, and are governed by the Site subsurface conditions and the air permeability of the soil. The anticipated optimal vacuum and flow settings for a vertical SVE well were estimated to be 28 IW and 45 cubic feet per minute (cfm), respectively. The applied vacuum is measured at the extraction point and does not account for friction losses in pipelines.

The contaminant loading rate was estimated using air samples collected during the pilot test. A factor of safety of 20% was applied to provide an adequate vapor control.

Figure 8 portrays the approximate layout of the full-scale SVE system. The SVE system is comprised of five vapor extraction wells installed to approximately 18 feet bgs to capture VOCs from the designated treatment zone. In addition, the SVE system includes five vapor monitoring points to monitor induced vacuum and local vapor concentrations. Construction details (typical detail) for the vapor extraction and vapor monitoring points are shown in **Figure 9**.

The SVE wells are connected to the blower with 4-inch diameter, schedule 40 PVC piping. The piping is divided into two manifold legs connecting three SVE wells (SVE-1 through SVE-3) on Header-1 and two SVE wells (SVE-4 and SVE-5) on Header-2. The header piping runs below grade, inside constructed trenches, except at SVE-5, where the header pipe is above grade. The final connections to the blower are 3-inch diameter, schedule 40 PVC piping and fittings. The header lines are pitched towards the SVE wells to drain condensate back into the wells.

The blower is housed within an enclosed mobile trailer unit, also located in the southwestern corner of the site. The trailer unit houses the following SVE system components:

A. A multi-leg SVE manifold equipped with airflow meters, vacuum gauges, and quick open gate valves;
B. A vapor liquid separator (VLS) tank with a capacity of 50 gallons, equipped with a high level alarm and drain port to drain the liquid;
C. A blower with a capacity of 250 cfm at 30 inches of water (IW), equipped with a pressure relief valve and inline filters;
D. The exhaust from the blower equipped with a silencer to dampen the noise levels from the exiting vapors;
E. Flow meters and vacuum gauges;
F. Three 150-lbs. vapor phase granular activated carbon (GAC) vessels with the discharge point 10 feet above grade; and
G. Influent, mid-treatment and effluent sample ports.

The system was commissioned on June 5, 2019. The commissioning event involved system and extraction well adjustments in order to establish optimal operating conditions, which were determined during the pilot test.

Procedures for operating and maintaining the soil vapor extraction system are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As built drawings, signed and sealed by a professional engineer will be included in the Final Engineering Report.**Figure 10** shows the location of the ECs for the site.

3.3.3 Ventilation System

Exposure to remaining contamination in the site soil vapor beneath Building 2 is prevented by a mechanic shop ventilation system. Sampling during the remedial investigation identified low VOC concentrations beneath the slab at Building 2. Based on the current use (mechanic shop), there are local requirements for air exchange rates within the building. A ventilation system was installed within Building 2, in accordance with the International Mechanical Code, Table 403.3.1.1.

Procedures for operating and maintaining the ventilation system are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As built drawings, signed and sealed by a professional engineer will be included in the Final Engineering Report.. **Figure 10** shows the location of the ECs for the site.

3.3.4 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.

3.3.4.1 – Cover System

The composite cover system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in accordance with this SMP in perpetuity.

3.3.4.2 – Soil Vapor Extraction System

The SVE system will not be discontinued unless prior written approval is granted by the NYSDEC. In the event that monitoring data indicates that the SVE system may no longer be required, a proposal to discontinue the system will be submitted by the remedial party. Conditions that may warrant discontinuing the SVE system include contaminant concentrations of soil gas that: (1) have become asymptotic to a low level over an extended period of time, as accepted by the NYSDEC; or (2) the NYSDEC has determined that the SVE system has reached the limit of its effectiveness. This assessment will be based in part on post-remediation contaminant levels in soil vapor collected from the SVE system influent. Systems will remain in place and operational until permission to discontinue their use is granted in writing by the NYSDEC.

3.3.4.3 - Ventilation System

The ventilation system is a permanent control and will not be discontinued unless prior written approval is granted by the NYSDEC and the NYSDOH.

3.3.4.4 - Monitoring Wells associated with Monitored Natural Attenuation

Groundwater monitoring activities to assess natural attenuation will continue, as determined by the NYSDEC with consultation with NYSDOH, until residual groundwater concentrations are found to be consistently below ambient water quality standards, the site SCGs, or have become asymptotic at an acceptable level over an extended period. It is anticipated that contamination will decrease by an order of magnitude in a reasonable period of time (2 years). In the event that monitoring data indicates that monitoring for natural attenuation may no longer be required, a proposal to discontinue the system will be

submitted by the remedial party. Monitoring will continue until permission to discontinue is granted in writing by the NYSDEC. If groundwater contaminant levels become asymptotic at a level that is not acceptable to the NYSDEC, additional 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. 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 J**.

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 AWQS groundwater standards; 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 7.0 of this SMP.

4.2 Site – wide Inspection

Site-wide inspections will be performed once per year. Modification to the frequency or duration of the inspections will require approval from the NYSDEC. 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 K** – 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;
- 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; and

Reporting requirements are outlined in **Section 7.0** 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 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 determined by the NYSDEC. Written confirmation must be provided to the NYSDEC 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.

4.3 Treatment System Monitoring and Sampling

4.3.1 Remedial System Monitoring

Monitoring of the cover system will be performed on a routine basis, as identified in **Table 2** - Remedial System Monitoring Requirements and Schedule (see below). Modification to the frequency or sampling requirements will require approval from the NYSDEC. 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 cap has been reported or an emergency occurs that is deemed likely to affect the operation of the system. Cap components to be monitored include, but are not limited to, the components included in **Table 2** below.

Monitoring of the SVE system will be performed on a routine basis, as identified in **Table 2** - Remedial System Monitoring Requirements and Schedule (see below). Modification to the frequency or sampling requirements will require approval from the NYSDEC. 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 system has been reported or an emergency occurs that is deemed likely to affect the operation of the system. SVE system components to be monitored include, but are not limited to, the components included in **Table 2** below.

Table 2 – Remedial System Monitoring Requirements and Schedule

Remedial System Component	Monitoring Parameter	Operating Range	Monitoring Schedule
Cap			
Asphalt. Concrete, Landscaped Areas	Visible cracks, visible subsurface soil	Not Applicable	Annually
SVE System			
Header 1 (SVE-1 through SVE-3)	Vacuum, Flow	7 – 9 IW, 135-150 CFM, (Respectively)	Quarterly
Header 2 (SVE-4 and SVE-5)	Vacuum, Flow	9 – 11 IW, 75-90 CFM, (Respectively)	Quarterly
Granular Activated Carbon (GAC) – 1	Pressure	Not to exceed 10 psig	Quarterly
Drum 2 GAC	Pressure	Not to exceed 10 psi	Quarterly
Drum 3 GAC	Pressure	Not to exceed 10 psi	Quarterly
Stack	Pressure	Not to exceed 220 psi	Quarterly
VP-1 through VP-5	Vacuum	>0.1 IW	Quarterly

A complete list of components to be inspected is provided in the Inspection Checklist, provided in **Appendix K** - Site Management Forms. Additionally, tables for SVE system readings can be found in the Operations and Maintenance Manual (**Appendix I**) 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 System on a routine basis. Sampling locations, required analytical parameters and schedule are provided in **Table 3** – Remedial System Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

Table 3 – Remedial System Sampling Requirements and Schedule

Sampling Location	**Analytical Parameters**		**Schedule**
	VOC (EPA Method TO-15)	Photoionization Detector (PID)	
Combined SVE System Influent	X	X	Quarterly
Stack (Before discharging and after treatment with three carbon vessels connected in series)	X	X	Quarterly
Header 1 and Header 2		X	Quarterly
Individual SVE Wells (SVE-1 through SVE-5)		X	Quarterly

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

4.4 Post-Remediation Media Monitoring and Sampling

Samples shall be collected from the MNA groundwater monitoring wells on a routine basis as part of the Remedial Action. Sampling locations, required analytical parameters and schedule are provided in **Table 4** – Remedial System Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

Table 4 – Post Remediation Sampling Requirements and Schedule

Sampling Location	**Analytical Parameters**		**Schedule**
	VOCs (EPA Method 624)	PFAS (Modified EPA Method 537)	
MNA Monitoring Wells #1-6	X		Annually
MNA Monitoring Wells # 1 & 5		X	Annually

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

4.4.1 Groundwater Sampling

Groundwater monitoring will be performed annually to assess the performance of Monitored Natural Attenuation (MNA) of the remaining groundwater contaminant concentrations. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

The network of monitoring wells has been installed to monitor upgradient, on-site and downgradient groundwater conditions at the site. The network of on-site wells has been designed to evaluate groundwater conditions at the most upgradient locations of the site to identify potential regional contaminants that are migrating onto the site. The network will also evaluate locations downgradient of suspected source areas and areas of exceedances found during the RI in October of 2017. Locations of permanent monitoring well locations can be found in **Figure 10.**

As discussed in Section 2.3, the combined concentrations of PFOA and PFOS were not detected during the RI at concentrations above the current Environmental Protection Agency (EPA) Health Advisory Level of 70 parts per trillion (ppt) (October 2017). However, due to an expected change in the Health Advisory Level (to below 70 ppt for combined concentration of PFOA and PFOS), the NYSDEC has required that PFAS be monitored as part of the SMP. As specified in **Table 4**, one upgradient well (MW-1) and one downgradient well (MW-5) will be sampled on an annual basis for the full PFAS analyte list.

The PFAS results will be evaluated and compared to the latest standard(s) in the annual Periodic Review Report (See **Section 7.2**). Once the new PFAS standard has been implemented, the next PFAS sampling results will be compared to the standard. If the results indicate that PFAS levels are below the newly established standard, a proposal to discontinue PFAS sampling will be submitted to the NYSDEC and NYSDOH as part of the annual Period Review Report. Sampling for PFAS will not be discontinued unless prior approval is granted by the NYSDEC.

Table 5 summarizes the wells identification number, as well as the purpose, location, depths, diameter and screened intervals of the wells. As part of the groundwater monitoring, two upgradient wells and four downgradient wells are sampled to evaluate the effectiveness of monitored natural attenuation. **Table 4** summarizes proposed analytical parameters for sampling events.

Table 5 – Monitoring Well Construction Details

Monitoring Well ID	Well Location	Coordinates (longitude/ latitude)	Well Diameter (inches)	Elevation (feet above mean sea level)			
				Casing	Surface	Screen Top	Screen Bottom
MW-1	Upgradient	W 73°26’05.95”	2	75.85	76.26	70.85	55.85

		/N 40°44’13.78”					
MW-2	Downgradient	W 73°26’05.42” /N 40°44’12.02”	2	75.83	76.06	55.83	40.83
MW-3	Downgradient	W 73°26’04.40” /N 40°44’12.28”	2	73.31	75.74	58.31	43.31
MW-4	Downgradient	W 73°26’02.00” /N 40°44’12.78”	2	74.33	74.84	59.33	44.33
MW-5	Downgradient	W 73°25’58.84” /N 40°44’13.50”	2	72.42	72.76	57.42	42.42
MW-6	Upgradient	W 73°25’59.67” /N 40°44’15.30”	2	75.14	75.67	60.14	45.14

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

Groundwater samples will be collected using low flow sampling techniques from the permanent monitoring wells. Prior to sampling each monitoring well, the headspace will be measured using a PID, the water level will be measured using an electronic water level meter and the well will be purged utilizing a low-flow submersible stainless steel pump with dedicated Teflon® or Teflon®-lined polyethylene tubing connected to a transparent flow cell. Groundwater from each well will be purged using low pumping rates (between 100 and 500 m//min) so as to limit drawdown of the water level. Wells

will be purged until turbidity, pH, temperature, dissolved oxygen and specific conductivity stabilize. Field measurements, taken from the flow cell, will be recorded in the field logbook during and after purging, and before sampling. Purging will be performed with the pump intake placed at about five feet above the bottom of the well screen to ensure that stagnant water in the well is removed, while not stirring up sediment that may have accumulated on the bottom of the well. Purge volumes will be monitored and recorded in the Groundwater Sampling Forms in **Appendix J.**

If biofouling or silt accumulation occurs in the on-site and/or off-site monitoring wells, the wells 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 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. Well abandonment will be performed in accordance with NYSDEC's guidance entitled "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.

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

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

4.4.2 Monitoring and Sampling Protocol

All sampling activities will be recorded in a field book and associated sampling log as provided in **Appendix K** - Site Management Forms. Other observations (e.g., groundwater monitoring well integrity, etc.) 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 Activities 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 system;
- Will be updated periodically to reflect changes in site conditions or the manner in which the SVE system is operated and maintained.

Further detail regarding the Operation and Maintenance of the SVE system is provided in **Appendix I** - 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 minimum operating requirements of the SVE system are provided in **Table 6.** The minimum operating requirements were based on the results of the pilot test. An effective

radius of influence (ROI) of approximately 45 feet was estimated at an applied vacuum of 28 inches of water (IW) and a flow rate of 45 cubic feet per minute (cfm) for each extraction point. However, for design purposes the ROI was reduced to 34-feet by applying a 25% safety factor.

Table 6 – SVE System Minimum Operating Requirements

SVE System Component	Parameter	Minimum Operating Requirement(s)
Extraction Well	Flow Rate	45 CFM
Blower	Minimum Flow Rate Capacity	250 CFM
Blower	Minimum Pressure	30 IW
Carbon Treatment for Vapors	Removal Rate	99% removal at the stack
Vapor Monitoring Points	Induced Vacuum	0.1 IW

Three 200-lb GAC vessels are used for vapor treatment. Using the soil vapor concentration obtained during the pilot test, a 20% factor of safety, and the proposed flow rate, the anticipated contaminant loading rate during the proposed operation mode is approximately 0.00281 lbs/hour. If the system runs continuously (365 days / 24-hour days/ year), the anticipated total VOCs annual removal rate will be approximately 25 lbs. Considering a rule-of-thumb for GAC adsorption rate of 1:10 (1 lb contaminant to 10 lbs GAC), the annual GAC consumption rate is estimated at approximately 250 lbs. Using three 200 lb. vessels in series, the system would require one to two complete GAC change-out events per year. GAC vessels shall be operated in a lead/lag configuration. Carbon in the lead vessel will be changed out when sampling indicates breakthrough in the second GAC vessel or saturation of the lead GAC unit (outlet PID reading within 10% of inlet

reading). The spent carbon will be profiled and shipped off-Site for disposal or regeneration.

The effluent samples collected during the pilot test study were evaluated for its toxicity and impacts on the receptors downwind using a dispersion model (AERSCREEN). These concentrations were compared with Short-term Guideline Concentrations (SGCs) and Average-Annual Guidance Criteria (AGCs). The effluent analytical results did not exceed the concentration values for contaminants of concern listed within the SGC and AGC tables. Thus, an air permit is not required for the SVE system effluent after treating with GAC.

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 I** - Operations and Maintenance Manual.

5.3.1 System Restart-Up and Testing

Before restarting the system, complete **Table 1** of the Operations and Maintenance Manual (**Appendix I**): SVE System Startup Checklist and Commissioning Plan. The following procedures should be followed when starting up the system:

1. Connect the GAC vessels to the blower, all the SVE wells to the header line
2. Open the valves at the SVE wells and header lines.
3. Set the SVE blower HOA switch to AUTO and allow the flow to stabilize for 15 minutes. Note: The SVE blower switch can also be set to HAND. HAND should only be used while troubleshooting and while an operator is present. The system running in HAND mode will not shut down due to high temperature alarms.
4. If water is suspected to be in header lines, it can be removed by closing off flow to the other header legs using the gate valves on the header legs inside the system enclosure. Increasing vacuum to the leg containing water will pull the water through the header leg into the system to be collected by the Vapor Liquid

Separator (VLS). Remove water from one header leg at a time, and return valves to their normal position when complete.

This system testing protocol was performed when the system was installed. The system testing described above will be conducted if, in the course of the SVE 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 SVE system essentially includes these three primary components; SVE blower, VLS and the GAC units, which will require routine maintenance.

Blower will be maintained as per owner's manual. SVE blowers create excessive noise when in operation. When either blower is operating, all personnel must wear hearing protection at all times when inside the system trailer.

The VLS connected in series will separate moisture from the air stream before entering the GAC vessels. The liquid collected from the system operations will be passed through a liquid granular activated carbon vessel to treat for potential VOC contamination. Upon treating the liquid stream, it will be discharged on-site.

GAC vessels will be operated in a lead/lag configuration. Carbon in the lead vessel will be changed out when sampling indicates breakthrough in the second GAC vessel or saturation of the lead GAC unit (outlet PID reading within 10% of inlet reading). The order of the vessels will be rearranged by reconfiguring the hose connections to put the middle vessel in the lead and the lag in the middle position. The carbon in the spent vessel will be removed and new or regenerated carbon will be replaced into the empty unit. The newly filled vessel will be connected in the lag position.

During each monitoring event, the system monitoring components (pressures and vacuum gauges) will be checked to ensure they continue to function properly and accurately. The condition of the SVE system components will be checked quarterly for any damage, rusting, degradation, missing parts and/or signs of malfunctions. Condition of SVE

connections, valves, manifold legs; GAC plumbing, flow meter(s), vacuum gauges, vapor probes, VLS tank, and vacuum blower will be observed.

5.3.3 Non-Routine Operation and Maintenance

The SVE system is equipped with the following alarm systems. The system will shut down if any of the alarm conditions are triggered. The SVE system will be inspected for the cause of the alarm and the necessary troubleshooting steps will be implemented. Damaged component/parts will be repaired or replaced.

- High water level alarm,
- Low vacuum alarm,
- High pressure alarm, and
- High temperature alarm

If sufficient vacuum and flows are not achieved, then SVE system will be inspected and necessary troubleshooting steps will be implemented.

5.3.4 System Monitoring Devices and Alarms

The SVE system is equipped with alarm devices to indicate that the system is not operating properly. In the event that the system is found to be operating improperly, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the SVE system will be restarted. 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.

A vulnerability assessment will not be performed at the Site for the following reasons:

- According to Federal Emergency Management Agency (FEMA) Flood Map Service, the Site is not located in a flood plain, low-lying or low-groundwater recharge area;
- Site Drainage and Storm Water Management is and will be connected to municipal systems;
- There are no exposed soils on the Site; landscaped areas are covered with either grass, bushes, plants or mulch. Therefore, the Site is not susceptible to erosion during severe rain events;
- The remaining contaminants at the Site are located underneath a cap and are found at deep depth intervals so the Site is not susceptible to a spill or contaminant release due to storm-related damage caused by flooding, erosion, high winds, loss of power etc.

This section provides a summary of vulnerability assessments that will be conducted for the site during periodic assessments, and briefly summarizes the vulnerability of the site and/or engineering controls to severe storms/weather events and associated flooding.

The SVE System on the northwestern corner of the Site has been identified as a remedial system which may be susceptible to damage from the wind itself or falling objects, such as trees or utility structures during periods of high wind. The SVE system is also susceptible to power loss and/or dips/surges in voltage during severe weather events, including lightening strikes. In the event of a major storm/high wind event, contact shall be made with the on-site representative to determine if the Site experienced any power loss or damage from falling objects or trees. If there is reason to believe the SVE System has been compromised, a site visit will be made to inspect the system and correct any storm impacts.

6.2 Green Remediation Evaluation

NYSDEC's DER-31 Green Remediation requires that green remediation concepts and techniques be considered during all stages 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 of the SMP provides a summary of any green remediation evaluations to be completed for the site during site management, and as reported in the Periodic Review Report (PRR).

The Green Remediation Evaluation will include the following items:

1. Fuel usage associated with travel to and from the Site for sampling and monitoring activities.
2. Electricity usage for powering the SVE system.
3. Modifications resulting from the Green Remediation Evaluations will be routinely implemented and scheduled to occur during planned/routine operation and maintenance activities. Reporting of these modifications will be presented in the PRR.

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 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. 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 Frequency of System Checks, Sampling and Other Periodic Activities

Transportation to and from the Site and 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 K** – 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.

6.3 Remedial System Optimization

A Remedial Site Optimization (RSO) study will be conducted any time that the NYSDEC 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 focuses 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 K**. These forms are subject to NYSDEC revision.

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 7** and summarized in the Periodic Review Report.

Table 7: Schedule of Interim Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Inspection Report	Annually, as part of the Periodic Review Report
Periodic Review Report	Annually, or as otherwise determined by the Department

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

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, etc);
- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);
- 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^{TM} 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 Department beginning sixteen (16) months after the Certificate of Completion (COC) is issued. After submittal of the initial Periodic Review Report, the next PRR shall be submitted annually to the Department or at another frequency as may be required by the Department. 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 B** - Environmental Easement. 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 and submitted in electronic format as described in **Section 7.1** above. 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 and severe condition inspections, if applicable.
- 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.

- 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 will include a presentation of past data as part of an evaluation of contaminant concentration trends.

- 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^{TM} 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 RAWP, 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; and

  – Trends in contaminant levels in the affected media will be evaluated to determine if the remedy continues to be effective in achieving remedial goals as specified by the Decision Document.

  – 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;

- 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.

7.2.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, a Professional Engineer licensed to practice 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 generally accepted engineering practices; 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, Ernest Hanna, of 104 West 29th Street, 10th Floor, New York, NY 10001, am certifying as 441 Eastern Parkway, LLC's Designated Site Representative: *I have been authorized and designated by all site owners/remedial parties to sign this certification for the site."*

At the end of each certifying period, as determined by the NYSDEC, the following certification will be provided to the Department:

- *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 Central Office, Regional Office in which the site is located and the NYSDOH Bureau of Environmental Exposure Investigation. The Periodic Review Report may need to be submitted in hard-copy format, as 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, a Corrective Measures Work Plan will be submitted to the NYSDEC 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.

7.4 Remedial Site Optimization Report

In the event that an RSO is to be performed (see Section 6.3, upon completion of an RSO, an RSO report must be submitted to the Department for approval. 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 Central Office, Regional Office in which the site is located, Site Control and the NYSDOH Bureau of Environmental Exposure Investigation.

8.0 REFERENCES

Phase I Site Assessment of BH Aircraft, 441 Eastern Parkway, Farmingdale New York, Prepared by Tyree Brothers Environmental Services, Inc. (January 2001)

Phase II Environmental Site Assessment, 441 Eastern Parkway, Farmingdale New York, Prepared by ACT (December 2001)

Limited Phase II Site Assessment, B.H. Aircraft Company Inc. Facility, 441 Eastern Parkway, Farmingdale New York, Prepared by PES (September 2002)

Phase I Environmental Site Assessment, 441 Eastern Parkway, Farmingdale New York, Prepared by Laurel Environmental (September 2016)

Phase II Environmental Site Assessment, 441 Eastern Parkway, Farmingdale New York, Prepared By Galli Engineering (January 2017)

Interim Remedial Measure Work Plan – Leaching Pool and Drywell Closure, BH Aircraft Site, 441 Eastern Parkway, Farmingdale New York, Prepared by GZA (October 2017)

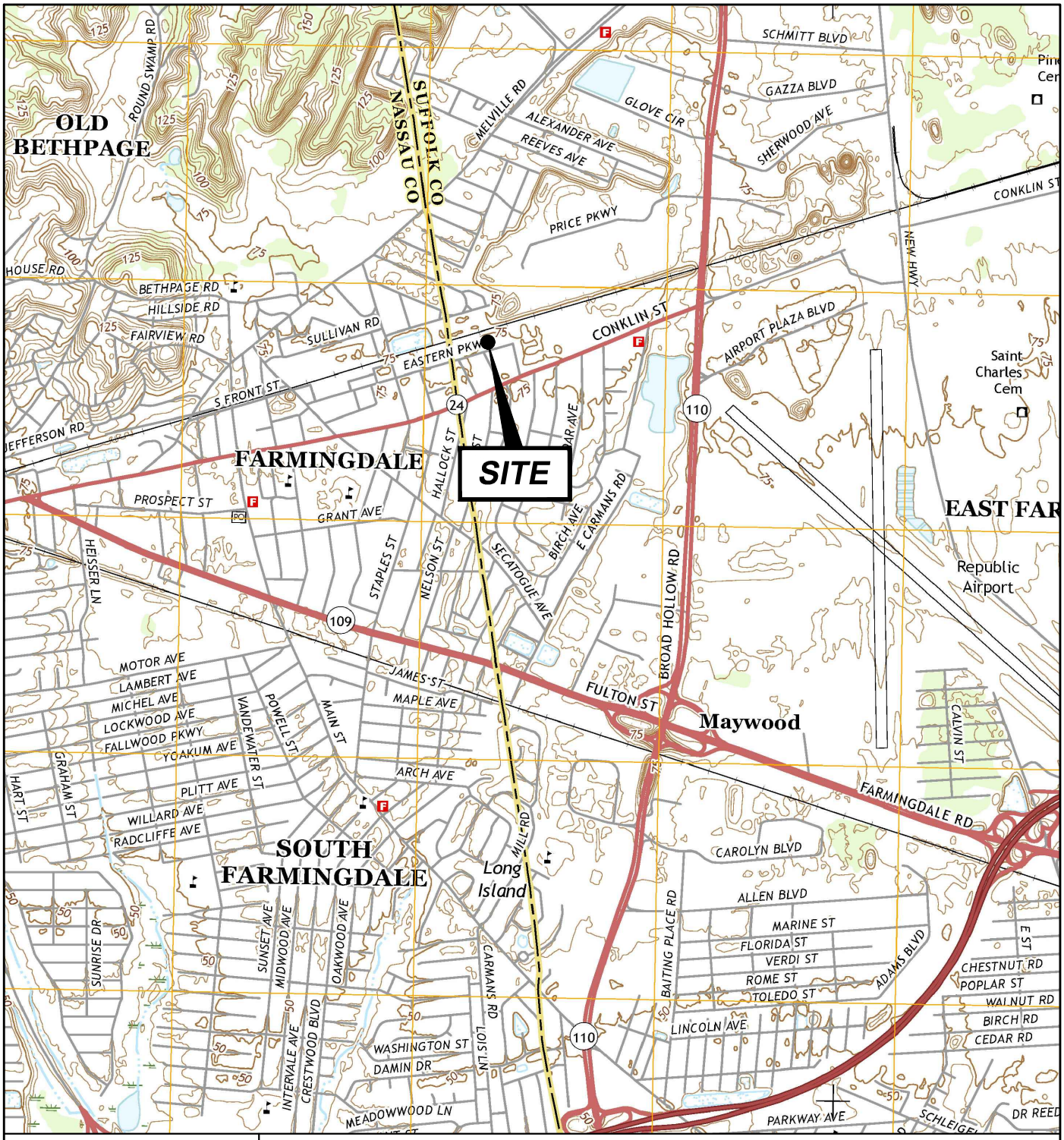
Remedial Investigation Report and Remedial Action Work Plan, 441 Eastern Parkway, Farmingdale New York, Prepared by GZA (August 2018)

Decision Document, BH Aircraft Site, Brownfield Cleanup Program, East Farmingdale, Suffolk County, Site No. C152247, Prepared by Division of Environmental Remediation, New York State Department of Environmental Conservation (August 2019)

6NYCRR 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).



NEW YORK

QUADRANGLE LOCATION

SOURCE:
USGS TOPOGRAPHIC MAP: GLENVILLE, CT-NY (2012).
CONTOUR INTERVAL 10 FT., NAVD-1988, ORIGINAL
SCALE 1:24,000 (1" = 2,000 FT.).

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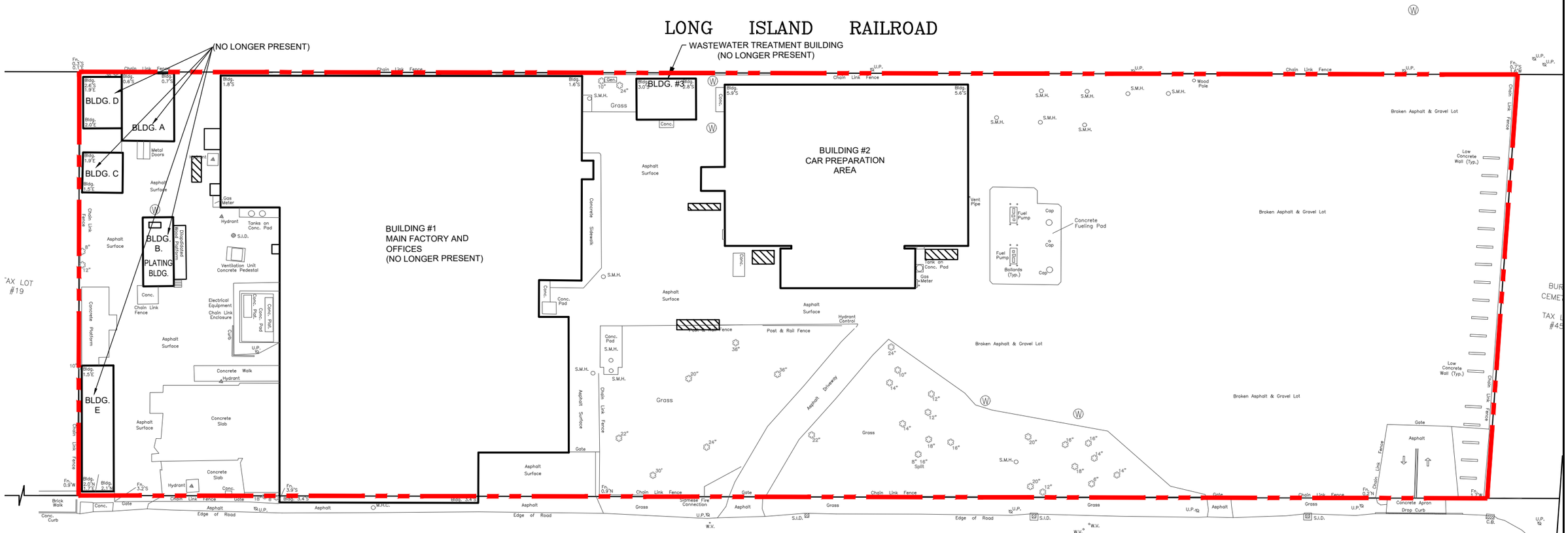
441 EASTERN PARKWAY
FARMINGDALE, NEW YORK

PREPARED BY:
GZA GeoEnvironmental of New York
Engineers and Scientists
104 WEST 29TH STREET, 10TH FLOOR
NEW YORK, NEW YORK 10001

PREPARED FOR:
441 EASTERN PARKWAY, LLC

SITE LOCATION PLAN

PROJ MGR: DW	REVIEWED BY: DW	CHECKED BY: DW	FIGURE 1
DESIGNED BY: DW	DRAWN BY: MT	SCALE: 1" = 2,000'	
DATE: APRIL 2017	PROJECT NO. 12.0076545.00	REVISION NO.	SHEET NO.



LEGEND:

- BROWNFIELD SITE BOUNDARY
- Ⓦ APPROXIMATE LOCATION OF FORMER DRY WELL
- FORMER UST
- S.M.H. EXISTING SEWER MANHOLE

NOTES:

1. THE BASE MAP WAS DEVELOPED FROM A PLAN PROVIDED BY: 441 EASTERN PARKWAY, LLC ENTITLED: "TOPOGRAPHIC MAP," DATED: 11/4/2016, ORIGINAL SCALE: 1" = 20'.

N W E S

0 25' 50' 100'

SCALE IN FEET 1" = 50'

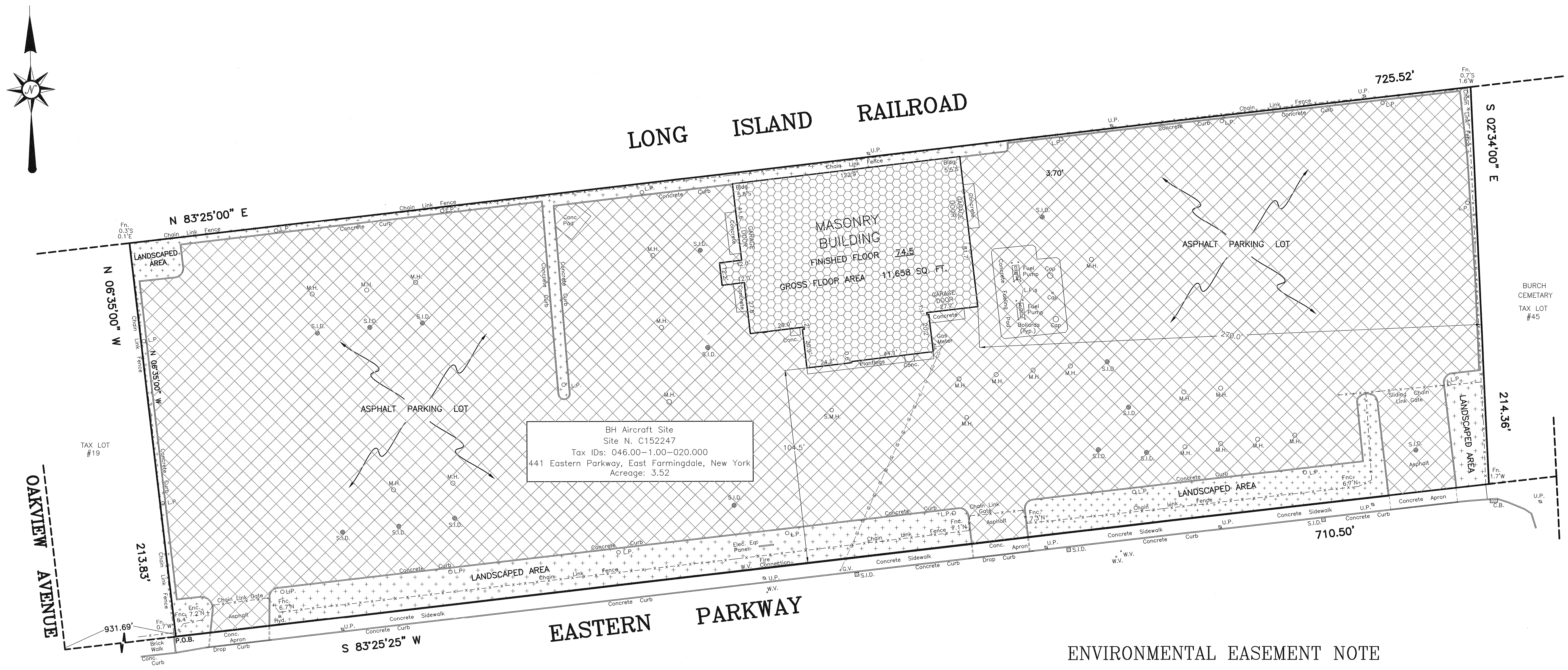
NO.	ISSUE/DESCRIPTION	BY	DATE

441 EASTERN PARKWAY
FARMINGDALE, NEW YORK

SITE PLAN

PREPARED BY: GZA GeoEnvironmental of New York, Engineers and Scientists, 104 WEST 29TH STREET, 10TH FLOOR, NEW YORK, NEW YORK 10001		PREPARED FOR: 441 EASTERN PARKWAY, LLC	
PROJ MGR: DW	REVIEWED BY: MW	CHECKED BY: DW	FIGURE 2
DESIGNED BY: MW	DRAWN BY: MT	SCALE: 1" = 50'	SHEET NO.
DATE: NOVEMBER 2018	PROJECT NO. 12.0076545.00	REVISION NO.	

FIGURE 3



ENVIRONMENTAL EASEMENT NOTE

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 New York Environmental Conservation Law. The engineering and institutional controls for this Easement are set forth in the Site Management Plan (SMP). A copy of the SMP must be obtained by any party with an interest in the property. The SMP can be obtained from NYS Department of Environmental Conservation, Division of Environmental Remediation, Site Control Section, 625 Broadway, Albany NY 12233 or at derweb@dec.ny.gov

PROPERTY AND ENVIRONMENTAL EASEMENT
LEGAL DESCRIPTION

Dist. 100 Sec. 46 Blk. 1 Lot 20

ALL those lots or parcels of land, in or near the Village of Farmingdale, Town of Babylon, County of Suffolk and State of New York, bounded and described as follows:

BEGINNING at a point on the northerly side of Eastern Parkway distant 931.69 feet easterly from the corner formed by the intersection of the northerly side of Eastern Parkway with the easterly side of Oakview Avenue;

RUNNING THENCE North 06 degrees 35 minutes 00 seconds West, a distance of 213.83 feet;

THENCE North 83 degrees 25 minutes 00 seconds East, a distance of 725.52 feet;

THENCE South 02 degrees 34 minutes 00 seconds East, a distance of 214.36 feet;

THENCE South 83 degrees 25 minutes 25 seconds West, a distance of 710.50 feet to the point or place of BEGINNING.

AREA: 153,504.5 SQ. FT or 3.52 Acres

LOT AREA:
153,504.5 SQ. FT.
3.52 ACRES

CERTIFICATIONS ON THIS BOUNDARY SURVEY MAP SIGNIFY THAT THE MAP WAS PREPARED IN ACCORDANCE WITH THE CURRENT EXISTING CODE OF PRACTICE FOR LAND SURVEYORS ADOPTED BY THE NEW YORK STATE ASSOCIATION OF PROFESSIONAL LAND SURVEYORS.

GUARANTEES INDICATED HEREON SHALL RUN ONLY TO THE PERSON FOR WHOM THE SURVEY IS PREPARED, AND ON THEIR BEHALF TO THE TITLE COMPANY, GOVERNMENTAL AGENCY, AND LENDING INSTITUTION LISTED. THE ASSIGNEES OF THE LENDING INSTITUTION GUARANTEES ARE NOT TRANSFERABLE TO ADDITIONAL INSTITUTIONS OR SUBSEQUENT OWNERS.

NO GUARANTEE IS IMPLIED BY THIS MAP AS TO THE EXISTENCE OR NONEXISTENCE OF ANY EASEMENTS OF RECORD THAT WOULD AFFECT SUBJECT PROPERTY, UNLESS SURVEYOR HAS BEEN FURNISHED WITH A COMPLETE COPY OF THE TITLE REPORT.

THE LOCATION OF UNDERGROUND IMPROVEMENTS OR ENCROACHMENTS ARE NOT ALWAYS KNOWN AND OFTEN MUST BE ESTIMATED. IF ANY UNDERGROUND IMPROVEMENTS OR ENCROACHMENTS ARE NOT COVERED BY THIS CERTIFICATE.

THE OFFSETS (OR DIMENSIONS) SHOWN HEREON FROM THE STRUCTURES TO THE PROPERTY LINES ARE FOR A SPECIFIC PURPOSE AND USE AND THEREFORE ARE NOT INTENDED TO GUIDE THE ERECTION OF FENCES, RETAINING WALLS, POOLS, AND ANY OTHER CONSTRUCTION.

UNAUTHORIZED ALTERATION OR ADDITION TO THIS SURVEY IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW.

COPIES OF THIS SURVEY MAP NOT BEARING THE LAND SURVEYOR'S INKED SEAL OR EMBOSSED SEAL SHALL NOT BE CONSIDERED AS A VALID, TRUE COPY.

LEGEND

Symbol	Description
C.B.	Catch Basin
G.V.	Gas Valve
M.H.	Manhole
S.M.H.	Sanitary Manhole
Hyd.	Hydrant
L.P.	Light Pole
S.I.D.	Surface Inlet Drain
U.P.	Utility Pole
W.M.	Water Meter
W.V.	Water Valve
	Street Sign
— OHP — OHP —	Overhead Wires
— E — E —	Electric Service
— W — W —	Water Service
— G — G —	Gas Service
	Proposed Building Area Cover System
	Proposed Asphalt / Concrete Cover System
	Proposed Landscaped Cover System

SURVEY GUARANTEED TO:
441 Eastern Parkway, LLC
Knauf Shaw LLP
New York State Department of Environmental Conservation

GRAPHIC SCALE
(IN FEET) SCALE: 1" = 30'
(IN METERS)

NOTE: ELEVATIONS SHOWN ARE BASED ON THE NAVD '88

FINAL SURVEY 6/13/2018

Suffolk County Tax Map Designation:
Dist. 100 Sec. 46 Blk. 1 Lot 20

ENVIRONMENTAL EASEMENT SURVEY
Of Property
Situated In The
Village of Farmingdale
Suffolk County, N.Y.

STATE OF NEW YORK · CHARLES F PANETTA · No. 068914 · No. 050429 · LICENSED PROFESSIONAL ENGINEER & LAND SURVEYOR

Charles Panetta, P.E., L.S.
N.Y. State Lic. No. 050429
N.Y. State Lic. No. 068914

Drawn by: GT
Date: 11/4/2016
SCALE: 1" = 30'

BLADYKAS & PANETTA
L.S. & P.E., P.C.
23 Spring Street
Oyster Bay, NY 11771
516-922-3031

	NYSDEC Part 375 Unrestricted	NYSDEC Part 375 Commercial	SD-09 depth: 0-2 10/14/01
Metal			
Chromium	1	400	4.9

	NYSDEC Part 375 Unrestricted	NYSDEC Part 375 Commercial	PES-7 (12-14ft bgs)
Metals			
Chromium	1	400	198
Lead	63	100	**435**
Silver	2	1500	2.76
Cadmium	2.5	9.3	5.33

	NYSDEC Part 375 Unrestricted	NYSDEC Part 375 Commercial	PES-9 (0-4ft bgs)
Metals			
Chromium	1	400	5.43
Mercury	0.18	2.8	0.321
Lead	63	1000	**1452**

	NYSDEC Part 375 Unrestricted	NYSDEC Part 375 Commercial	CP-3 Northern (14ft bgs)
Metals			
Barium	1	400	**498**

	NYSDEC Part 375 Unrestricted	NYSDEC Part 375 Commercial	PES-6 (8-10ft bgs)
Metals			
Chromium	1	400	36.2
Mercury	0.18	2.8	0.219
Lead	63	1000	198
Silver	2	1500	3.38
Arsenic	13	16	**31.5**

	NYSDEC Part 375 Unrestricted	NYSDEC Part 375 Commercial	PES-11 (4 - 6' bgs)
Metals			
Chromium	1	400	7.01

	NYSDEC Part 375 Unrestricted	NYSDEC Part 375 Commercial	SB-9 (9 - 10' bgs)
Metals			
Selenium	3.9	1500	9.17

	NYSDEC Part 375 Unrestricted	NYSDEC Part 375 Commercial	PES-12 (10.5 ft bgs)
VOCs			
Acetone	0.05	500	0.15
Metals			
Chromium	1	400	4.49
Lead	63	1000	79.3

	NYSDEC Part 375 Unrestricted	NYSDEC Part 375 Commercial	SD-14 depth:0-4 10/14/01
Metals			
Chromium	1	400	4.5

	NYSDEC Part 375 Unrestricted	NYSDEC Part 375 Commercial	CP-12 (10' bgs)
SVOCs			
Benzo(a)anthracene	1	5.6	3.64
Benzo(a)pyrene	1	1	3.19
Benzo(b)flouranthe	1	5.6	**7.85**
Benzo(k)fluoranthene	0.8	56	2.9
Chrysene	1	56	4.98
Pesticides			
4,4'-DDT	0.0033	47	0.0221
Metals			
Cadmium	4.3	9.3	4.47
Chromium	30	400	39.9
Copper	50	270	**347**
Nickel	30	310	74.3
Lead	63	1000	378
Zinc	109	10000	635

	NYSDEC Part 375 Unrestricted	NYSDEC Part 375 Commercial	SD-16 depth:0-4 10/14/01
Metals			
Chromium	1	400	19.4
Copper	50	270	172
Lead	30	1000	124

	NYSDEC Part 375 Unrestricted	NYSDEC Part 375 Commercial	SB-7 (9 - 10' bgs)
VOCs			
Benzo(a)pyrene	1	1	**2.62**
Trichloroethene	0.021	0.2	0.0332
SVOCs			
Benzo(a)anthracene	1	5.6	3.3
Benzo(b)fluoranthene	1	5.6	3.63
Benzo(k)fluoranthene	0.8	56	1.27
Chrysene	1	56	3.21
Indeno(1,2,3-cd)pyrene	0.5	5.6	0.981
Copper	50	270	63.6
Silver	2	1500	5.01
Lead	63	1000	80.2
Mercury	0.18	2.8	0.223

	NYSDEC Part 375 Unrestricted	NYSDEC Part 375 Commercial	SD-17 depth:8-12 10/14/01
Metals			
Chromium	1	400	14.6

	NYSDEC Part 375 Unrestricted	NYSDEC Part 375 Commercial	SD-18 depth:0-2 10/14/01
Metals			
Chromium	1	400	7.75
Selenium	3.9	1500	9.17

	NYSDEC Part 375 Unrestricted	NYSDEC Part 375 Commercial	SB-5 (9 - 37 bgs)
Metals			
Barium	350	400	**648**
Lead	63	1000	694
Zinc	109	10000	165

	NYSDEC Part 375 Unrestricted	NYSDEC Part 375 Commercial	SB-01 depth:4-8 10/01/01	SB-01 depth:24-28 10/01/01	SB-01 depth:9-10 10/01/01
Metals					
Lead	63	1000	277	160	160
Mercury	0.18	2.8	0.18	ND	ND
Nickel	30	310	ND	ND	160
Zinc	109	10000	261	ND	219

	NYSDEC Part 375 Unrestricted	NYSDEC Part 375 Commercial	SB-6 (9 - 10' bgs)
SVOCs			
Benzo(b)fluoranthene	1	5.6	1.32
TAL Metals			
Barium	350	400	**1040**
Chromium	1	400	47.1
Copper	50	270	**668**
Lead	63	1000	**1040**
Zinc	109	10000	229
Mercury	0.18	2.8	2.23

LOCATION				GZA-04		GZA-04	
SAMPLE NAME				GZA 4 (21.5-22)		GZA 4 (24.5-25)	
SAMPLING DATE				11/8/2017		11/8/2017	
LAB SAMPLE ID				L1741010-04		L1741010-05	
SAMPLE DEPTH (bgs)				(21.5-22)		(24.5-25)	
UNITS				mg/kg		mg/kg	
	NY-RESC	NY-RESGW	NY-RESRR	Results	Qual	Results	Qual
Chlorinated Herbicides				ND		ND	
Organochlorine Pesticides				NE		ND	
Polychlorinated Biphenyls				NE		ND	
Semivolatile Organics				ND		ND	
Total Metals				NE		NE	
Volatile Organics						NE	
Tetrachloroethene	150	1.3	19	2.4		0.0012	U
1,1,1-Trichloroethane	500	0.68	100	13		0.0012	U
Toluene	500	0.7	100	1	J	0.0018	U
Trichloroethene	200	0.47	21	130		0.0012	U

LONG ISLAND RAILROAD

EASTERN PARKWAY

WASTEWATER TREATMENT BUILDING

BUILDING #1 MAIN FACTORY AND OFFICES

BUILDING #2 ASSEMBLY AREA

BOILER ROOM

LEGEND:

- SOIL BORING LOCATION (GALLI)
- SOIL BORING LOCATION (ACT)
- SOIL BORING LOCATION (PES)
- SOIL/GROUNDWATER SAMPLE LOCATION (GALLI)
- SOIL/GROUNDWATER SAMPLE LOCATION (PES)
- SOIL GAS SAMPLE LOCATION (GALLI)
- DRAIN/SEPTIC SAMPLE LOCATION (GALLI)
- DRAIN/SEPTIC SAMPLE LOCATION (PES)
- TEMPORARY MONITORING WELL (ACT)
- MONITORING WELL (ACT)
- SEDIMENT SAMPLE LOCATION (ACT)
- APPROXIMATE LOCATION OF FORMER DRY WELL
- FORMER UST
- ASPHALT PATCH
- APPROXIMATE LOCATION OF EXISTING OR FORMER LEACHING POOL/DRYWELL/FLOOR DRAIN
- EXISTING SEWER MANHOLE
- EXCEEDS NYSDEC PART 375 UNRESTRICTED USE SOIL CLEANUP OBJECTIVES
- 2.62 EXCEEDS NYSDEC PART 375 COMMERCIAL USE SOIL CLEANUP OBJECTIVES

NOTES:

1. THE BASE MAP WAS DEVELOPED FROM A PLAN PROVIDED BY: 441 EASTERN PARKWAY, LLC ENTITLED: "TOPOGRAPHIC MAP," DATED: 11/4/2016, ORIGINAL SCALE: 1" = 20'.
2. CONCENTRATIONS ARE REPORTED IN MILLIGRAMS PER KILOGRAM.

N W E S

0 25' 50' 100'

SCALE IN FEET 1" = 50'

NO.	ISSUE/DESCRIPTION	BY	DATE

441 EASTERN PARKWAY
FARMINGDALE, NEW YORK

REMAINING SOIL EXCEEDANCES

PREPARED BY:
GZA GeoEnvironmental of New York
Engineers and Scientists
104 WEST 29TH STREET, 10TH FLOOR
NEW YORK, NEW YORK 10001

PREPARED FOR:
441 EASTERN PARKWAY, LLC

PROJ MGR: D	REVIEWED BY: MW	CHECKED BY: DW	FIGURE 4
DESIGNED BY: MW	DRAWN BY: MT	SCALE: 1" = 50'	
DATE: NOVEMBER 2018	PROJECT NO. 12.0076545.00	REVISION NO.	

Location	NYSDEC AWQS	GZA-1	DUP-111017
Sampling Date		11/10/2017	11/10/2017
Lab Sample ID		L1741452-01	L1741452-03
Units		µg/L	µg/L
Organochlorine Pesticides			
Chlordane	0.05	**0.223 P**	NA
Total Metals			
Iron	300	**778**	NA
Sodium	20,000	**24,500**	NA

Location	NYSDEC AWQS	GZA-2
Sampling Date		11/10/2017
Lab Sample ID		L1741452-01
Units		µg/L
Organochlorine Pesticides		
Dieldrin	0.004	**0.047**
Chlordane	0.05	**0.153 J**
Semivolatile Organics		
Benzo(a)anthracene	0.002	**0.02 J**
Total Metals		
Iron	300	**1,280**
Sodium	20,000	**55,100**

Location	NYSDEC AWQS	GZA-3
Sampling Date		11/8/2017
Lab Sample ID		L1741273-01
Units		µg/L
Organochlorine Pesticides		
Dieldrin	0.004	**0.118 P**
Total Metals		
Iron	300	**2,490**
Sodium	20,000	**49,200**
Volatile Organics		
Trichloroethene	5	**6.8**

Location	NYSDEC AWQS	GZA-4
Sampling Date		11/8/2017
Lab Sample ID		L1741007-03
Units		µg/L
Organochlorine Pesticides		
Dieldrin	0.004	**0.04**
Total Metals		
Iron	300	**457**
Manganese	300	**333.5**
Sodium	20,000	**25,200**
Volatile Organics		
1,1,1-Trichloroethane	5	**9.2**
Trichloroethene	5	**11**

Location	NYSDEC AWQS	GZA-12
Sampling Date		11/8/2017
Lab Sample ID		L1741007-02
Units		µg/L
Organochlorine Pesticides		
Dieldrin	0.004	**0.036 J**
Chlordane	0.05	**0.159 J**
Total Metals		
Iron	300	**1,350**
Sodium	20,000	**55,700**

Location	NYSDEC AWQS	GZA-13
Sampling Date		11/8/2017
Lab Sample ID		L1741007-01
Units		µg/L
Organochlorine Pesticides		
Dieldrin	0.004	**0.072**
Semivolatile Organics		
Benzo(a)anthracene	0.002	**0.04 J**
Benzo(b)fluoranthene	0.002	**0.03 J**
Total Metals		
Iron	300	**951**
Manganese	300	**471.5**
Sodium	20,000	**40,800**

Location	NYSDEC AWQS	GZA-7
Sampling Date		11/7/2017
Lab Sample ID		L1740783-04
Units		µg/L
Organochlorine Pesticides		
Endrin	0.002	**0.005 J**
Dieldrin	0.004	**0.028 J**
Chlordane	0.05	**0.05 J**
Total Metals		
Iron	300	**1,100**
Sodium	20,000	**30,200**

Location	NYSDEC AWQS	GZA-6
Sampling Date		11/7/2017
Lab Sample ID		L1740783-07
Units		µg/L
Organochlorine Pesticides		
Dieldrin	0.004	**0.023 J**
Chlordane	0.05	**0.116 J**
Semivolatile Organics		
Benzo(a)anthracene	0.002	**0.03 J**
Benzo(b)fluoranthene	0.002	**0.02 J**
Total Metals		
Iron	300	**381**
Sodium	20,000	**31,100**

Location	NYSDEC AWQS	GZA-8	DUP-11717
Sampling Date		11/7/2017	11/7/2017
Lab Sample ID		L1740783-01	L1740783-06
Units		µg/L	µg/L
Organochlorine Pesticides			
Dieldrin	0.004	**0.009 J**	**0.012 J**
Semivolatile Organics			
Benzo(a)anthracene	0.002	**0.02 J**	**0.02 J**
Total Metals			
Iron	300	**1,950**	**712**
Sodium	20,000	**31,600**	**31,600**

Location	NYSDEC AWQS	GZA-10
Sampling Date		11/6/2017
Lab Sample ID		L1740579-01
Units		µg/L
Organochlorine Pesticides		
Dieldrin	0.004	**0.005 J**
Semivolatile Organics		
Benzo(a)anthracene	0.002	**0.02 J**
Total Metals		
Chromium	50	**94.85**
Iron	300	**21,700**
Sodium	20,000	**38,600**

Location	NYSDEC AWQS	GZA-15
Sampling Date		11/6/2017
Lab Sample ID		L1740579-03
Units		µg/L
Organochlorine Pesticides		
Dieldrin	0.004	**0.006 J**
Total Metals		
Chromium	50	**52.79**
Iron	300	**2,850**
Sodium	20,000	**30,300**

Location	NYSDEC AWQS	GZA-5
Sampling Date		11/9/2017
Lab Sample ID		L1741273-04
Units		µg/L
Organochlorine Pesticides		
Dieldrin	0.004	**0.021 J**
Chlordane	0.05	**0.194**
Total Metals		
Iron	300	**2,180**
Sodium	20,000	**45,600**

Location	NYSDEC AWQS	GZA-9
Sampling Date		11/7/2017
Lab Sample ID		L1740783-05
Units		µg/L
Organochlorine Pesticides		
Dieldrin	0.004	**0.013 J**
Semivolatile Organics		
Benzo(a)anthracene	0.002	**0.02 J**
Benzo(a)pyrene	0.002	**0.08 J**
Total Metals		
Iron	300	**1,760**
Sodium	20,000	**30,800**

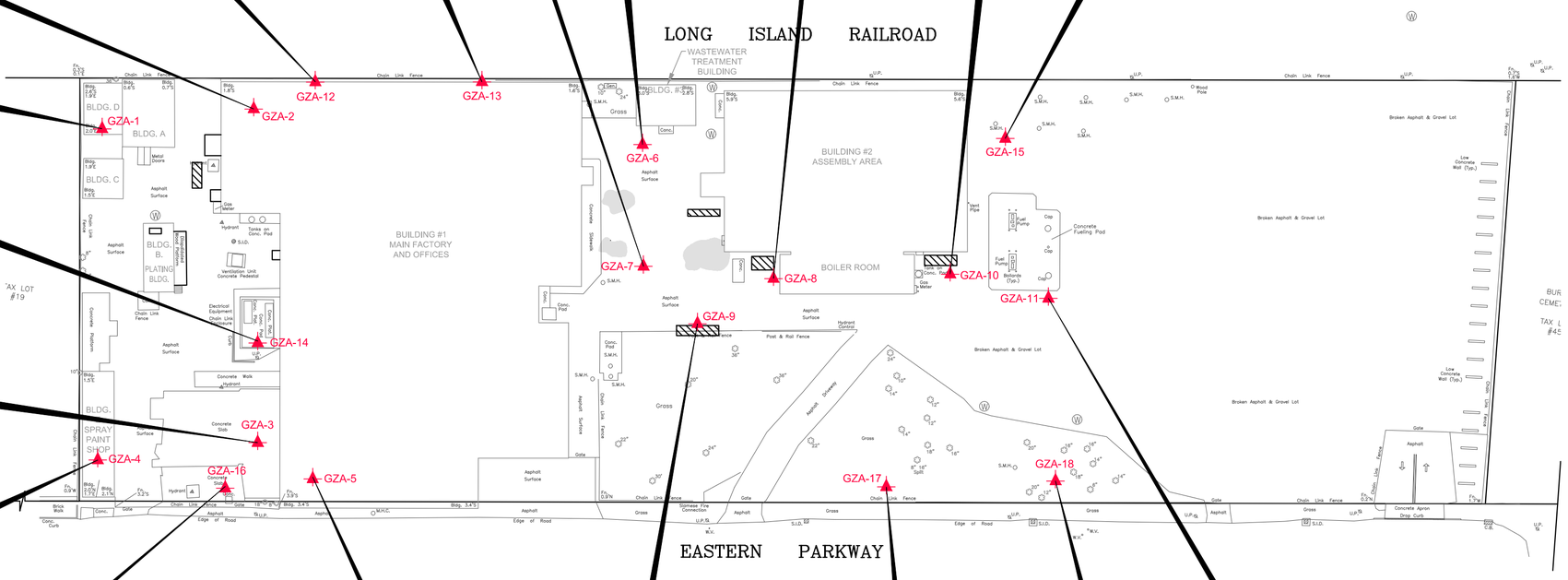
Location	NYSDEC AWQS	GZA-17
Sampling Date		11/6/2017
Lab Sample ID		L1740783-03
Units		µg/L
Organochlorine Pesticides		
Dieldrin	0.004	**0.007 J**
Semivolatile Organics		
Benzo(a)pyrene	0.002	**0.07 J**
Total Metals		
Iron	300	**2,220**
Sodium	20,000	**31,200**

Location	NYSDEC AWQS	GZA-18
Sampling Date		11/7/2017
Lab Sample ID		L1740783-02
Units		µg/L
Organochlorine Pesticides		
Benzo(a)anthracene	0.002	**0.02 J**
Total Metals		
Iron	300	**4,480**
Manganese	300	**831.6**
Sodium	20,000	**33,400**

Location	NYSDEC AWQS	GZA-11
Sampling Date		11/6/2017
Lab Sample ID		L1740579-02
Units		µg/L
Organochlorine Pesticides		
Dieldrin	0.004	**0.009 J**
Total Metals		
Iron	300	**1,300**
Manganese	300	**368.2**
Sodium	20,000	**37,800**

Location	NYSDEC AWQS	GZA-16
Sampling Date		11/9/2017
Lab Sample ID		L1741273-05
Units		µg/L
Organochlorine Pesticides		
Dieldrin	0.004	**0.01 J**
Total Metals		
Antimony	3	**4.39**
Iron	300	**3,980**
Sodium	20,000	**43,300**

Location	NYSDEC AWQS	GZA-14
Sampling Date		11/9/2017
Lab Sample ID		L1741273-06
Units		µg/L
Organochlorine Pesticides		
Dieldrin	0.004	**0.049 P**
Chlordane	0.05	**0.226**
Semivolatile Organics		
Benzo(a)anthracene	0.002	**0.03 J**
Total Metals		
Iron	300	**2,380**
Sodium	20,000	**41,600**



LEGEND:

- SOIL AND GROUNDWATER SAMPLE LOCATION
- Ⓦ APPROXIMATE LOCATION OF FORMER DRY WELL
- FORMER UST
- ASPHALT PATCH
- S.M.H. EXISTING SEWER MANHOLE
- AWQS AMBIENT WATER QUALITY STANDARDS
- 8 YELLOW HIGHLIGHT / BOLD TEXT = VALUE EXCEEDS NYSDEC AWQS
- U THE COMPOUND WAS NOT DETECTED AT THE INDICATED CONCENTRATION.
- J DATA INDICATES THE PRESENCE OF A COMPOUND THAT MEETS THE IDENTIFICATION CRITERIA. THE RESULT IS LESS THAN THE QUANTITATION LIMIT BUT GREATER THAN MDL. THE CONCENTRATION GIVEN IS AN APPROXIMATE VALUE.
- P THE RPD BETWEEN RESULTS FOR THE TWO COLUMNS EXCEEDS THE METHOD-SPECIFIED CRITERIA
- NA THE SAMPLE WAS NOT ANALYZED FOR THESE ANALYTICAL PARAMETERS

NOTES:

1. THE BASE MAP WAS DEVELOPED FROM A PLAN PROVIDED BY: 441 EASTERN PARKWAY, LLC ENTITLED: "TOPOGRAPHIC MAP," DATED: 11/4/2016, ORIGINAL SCALE: 1" = 20'.

N W E S

0 25' 50' 100'

SCALE IN FEET 1" = 50'

NO.	ISSUE/DESCRIPTION	BY	DATE

441 EASTERN PARKWAY
FARMINGDALE, NEW YORK

REMAINING GROUNDWATER EXCEEDANCES

PREPARED BY:
GZA GeoEnvironmental of New York
Engineers and Scientists
104 WEST 29TH STREET, 10TH FLOOR
NEW YORK, NEW YORK 10001

PREPARED FOR: 441 EASTERN PARKWAY, LLC

PROJ MGR: DW	REVIEWED BY: MD	CHECKED BY: DW	FIGURE
DESIGNED BY: MD	DRAWN BY: MT	SCALE: 1" = 50'	5
DATE: JANUARY 2018	PROJECT NO. 12.0076545.00	REVISION NO.	SHEET NO.

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-5
SAMPLING DATE		11/9/2017
LAB SAMPLE ID		L1741445-01
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride		188 U
1,1,1-Trichloroethane	100	**1,670**
Carbon tetrachloride	6	**545**
Trichloroethene	6	**8,440**
Tetrachloroethene	100	**1,230**
Total VOCs		12,453

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-7
SAMPLING DATE		11/9/2017
LAB SAMPLE ID		L1741221-01
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride		24.1 U
1,1,1-Trichloroethane	100	**476**
Carbon tetrachloride	6	17.4 U
Trichloroethene	6	**118**
Tetrachloroethene	100	**35.7**
Total VOCs		6,290

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-16
SAMPLING DATE		11/10/2017
LAB SAMPLE ID		L1741445-10
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride		8.69 U
1,1,1-Trichloroethane	100	51.7
Carbon tetrachloride	6	6.29 U
Trichloroethene	6	**82.2**
Tetrachloroethene	100	6.92
Total VOCs		277

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-1
SAMPLING DATE		11/9/2017
LAB SAMPLE ID		L1741221-03
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride		5.8 U
1,1,1-Trichloroethane	100	**649**
Carbon tetrachloride	6	**9.25**
Trichloroethene	6	**758**
Tetrachloroethene	100	**848**
Total VOCs		1989

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-4
SAMPLING DATE		11/9/2017
LAB SAMPLE ID		L1741221-02
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride		8.69 U
1,1,1-Trichloroethane	100	**2,320**
Carbon tetrachloride	6	**26.8**
Trichloroethene	6	**245**
Tetrachloroethene	100	**193**
Total VOCs		3,199

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-8
SAMPLING DATE		11/9/2017
LAB SAMPLE ID		L1741445-02
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride		3.47 U
1,1,1-Trichloroethane	100	**208**
Carbon tetrachloride	6	**200**
Trichloroethene	6	**656**
Tetrachloroethene	100	**61.7**
Total VOCs		1419

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-15
SAMPLING DATE		11/7/2017
LAB SAMPLE ID		L1740956-02
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride		1.74 U
1,1,1-Trichloroethane	100	7.8
Carbon tetrachloride	6	1.26 U
Trichloroethene	6	**33.5**
Tetrachloroethene	100	1.36 U
Total VOCs		343

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-13
SAMPLING DATE		11/7/2017
LAB SAMPLE ID		L1740956-01
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride		1.74 U
1,1,1-Trichloroethane	100	55.7
Carbon tetrachloride	6	1.26 U
Trichloroethene	6	**74.7**
Tetrachloroethene	100	1.36 U
Total VOCs		321

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-2
SAMPLING DATE		11/9/2017
LAB SAMPLE ID		L1741221-04
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride		47.6 U
1,1,1-Trichloroethane	100	**525**
Carbon tetrachloride	6	34.5 U
Trichloroethene	6	**8,440**
Tetrachloroethene	100	**1,630**
Total VOCs		10,896

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-3
SAMPLING DATE		11/10/2017
LAB SAMPLE ID		L1741445-09
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride		466 U
1,1,1-Trichloroethane	100	**25,700**
Carbon tetrachloride	6	338 U
Trichloroethene	6	**64,000**
Tetrachloroethene	100	**4,750**
Total VOCs		96,165

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-6	V-6
SAMPLING DATE		11/9/2017	11/9/2017
LAB SAMPLE ID		L1741445-04	L1741445-04 R1
SAMPLE DEPTH			
UNITS		ug/m3	ug/m3
Volatile Organics in Air			
Methylene chloride		23.4 U	-
1,1,1-Trichloroethane	100	**2,690**	-
Carbon tetrachloride	6	**108**	-
Trichloroethene	6	**8970 E**	**10,800**
Tetrachloroethene	100	**1,580**	-
Total VOCs		15,855	

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-19
SAMPLING DATE		4/9/2018
LAB SAMPLE ID		L1812275-03
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride		8.69 U
1,1,1-Trichloroethane	100	**124**
Carbon tetrachloride	6	4.2 U
Trichloroethene	6	**343**
Tetrachloroethene	100	**698**
Total VOCs		2665

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-12	V-12
SAMPLING DATE		11/10/2017	11/10/2017
LAB SAMPLE ID		L1741445-05	L1741445-05 R1
SAMPLE DEPTH			
UNITS		ug/m3	ug/m3
Volatile Organics in Air			
Methylene chloride		92.4 U	-
1,1,1-Trichloroethane	100	**1,840**	-
Carbon tetrachloride	6	67.3 U	-
Trichloroethene	6	**11,000**	**11,400**
Tetrachloroethene	100	**494**	-
Total VOCs		13,978	

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-18
SAMPLING DATE		4/9/2018
LAB SAMPLE ID		L1812275-02
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride		8.69 U
1,1,1-Trichloroethane	100	**119**
Carbon tetrachloride	6	6.29 U
Trichloroethene	6	**2030**
Tetrachloroethene	100	**66.8**
Total VOCs		3200

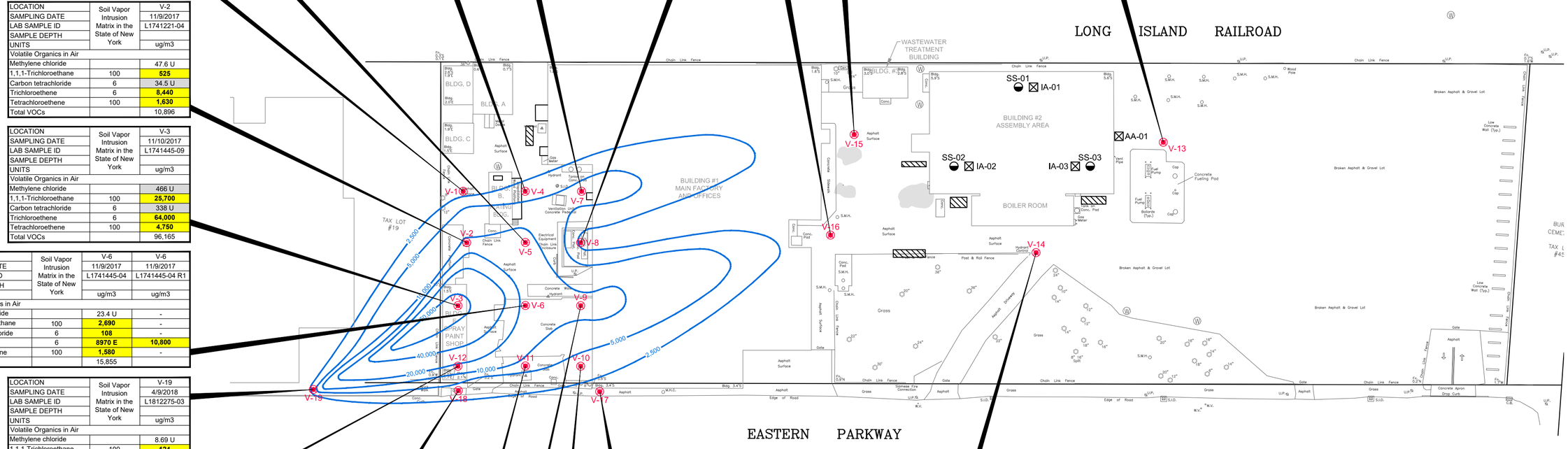
LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-17
SAMPLING DATE		4/9/2018
LAB SAMPLE ID		L1812275-01
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride		5.8 U
1,1,1-Trichloroethane	100	35.6
Carbon tetrachloride	6	4.2 U
Trichloroethene	6	**31.4**
Tetrachloroethene	100	19.3
Total VOCs		2302

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-14
SAMPLING DATE		11/7/2017
LAB SAMPLE ID		L1740956-03
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride		1.79
1,1,1-Trichloroethane	100	74.2
Carbon tetrachloride	6	1.26 U
Trichloroethene	6	**2.69**
Tetrachloroethene	100	1.36 U
Total VOCs		560

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-11
SAMPLING DATE		11/10/2017
LAB SAMPLE ID		L1741445-06
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride		22.7 U
1,1,1-Trichloroethane	100	**600**
Carbon tetrachloride	6	**23**
Trichloroethene	6	**5,480**
Tetrachloroethene	100	**517**
Total VOCs		6,699

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-10	DUPSG-111017
SAMPLING DATE		11/10/2017	11/10/2017
LAB SAMPLE ID		L1741445-07	L1741445-08
SAMPLE DEPTH			
UNITS		ug/m3	ug/m3
Volatile Organics in Air			
Methylene chloride		17.4 U	17.4 U
1,1,1-Trichloroethane	100	**261**	**251**
Carbon tetrachloride	6	**29.4**	**28.9**
Trichloroethene	6	**2,290**	**2,190**
Tetrachloroethene	100	**291**	**256**
Total VOCs		2,896	2,751

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	V-9	V-9
SAMPLING DATE		11/9/2017	11/9/2017
LAB SAMPLE ID		L1741445-03	L1741445-03 R1
SAMPLE DEPTH			
UNITS		ug/m3	ug/m3
Volatile Organics in Air			
Methylene chloride		23.6 U	-
1,1,1-Trichloroethane	100	**1,370**	-
Carbon tetrachloride	6	**30.3**	
Trichloroethene	6	**8120 E**	**8,920**
Tetrachloroethene	100	**1,540**	-
Total VOCs		12,040	



NOTES:

1. THE BASE MAP WAS DEVELOPED FROM A PLAN PROVIDED BY: 441 EASTERN PARKWAY, LLC ENTITLED: "TOPOGRAPHIC MAP," DATED: 11/4/2016, ORIGINAL SCALE: 1" = 20'.

LEGEND:

- SOIL GAS SAMPLE LOCATION
- APPROXIMATE LOCATION OF FORMER DRY WELL
- FORMER UST
- ASPHALT PATCH
- EXISTING SEWER MANHOLE
- **8** VALUE EXCEEDS NYSDOH MINIMUM SOIL VAPOR INTRUSION MATRIX VALUE (UPDATED MAY 2017)
- U THE COMPOUND WAS NOT DETECTED AT THE INDICATED CONCENTRATION
- J DATA INDICATES THE PRESENCE OF A COMPOUND THAT MEETS THE IDENTIFICATION CRITERIA. THE RESULT IS LESS THAN THE QUANTITATION LIMIT BUT GREATER THAN MDL. THE CONCENTRATION GIVEN IS AN APPROXIMATE VALUE.
- 5,000 TRICHLOROETHENE CONCENTRATION ISOCONTOUR
- SS-03 SUB-SLAB AIR SAMPLING LOCATION
- IA-03 INDOOR AIR (IA) OR AMBIENT AIR (AA) SAMPLING LOCATION

N W E S

0 25' 50' 100'

SCALE IN FEET 1" = 50'

NO.	ISSUE/DESCRIPTION	BY	DATE

441 EASTERN PARKWAY
FARMINGDALE, NEW YORK

SOIL VAPOR EXCEEDANCES PRIOR TO RA

PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental of New York, Engineers and Scientists, 104 WEST 29TH STREET, 10TH FLOOR, NEW YORK, NEW YORK 10001		441 EASTERN PARKWAY, LLC	
PROJ MGR: DW	REVIEWED BY: MW	CHECKED BY: DW	FIGURE 6
DESIGNED BY: MW	DRAWN BY: MT	SCALE: 1" = 50'	SHEET NO.
DATE: NOVEMBER 2018	PROJECT NO. 12.0076545.00	REVISION NO.	

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	SS-01
SAMPLING DATE		4/9/2018
LAB SAMPLE ID		L1812275-04
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride		1.74 U
1,1,1-Trichloroethane	100	47
Carbon tetrachloride	6	**7.61**
Trichloroethene	6	1.07 U
Tetrachloroethene	100	1.36 U
Total VOCs		113

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	SS-02
SAMPLING DATE		4/9/2018
LAB SAMPLE ID		L1812275-05
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride		1.74 U
1,1,1-Trichloroethane	100	73.1
Carbon tetrachloride	6	1.26 U
Trichloroethene	6	4.37
Tetrachloroethene	100	1.64
Total VOCs		158

LOCATION	NYSDOH AGV[1]	IA-01
SAMPLING DATE		4/9/2018
LAB SAMPLE ID		L1812275-07
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride	60	1.74 U
1,1,1-Trichloroethane		0.109 U
Carbon tetrachloride		0.516
Trichloroethene	2	0.107 U
Tetrachloroethene	30	0.359
Total VOCs		191

LOCATION	NYSDOH AGV[1]	AA-01
SAMPLING DATE		4/9/2018
LAB SAMPLE ID		L1812275-10
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride	60	1.74 U
1,1,1-Trichloroethane	100	0.109 U
Carbon tetrachloride	6	0.566
Trichloroethene	6	2 0.107 U
Tetrachloroethene	100	30 0.124
Total VOCs		21

LOCATION	Soil Vapor Intrusion Matrix in the State of New York	SS-03
SAMPLING DATE		4/9/2018
LAB SAMPLE ID		L1812275-06
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride		1.74 U
1,1,1-Trichloroethane	100	2.38
Carbon tetrachloride	6	1.26 U
Trichloroethene	6	0.107 U
Tetrachloroethene	100	1.83
Total VOCs		467

LOCATION	NYSDOH AGV[1]	IA-02
SAMPLING DATE		4/9/2018
LAB SAMPLE ID		L1812275-08
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride	60	1.74 U
1,1,1-Trichloroethane		0.109 U
Carbon tetrachloride		0.516
Trichloroethene	2	0.107 U
Tetrachloroethene	30	0.359
Total VOCs		152

LOCATION	NYSDOH AGV[1]	IA-03
SAMPLING DATE		4/9/2018
LAB SAMPLE ID		L1812275-09
SAMPLE DEPTH		
UNITS		ug/m3
Volatile Organics in Air		
Methylene chloride	60	1.75
1,1,1-Trichloroethane		0.109 U
Carbon tetrachloride		0.56
Trichloroethene	2	0.344
Tetrachloroethene	30	0.475
Total VOCs		182

LEGEND:

- SOIL GAS SAMPLE LOCATION
- APPROXIMATE LOCATION OF FORMER DRY WELL
- FORMER UST
- ASPHALT PATCH
- EXISTING SEWER MANHOLE
- 1 NYSDOH AIR GUIDANCE VALUE (UPDATED AUGUST 2015)
- 8 VALUE EXCEEDS MINIMUM NYSDOH SOIL VAPOR INTRUSION MATRIX VALUE (MAY 2017) AND/OR NYSDOH AGV
- 2 THIS DETECTION LIMIT EXCEEDS THE APPLICABLE STANDARD(S). IN THIS CASE, VALUE EXCEEDS MINIMUM NYSDOH SOIL VAPOR INTRUSION MATRIX AND/OR NYSDOH AGV
- U THE COMPOUND WAS NOT DETECTED AT THE INDICATED CONCENTRATION.
- J DATA INDICATES THE PRESENCE OF A COMPOUND THAT MEETS THE IDENTIFICATION CRITERIA. THE RESULT IS LESS THAN THE QUANTITATION LIMIT BUT GREATER THAN MDL. THE CONCENTRATION GIVEN IS AN APPROXIMATE VALUE.
- SS-03 SUB-SLAB AIR SAMPLING LOCATION
- IA-03 INDOOR AIR (IA) OR AMBIENT AIR (AA) SAMPLING LOCATION

NOTES:

1. THE BASE MAP WAS DEVELOPED FROM A PLAN PROVIDED BY: 441 EASTERN PARKWAY, LLC ENTITLED: "TOPOGRAPHIC MAP," DATED: 11/4/2016, ORIGINAL SCALE: 1" = 20'.

N W E S

0 25' 50' 100'

SCALE IN FEET 1" = 50'

NO.	ISSUE/DESCRIPTION	BY	DATE

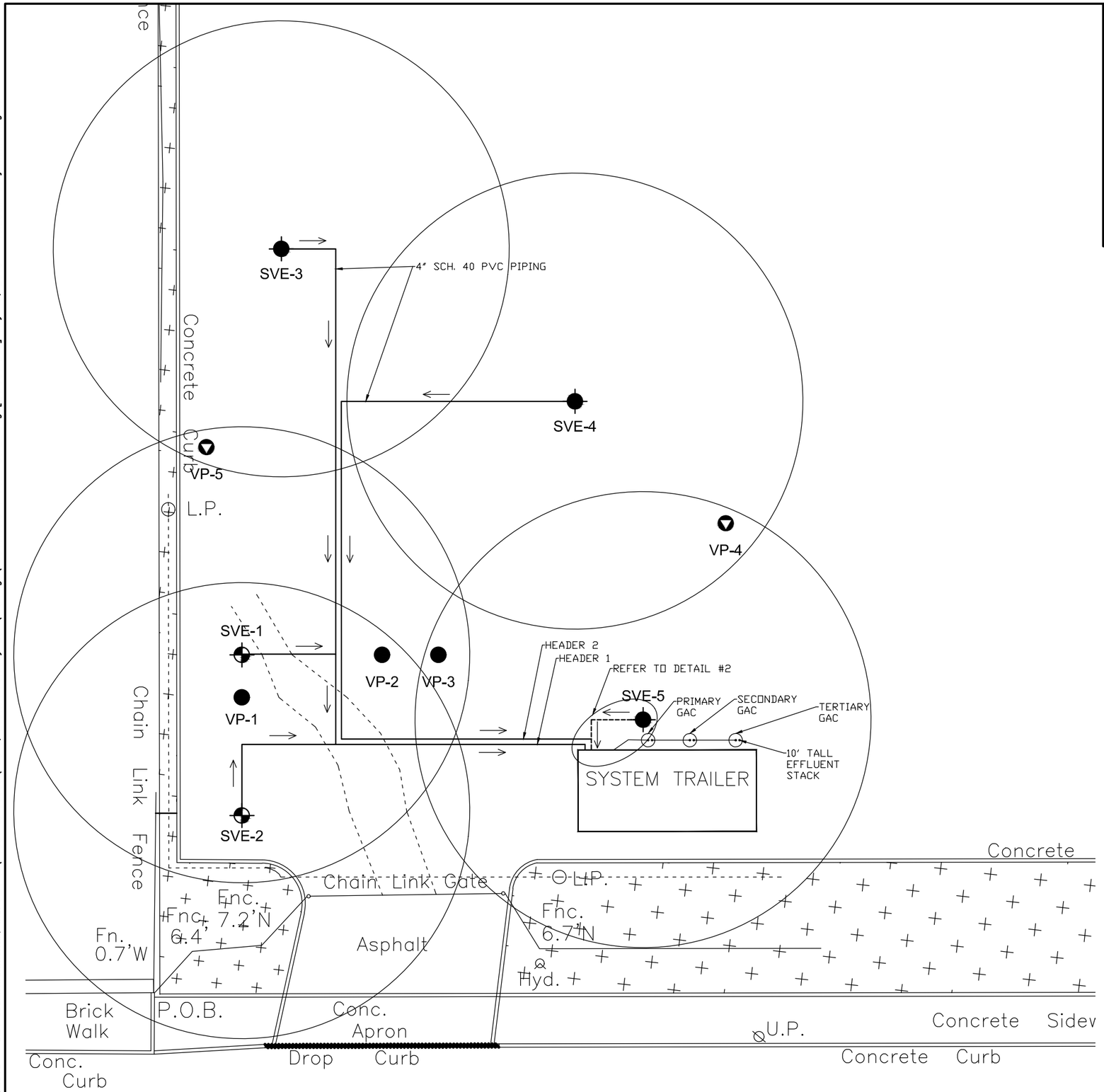
441 EASTERN PARKWAY
FARMINGDALE, NEW YORK

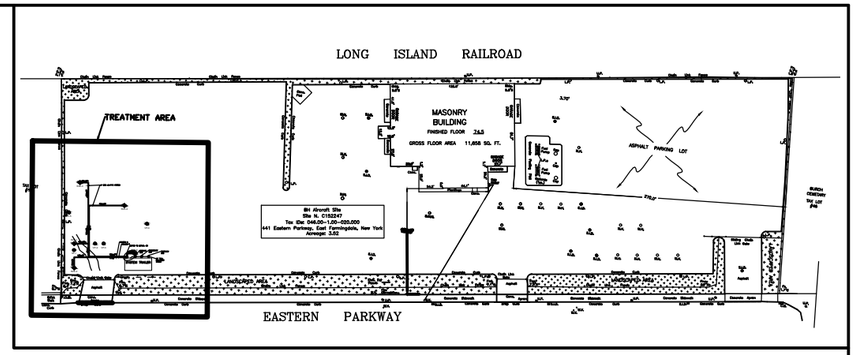
SOIL VAPOR / INDOOR AIR ANALYTICAL RESULTS MAP

PREPARED BY:
GZA GeoEnvironmental of New York
Engineers and Scientists
104 WEST 29TH STREET, 10TH FLOOR
NEW YORK, NEW YORK 10001

PREPARED FOR: 441 EASTERN PARKWAY, LLC

PROJ MGR: DW	REVIEWED BY: MW	CHECKED BY: DW	FIGURE
DESIGNED BY: MW	DRAWN BY: MT	SCALE: 1" = 50'	7
DATE: NOVEMBER 2018	PROJECT NO. 12.0076545.00	REVISION NO.	SHEET NO.





KEY MAP:
1" = 150'

LEGEND:

- SVE-1 — EXISTING 2" VAPOR EXTRACTION WELL
- SVE-3 — PROPOSED 2" VAPOR EXTRACTION WELL
- VP-1 — EXISTING 1" VAPOR MONITORING POINT
- VP-4 — PROPOSED 1" VAPOR MONITORING POINT
- SYSTEM TRAILER WITH BLOWER AND COMPRESSOR LOCATION
- MARKED ELECTRIC LINE
- ABOVE GROUND PIPING
- SUBSURFACE PIPING
- RADIUS OF INFLUENCE
- FLOW DIRECTION

N W E S

0 8' 16' 32'

SCALE IN FEET 1" = 16'

NO.	ISSUE/DESCRIPTION	BY	DATE

441 EASTERN PARKWAY
FARMINGDALE, NEW YORK

APPROVED:

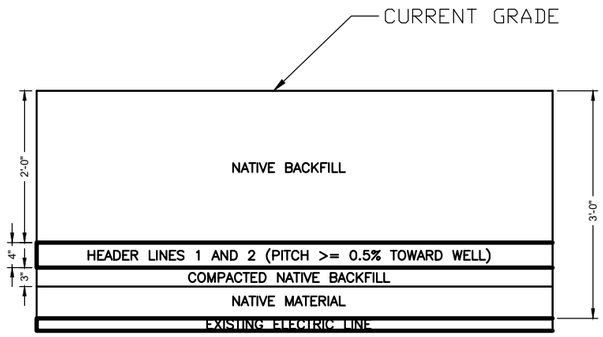
ERNEST R. HANNA
NY P.E. 065440

FULL SCALE SOIL VAPOR EXTRACTION WITH RADIUS OF INFLUENCE

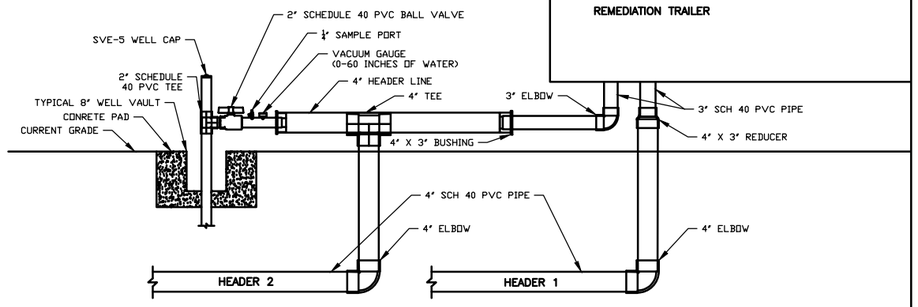
PREPARED BY:
GZA GeoEnvironmental of New York
Engineers and Scientists
104 WEST 29TH STREET, 10TH FLOOR
NEW YORK, NEW YORK 10001

PREPARED FOR:
441 EASTERN PARKWAY, LLC

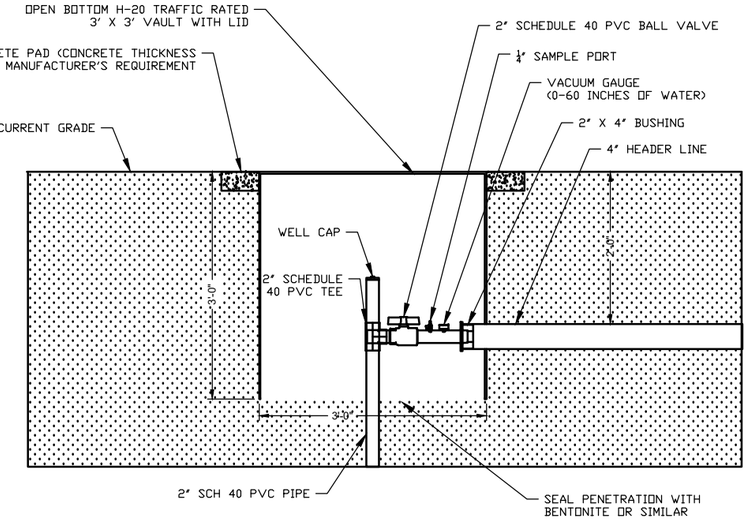
PROJ MGR: DW	REVIEWED BY: SK	CHECKED BY: DW	FIGURE
DESIGNED BY: BJ	DRAWN BY: PB	SCALE: 1" = 16'	8
DATE: APRIL 2019	PROJECT NO. 12.0076545.00	REVISION NO.	SHEET NO.



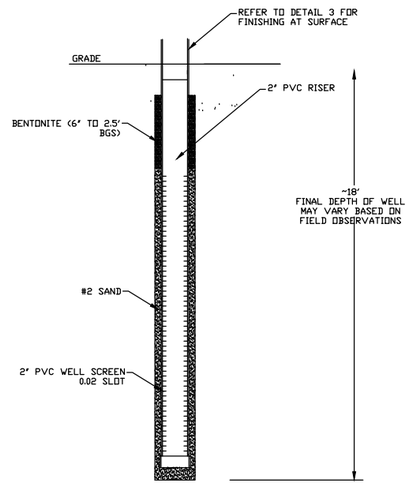
DETAIL 1 - PIPING CROSS SECTION (TYPICAL)
NOT TO SCALE



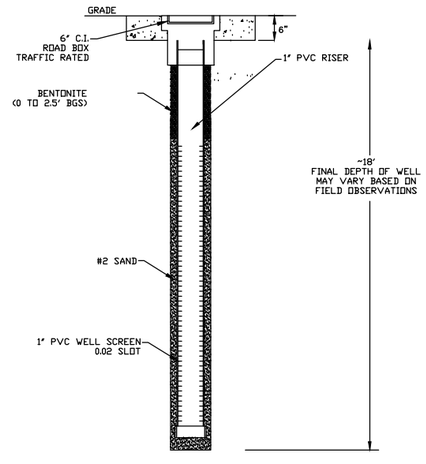
DETAIL 2 - SVE-5 ABOVE GROUND CONNECTION AND CONNECTIONS TO THE TRAILER
NOT TO SCALE



DETAIL 3 - TYPICAL EXTRACTION WELL VAULT
NOT TO SCALE



DETAIL 4 - 2" SOIL VAPOR EXTRACTION POINT
NOT TO SCALE



DETAIL 5 - 1" VAPOR MONITORING POINT
NOT TO SCALE

NO.	ISSUE/DESCRIPTION	BY	DATE

441 EASTERN PARKWAY
FARMINGDALE, NEW YORK

FULL SCALE SOIL VAPOR EXTRACTION DETAILS

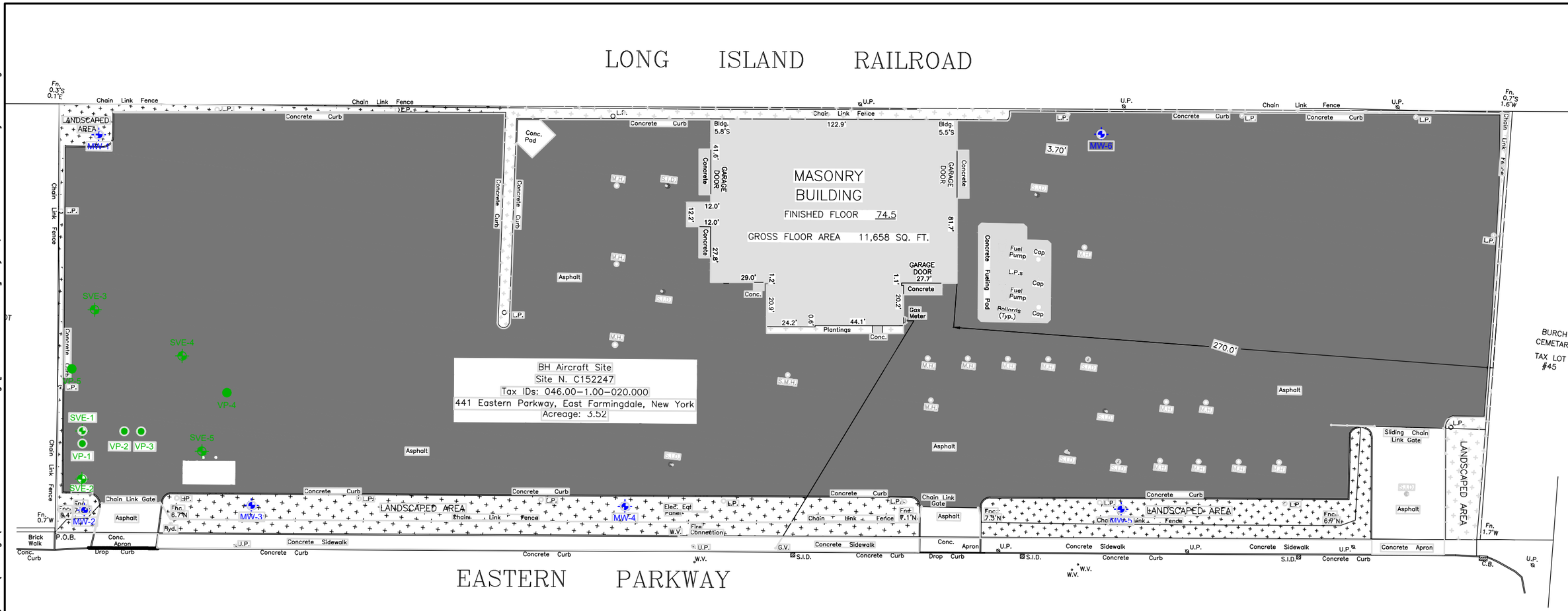
APPROVED:

ERNEST R. HANNA
NY P.E. 065440

PREPARED BY:
GZA GeoEnvironmental of New York
Engineers and Scientists
104 WEST 29TH STREET, 10TH FLOOR
NEW YORK, NEW YORK 10001

PREPARED FOR:
441 EASTERN PARKWAY, LLC

PROJ MGR: DW	REVIEWED BY: SK	CHECKED BY: DW	FIGURE 9
DESIGNED BY: BJ	DRAWN BY: PB	SCALE: 1" = 20'	
DATE: APRIL 2019	PROJECT NO. 12.0076545.00	REVISION NO.	SHEET NO.



LEGEND:

- MW-1 — GROUNDWATER MONITORING WELL
- SVE-1 — SOIL VAPOR EXTRACTION WELL
- VP-1 — SOIL VAPOR MONITORING POINT
- ASPHALT COVER
- CONCRETE COVER
- TOPSOIL COVER

0 25' 50' 100'

SCALE IN FEET 1" = 50'

NO.	ISSUE/DESCRIPTION	BY	DATE

441 EASTERN PARKWAY
FARMINGDALE, NEW YORK

LOCATION OF ENGINEERING CONTROLS

APPROVED:

ERNEST R. HANNA
NY P.E. 065440

PREPARED BY:
GZA GeoEnvironmental of New York
Engineers and Scientists
104 WEST 29TH STREET, 10TH FLOOR
NEW YORK, NEW YORK 10001

PREPARED FOR:
441 EASTERN PARKWAY, LLC

PROJ MGR: DW	REVIEWED BY: SK	CHECKED BY: DW	FIGURE
DESIGNED BY: BJ	DRAWN BY: PB	SCALE: 1" = 16'	10
DATE: APRIL 2019	PROJECT NO. 12.0076545.00	REVISION NO.	SHEET NO.

APPENDIX A – BROWNFIELD CLEANUP AGREEMENT

New York State Department of Environmental Conservation
Division of Environmental Remediation, 12th Floor
625 Broadway, Albany, New York 12233-7011
Phone: (518) 402-9706 **Fax:** (518) 402-9020
Website: www.dec.ny.gov

Certified Mail, Return Receipt Requested
441 Eastern Parkway, LLC
Michael Cohen
36-11 Northern Boulevard
Long Island City, NY 11101

August 21, 2017

Re: BH Aircraft Site
Tax Map ID No.: 046.00-1.00-020.000
Property County: Suffolk
Site No.: C152247

Dear Applicant:

Your application for the above-referenced Brownfield Cleanup Program ("BCP") project has been reviewed by the New York State Department of Environmental Conservation ("Department"). I am pleased to inform you that your request is accepted. The acceptance is based upon your participation as follows:

441 Eastern Parkway, LLC is a Volunteer as defined in ECL 27-1405(1)(b) Tangible Property Tax Credit Status is described in Section II of the attached Brownfield Cleanup Agreement (BCA).

Based upon the facts and information in the application, information contained in the Department's records, and a timely return of the signed BCAs, the Department is prepared to execute a BCA for the above-described property. Enclosed are three original proposed BCAs. Please have an authorized representative sign all three originals where indicated and return them to my attention at 625 Broadway, Albany, New York, along with proof that the party executing the BCA is authorized to bind the Requestor. This would be documentation from corporate organizational papers, which are updated, showing the authority to bind the corporation, or a Corporate Resolution showing the same, or an Operating Agreement or Resolution for an LLC. The BCA shall not be effective until it is fully executed by the parties. A reassessment of eligibility may result in a denial of the application if there are any changes to material facts and information before the BCA is fully executed. **Please note, if the BCA is not signed and returned to the Department within 60 days, the Department will consider the Application withdrawn and the offer to enter the BCP will be deemed rescinded.**

The Department looks forward to working with you on this project. The Department's project manager will assist you in completing your project. You can arrange a meeting to discuss the program's requirements and work plan. The work plan will determine the scope of work to be conducted and completed. You may contact the

Department's project team as set forth in Paragraph IV of the attached draft BCA to discuss the next steps.

Sincerely,

Robert W. Schick, P.E., Director
Division of Environmental Remediation

Enclosures:

Department's Copies:
ec: Eric Obrecht
Walter Parish
Dolores Tuohy
Kelly Lewandowski
Andrew Guglielmi
Richard P. Mustico
Michael Murphy

Applicant's Copies:
ec: Michael Cohen (mcohen@silverstarny.com)
Linda R. Shaw, Esq. (lshaw@nyenvlaw.com)
David Winslow, Ph, D., P.G. (david.winslow@gza.com)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
BROWNFIELD CLEANUP PROGRAM
ECL §27-1401 *et seq.*

In the Matter of a Remedial Program for

BROWNFIELD SITE CLEANUP AGREEMENT
Index No. C152247-08-17

BH Aircraft Site
DEC Site No.: C152247
Located at: 441 Eastern Parkway
Suffolk County
East Farmingdale, NY 11735

Hereinafter referred to as "Site"

by:

441 Eastern Parkway, LLC
36-11 Northern Boulevard, Long Island City, NY 11101

Hereinafter referred to as "Applicant"

WHEREAS, the Department of Environmental Conservation ("Department") is authorized to administer the Brownfield Cleanup Program ("BCP") set forth in Article 27, Title 14 of the Environmental Conservation Law ("ECL"); and

WHEREAS, the Applicant submitted an application received by the Department on April 20, 2017; and

WHEREAS, the Department has determined that the Site and Applicant are eligible to participate in the BCP.

NOW, THEREFORE, IN CONSIDERATION OF AND IN EXCHANGE FOR THE MUTUAL COVENANTS AND PROMISES, THE PARTIES AGREE TO THE FOLLOWING:

I. Applicant Status

The Applicant, 441 Eastern Parkway, LLC, is participating in the BCP as a Volunteer as defined in ECL 27-1405(1)(b).

II. Tangible Property Tax Credit Status

The Site is not located in a City having a population of one million or more. It is therefore presumed that the Site is eligible for tangible property tax credits.

III. Real Property

The Site subject to this Brownfield Cleanup Agreement (the "BCA" or "Agreement") consists of approximately 3.520 acres, a Map of which is attached as Exhibit "A", and is described as follows:

Tax Map/Parcel No.: 046.00-1.00-020.000
Street Number: 441 Eastern Parkway, East Farmingdale
Owner: 441 Eastern Parkway, LLC

IV. Communications

A. All written communications required by this Agreement shall be transmitted by United States Postal Service, by private courier service, by hand delivery, or by electronic mail.

1. Communication from Applicant shall be sent to:

Richard P. Mustico
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233-7015
richard.mustico1@dec.ny.gov

Note: one hard copy (unbound) of work plans and reports is required, as well as one electronic copy.

Krista Anders (electronic copy only)
New York State Department of Health
Bureau of Environmental Exposure Investigation
Empire State Plaza
Corning Tower Room 1787
Albany, NY 12237
krista.anders@health.ny.gov

Michael Murphy, Esq. (correspondence only)
New York State Department of Environmental Conservation
Office of General Counsel
625 Broadway
Albany, NY 12233-1500
michael.murphy1@dec.ny.gov

2. Communication from the Department to Applicant shall be sent to:

441 Eastern Parkway, LLC
Attn: Michael Cohen
36-11 Northern Boulevard
Long Island City, NY 11101
mcohen@silverstarny.com

B. The Department and Applicant reserve the right to designate additional or different addressees for communication on written notice to the other. Additionally, the Department reserves the right to request that the Applicant provide more than one paper copy of any work plan or report.

C. Each party shall notify the other within ninety (90) days after any change in the addresses listed in this paragraph or in Paragraph III.

V. Miscellaneous

A. Applicant acknowledges that it has read, understands, and agrees to abide by all the terms set forth in Appendix A - "Standard Clauses for All New York State Brownfield Site Cleanup Agreements" which is attached to and hereby made a part of this Agreement as if set forth fully herein.

B. In the event of a conflict between the terms of this BCA (including any and all attachments thereto and amendments thereof) and the terms of Appendix A, the terms of this BCA shall control.

C. The effective date of this Agreement is the date it is signed by the Commissioner or the Commissioner's designee.

DATED:
August 21, 2017

THIS BROWNFIELD CLEANUP AGREEMENT IS HEREBY APPROVED, Acting by and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: _____

Robert W. Schick, P.E., Director
Division of Environmental Remediation

CONSENT BY APPLICANT

Applicant hereby consents to the issuing and entering of this Agreement, waives Applicant's right to a hearing herein as provided by law, and agrees to be bound by this Agreement.

441 Eastern Parkway, LLC

By: _____

Title: Managing Member

Date: 8/29/17

STATE OF NEW YORK)
) ss:
COUNTY OF)

On the 29 day of August in the year 2017, before me, the undersigned, personally appeared Michael Cohen, 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.

_____
Signature and Office of individual
taking acknowledgment

CARMELA T. MORELLO
Notary Public, State of New York
No. 4969878
Qualified in Westchester County
Commission Expires July 30, 2018

EXHIBIT A

SITE MAP

BASE MAP

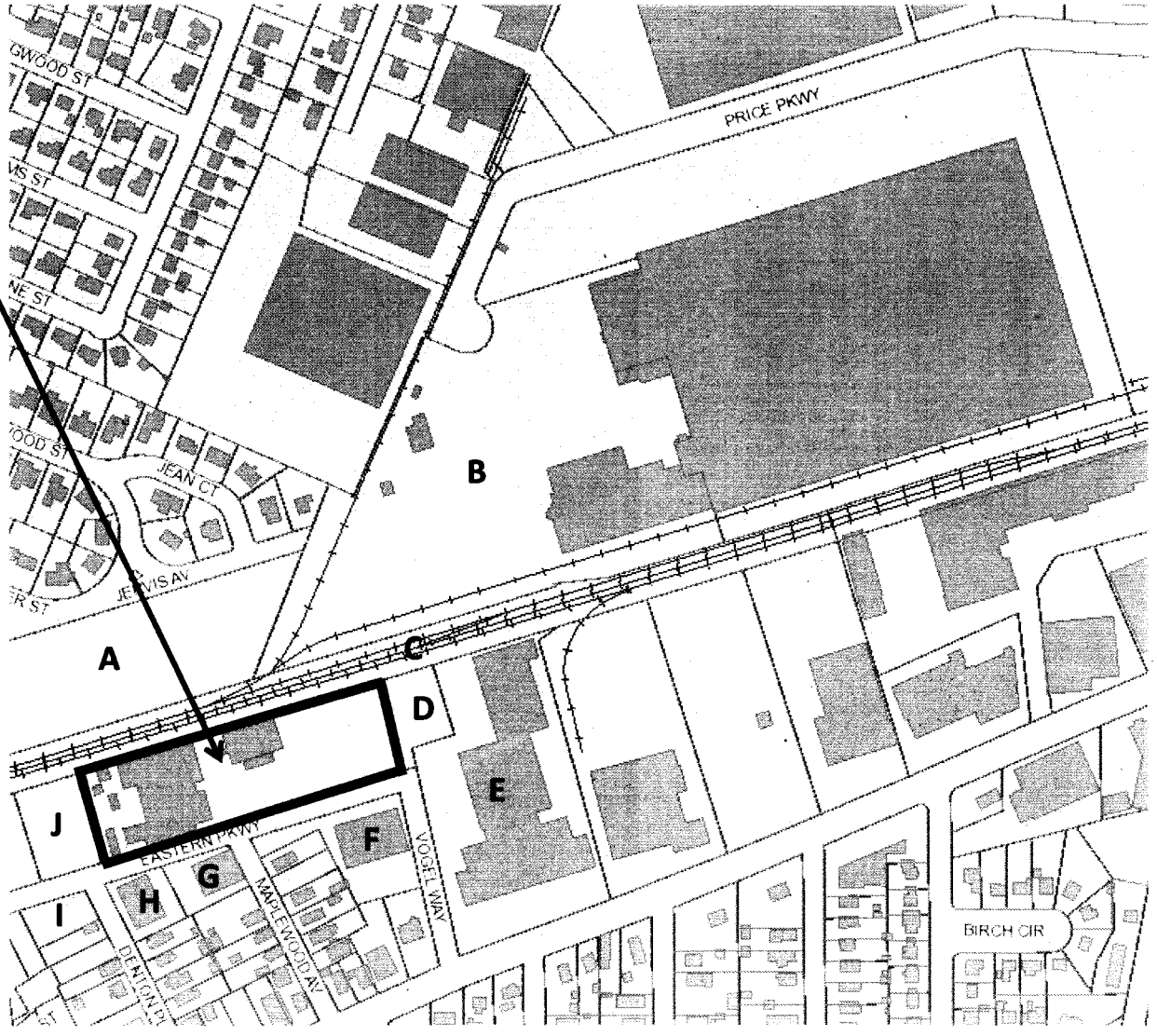
BH Aircraft Site

441 Eastern Parkway
Babylon, New York

Legend:

Site Property Boundary

Corresponding page
lists adjacent property owners
by letter A – J



N

All feature locations are approximate. This map is intended as a schematic to be used in conjunction with associated Application and Support Information, and should not be relied upon as a survey for planning and other activities.

March 24, 2017
Source: Suffolk County
Property Information
Scale: 1" = 100' approximately

APPENDIX A

STANDARD CLAUSES FOR ALL NEW YORK STATE BROWNFIELD SITE CLEANUP AGREEMENTS

The parties to the Brownfield Site Cleanup Agreement (hereinafter "BCA" or "Agreement") agree to be bound by the following clauses which are hereby made a part of the BCA. The word "Applicant" herein refers to any party to the Agreement, other than the New York State Department of Environmental Conservation (herein after "Department").

I. Citizen Participation Plan

Within twenty (20) days after the effective date of this Agreement, Applicant shall submit for review and approval a written citizen participation plan prepared in accordance with the requirements of Environmental Conservation Law (ECL) § 27-1417 and 6 NYCRR §§ 375-1.10 and 375-3.10. Upon approval, the Citizen Participation Plan shall be deemed to be incorporated into and made a part of this Agreement.

II. Development, Performance, and Reporting of Work Plans

A. Work Plan Requirements

The work plans ("Work Plan" or "Work Plans") under this Agreement shall be prepared and implemented in accordance with the requirements of ECL Article 27, Title 14, 6 NYCRR §§ 375-1.6(a) and 375-3.6, and all applicable laws, rules, regulations, and guidance documents. The Work Plans shall be captioned as follows:

1. "Remedial Investigation Work Plan" if the Work Plan provides for the investigation of the nature and extent of contamination within the boundaries of the Site and, if the Applicant is a "Participant", the extent of contamination emanating from such Site. If the Applicant is a "Volunteer" it shall perform a qualitative exposure assessment of the contamination emanating from the site in accordance with ECL § 27-1415(2)(b) and Department guidance;

2. "Remedial Work Plan" if the Work Plan provides for the development and implementation of a Remedial Program for contamination within the boundaries of the Site and, if the Applicant is a "Participant", the contamination that has emanated from such Site;

3. "IRM Work Plan" if the Work Plan provides for an interim remedial measure; or

4. "Site Management Plan" if the Work Plan provides for the identification and implementation of institutional and/or engineering controls as well as any necessary monitoring and/or operation and maintenance of the remedy.

5. "Supplemental" if additional work plans other than those set forth in II.A.1-4 are required to be prepared and implemented.

B. Submission/Implementation of Work Plans

1. The first proposed Work Plan to be submitted under this Agreement shall be submitted no later than thirty (30) days after the effective date of this Agreement. Thereafter, the Applicant shall submit such other and additional work plans as determined in a schedule to be approved by the Department.

2. Any proposed Work Plan shall be submitted for the Department's review and approval and shall include, at a minimum, a chronological description of the anticipated activities to be conducted in accordance with current guidance, a schedule for performance of those activities, and sufficient detail to allow the Department to evaluate that Work Plan. The Department shall use best efforts in accordance with 6 NYCRR § 375-3.6(b) to approve, modify, or reject a proposed Work Plan within forty-five (45) days from its receipt or within fifteen (15) days from the close of the comment period, if applicable, whichever is later.

i. Upon the Department's written approval of a Work Plan, such Department-approved Work Plan shall be deemed to be incorporated into and made a part of this Agreement and shall be implemented in accordance with the schedule contained therein.

ii. If the Department requires modification of a Work Plan, the reason for such modification shall be provided in writing and the provisions of 6 NYCRR § 375-1.6(d)(3) shall apply.

iii. If the Department disapproves a Work Plan, the reason for such disapproval shall be provided in writing and the provisions of 6 NYCRR § 375-1.6(d)(4) shall apply.

3. A Site Management Plan, if necessary, shall be submitted in accordance with

the schedule set forth in the IRM Work Plan or Remedial Work Plan.

C. Submission of Final Reports

1. In accordance with the schedule contained in an approved Work Plan, Applicant shall submit a Final Report for an Investigation Work Plan prepared in accordance with ECL § 27-1411(1) and 6 NYCRR § 375-1.6. If such Final Report concludes that no remediation is necessary, and the Site does not meet the requirements for Track 1, Applicant shall submit an Alternatives Analysis prepared in accordance with ECL § 27-1413 and 6 NYCRR § 375-3.8(f) that supports such determination.

2. In accordance with the schedule contained in an approved Work Plan, Applicant shall submit a Final Engineering Report certifying that remediation of the Site has been performed in accordance with the requirements of ECL §§ 27-1419(1) and (2) and 6 NYCRR § 375-1.6. The Department shall review such Report, the submittals made pursuant to this Agreement, and any other relevant information regarding the Site and make a determination as to whether the goals of the remedial program have been or will be achieved in accordance with established timeframes; if so, a written Certificate of Completion will be issued in accordance with ECL § 27-1419, 6 NYCRR §§ 375-1.9 and 375-3.9.

3. Within sixty (60) days of the Department's approval of a Final Report, Applicant shall submit such additional Work Plans as it proposes to implement. In addition, Applicant shall include with every report submitted to the Department a schedule for the submission of any subsequent work plan required to meet the requirements of ECL Article 27 Title 14. Failure to submit any additional Work Plans within such period shall, unless other Work Plans are under review by the Department or being implemented by Applicant, result in the termination of this Agreement pursuant to Paragraph XII.

D. Review of Submittals other than Work Plans

1. The Department shall timely notify Applicant in writing of its approval or disapproval of each submittal other than a Work Plan in accordance with 6 NYCRR § 375-1.6. All Department-approved submittals shall be incorporated into and become an enforceable part of this Agreement.

2. If the Department disapproves a submittal covered by this Subparagraph, it shall specify the reason for its disapproval and may request Applicant to modify or expand the submittal. Within fifteen (15) days after receiving written notice that Applicant's submittal has been disapproved, Applicant shall elect in writing to either (i) modify or expand it within thirty (30) days of receipt of the written notice of disapproval; (ii) complete any other Department-approved Work Plan(s); (iii) invoke dispute resolution pursuant to Paragraph XIII; or (iv) terminate this Agreement pursuant to Paragraph XII. If Applicant submits a revised submittal and it is disapproved, the Department and Applicant may pursue whatever remedies may be available under this Agreement or under law.

E. Department's Determination of Need for Remediation

The Department shall determine upon its approval of each Final Report dealing with the investigation of the Site whether remediation, or additional remediation as the case may be, is needed for protection of public health and the environment.

1. If the Department makes a preliminary determination that remediation, or additional remediation, is not needed for protection of public health and the environment, the Department shall notify the public of such determination and seek public comment in accordance with ECL § 27-1417(3)(f). The Department shall provide timely notification to the Applicant of its final determination following the close of the public comment period.

2. If the Department determines that additional remediation is not needed and such determination is based upon use restrictions, Applicant shall cause to be recorded an Environmental Easement in accordance with 6 NYCRR § 375-1.8(h).

3. If the Department determines that remediation, or additional remediation, is needed, Applicant may elect to submit for review and approval a proposed Remedial Work Plan (or modify an existing Work Plan for the Site) for a remedy selected upon due consideration of the factors set forth in ECL § 27-1415(3) and 6

NYCRR § 375-1.8(f). A proposed Remedial Work Plan addressing the Site's remediation will be noticed for public comment in accordance with ECL § 27-1417(3)(f) and the Citizen Participation Plan developed pursuant to this Agreement. If the Department determines following the close of the public comment period that modifications to the proposed Remedial Work Plan are needed, Applicant agrees to negotiate appropriate modifications to such Work Plan. If Applicant elects not to develop a Work Plan under this Subparagraph then this Agreement shall terminate in accordance with Paragraph XII. If the Applicant elects to develop a Work Plan, then it will be reviewed in accordance with Paragraph II.D above.

F. Institutional/Engineering Control Certification

In the event that the remedy for the Site, if any, or any Work Plan for the Site, requires institutional or engineering controls, Applicant shall submit a written certification in accordance with 6 NYCRR §§ 375-1.8(h)(3) and 375-3.8(h)(2).

III. Enforcement

Except as provided in Paragraph V, this Agreement shall be enforceable as a contractual agreement under the laws of the State of New York. Applicant shall not suffer any penalty except as provided in Paragraph V, or be subject to any proceeding or action if it cannot comply with any requirement of this Agreement as a result of a Force Majeure Event as described at 6 NYCRR § 375-1.5(b)(4) provided Applicant complies with the requirements set forth therein.

IV. Entry upon Site

A. Applicant hereby agrees to provide access to the Site and to all relevant information regarding activities at the Site in accordance with the provisions of ECL § 27-1431. Applicant agrees to provide the Department upon request with proof of access if it is not the owner of the site.

B. The Department shall have the right to periodically inspect the Site to ensure that the use of the property complies with the terms and conditions of this Agreement. The Department will generally conduct such inspections during business hours, but retains the right to inspect at any time.

C. Failure to provide access as provided for under this Paragraph may result in termination of this Agreement pursuant to Paragraph XII.

V. Payment of State Costs (Applicable only to Applicants with Participant Status)

A. Within forty-five (45) days after receipt of an itemized invoice from the Department; Applicant shall pay to the Department a sum of money which shall represent reimbursement for State Costs as provided by 6 NYCRR § 375-1.5 (b)(3)(i).

B. Costs shall be documented as provided by 6 NYCRR § 375-1.5(b)(3)(ii). The Department shall not be required to provide any other documentation of costs, provided however, that the Department's records shall be available consistent with, and in accordance with, Article 6 of the Public Officers Law.

C. Each such payment shall be made payable to the "Commissioner of NYSDEC" and shall be sent to:

Director, Bureau of Program Management
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-7012

D. Each party shall provide written notification to the other within ninety (90) days of any change in the foregoing addresses.

E. If Applicant objects to any invoiced costs under this Agreement, the provisions of 6 NYCRR §§ 375-1.5 (b)(3)(v) and (vi) shall apply. Objections shall be sent to the Department as provided under subparagraph V.C above.

F. In the event of non-payment of any invoice within the 45 days provided herein, the Department may seek enforcement of this provision pursuant to Paragraph III or the Department may commence an enforcement action for non-compliance with ECL § 27-1409(2) and ECL § 71-4003.

VI. Liability Limitation

Subsequent to the issuance of a Certificate of Completion pursuant to this Agreement, Applicant shall be entitled to the Liability Limitation set forth at ECL § 27-1421, subject to the terms and conditions stated therein and to the provisions of 6 NYCRR §§ 375-1.9 and 375-3.9.

VII. Reservation of Rights

A. Except as provided in Subparagraph VII.B, Applicant reserves all rights and defenses under applicable law to contest, defend against, dispute, or disprove any action, proceeding, allegation, assertion, determination, or order of the Department, including any assertion of remedial liability by the Department against Applicant, and further reserves all rights including the rights to notice, to be heard, to appeal, and to any other due process respecting any action or proceeding by the Department, including the enforcement of this Agreement. The existence of this Agreement or Applicant's compliance with it shall not be construed as an admission of any liability, fault, wrongdoing, or violation of law by Applicant, and shall not give rise to any presumption of law or finding of fact which shall inure to the benefit of any third party.

B. Notwithstanding the foregoing, Applicant hereby waives any right it may have to make a claim pursuant to Article 12 of the Navigation Law with respect to the Site and releases the State and the New York Environmental Protection and Spill Compensation Fund from any and all legal or equitable claims, suits, causes of action, or demands whatsoever with respect to the Site that Applicant may have as a result of Applicant's entering into or fulfilling the terms of this Agreement.

VIII. Indemnification

Applicant shall indemnify and hold the Department, the State of New York, and their representatives and employees harmless from any claim, suit, action, and cost of every name and description arising out of or resulting from the fulfillment or attempted fulfillment of this Agreement by Applicant prior to the Termination Date except for those claims, suits, actions, and costs arising from the State's gross negligence or willful or intentional misconduct by the Department, the State of New York, and/or their representatives and employees during the course of any activities conducted pursuant to this Agreement. In the event that the Applicant is a Participant, this provision shall also include the Trustee of the State's Natural Resources. The Department shall provide Applicant with written notice no less than thirty (30) days prior to commencing a lawsuit seeking indemnification pursuant to this Paragraph.

IX. Change of Use

Applicant shall notify the Department at least sixty (60) days in advance of any change of use, as defined in ECL § 27-1425, which is proposed for the Site, in accordance with the provisions of 6 NYCRR § 375-1.11(d). In the event the Department determines that the proposed change of use is prohibited, the Department shall notify Applicant of such determination within forty-five (45) days of receipt of such notice.

X. Environmental Easement

A. Within thirty (30) days after the Department's approval of a Remedial Work Plan which relies upon one or more institutional and/or engineering controls, or within sixty (60) days after the Department's determination pursuant to Subparagraph II.E.2 that additional remediation is not needed based upon use restrictions, Applicant shall submit to the Department for approval an Environmental Easement to run with the land in favor of the State which complies with the requirements of ECL Article 71, Title 36 and 6 NYCRR § 375-1.8(h)(2). Applicant shall cause such instrument to be recorded with the recording officer for the county in which the Site is located within thirty (30) days after the Department's approval of such instrument. Applicant shall provide the Department with a copy of such instrument certified by the recording officer to be a true and faithful copy within thirty (30) days of such recording (or such longer period of time as may be required to obtain a certified copy provided Applicant advises the Department of the status of its efforts to obtain same within such thirty (30) day period), which shall be deemed to be incorporated into this Agreement.

B. Applicant or the owner of the Site may petition the Department to modify or extinguish the Environmental Easement filed pursuant to this Agreement at such time as it can certify that the Site is protective of public health and the environment without reliance upon the restrictions set forth in such instrument. Such certification shall be made by a Professional Engineer or Qualified Environmental Professional

as defined at 6 NYCRR § 375-1.2(ak) approved by the Department. The Department will not unreasonably withhold its consent.

XI. Progress Reports

Applicant shall submit a written progress report of its actions under this Agreement to the parties identified in Subparagraph III.A.1 of the Agreement by the 10th day of each month commencing with the month subsequent to the approval of the first Work Plan and ending with the Termination Date, unless a different frequency is set forth in a Work Plan. Such reports shall, at a minimum, include: all actions relative to the Site during the previous reporting period and those anticipated for the next reporting period; all approved activity modifications (changes of work scope and/or schedule); all results of sampling and tests and all other data received or generated by or on behalf of Applicant in connection with this Site, whether under this Agreement or otherwise, in the previous reporting period, including quality assurance/quality control information; information regarding percentage of completion; unresolved delays encountered or anticipated that may affect the future schedule and efforts made to mitigate such delays; and information regarding activities undertaken in support of the Citizen Participation Plan during the previous reporting period and those anticipated for the next reporting period.

XII. Termination of Agreement

Applicant or the Department may terminate this Agreement consistent with the provisions of 6 NYCRR §§ 375-3.5(b), (c), and (d) by providing written notification to the parties listed in Paragraph IV of the Agreement.

XIII. Dispute Resolution

A. In the event disputes arise under this Agreement, Applicant may, within fifteen (15) days after Applicant knew or should have known of the facts which are the basis of the dispute, initiate dispute resolution in accordance with the provisions of 6 NYCRR § 375-1.5(b)(2).

B. All cost incurred by the Department associated with dispute resolution are State costs subject to reimbursement pursuant to Paragraph V of Appendix A of this Agreement, if applicable.

C. Notwithstanding any other rights otherwise authorized in law or equity, any disputes pursuant to this Agreement shall be limited to Departmental decisions on remedial activities. In no event shall such dispute authorize a challenge to the applicable statute or regulation.

XIV. Miscellaneous

A. If the information provided and any certifications made by Applicant are not materially accurate and complete, this Agreement, except with respect to Applicant's obligations pursuant to Paragraphs V, if applicable, and VII.B, and VIII, shall be null and void ab initio fifteen (15) days after the Department's notification of such inaccuracy or incompleteness or fifteen (15) days after issuance of a final decision resolving a dispute pursuant to Paragraph XIII, whichever is later, unless Applicant submits information within that fifteen (15) day time period indicating that the information provided and the certifications made were materially accurate and complete. In the event this Agreement is rendered null and void, any Certificate of Completion and/or Liability Limitation that may have been issued or may have arisen under this Agreement shall also be null and void ab initio, and the Department shall reserve all rights that it may have under law.

B. By entering into this Agreement, Applicant agrees to comply with and be bound by the provisions of 6 NYCRR §§ 375-1, 375-3 and 375-6; the provisions of such subparts that are referenced herein are referenced for clarity and convenience only and the failure of this Agreement to specifically reference any particular regulatory provision is not intended to imply that such provision is not applicable to activities performed under this Agreement.

C. The Department may exempt Applicant from the requirement to obtain any state or local permit or other authorization for any activity conducted pursuant to this Agreement in accordance with 6 NYCRR §§ 375-1.12(b), (c), and (d).

D. 1. Applicant shall use "best efforts" to obtain all Site access, permits, easements, approvals, institutional controls, and/or authorizations necessary to perform Applicant's obligations under this Agreement, including all Department-approved Work Plans and the schedules contained therein. If, despite Applicant's best efforts, any access, permits,

easements, approvals, institutional controls, or authorizations cannot be obtained, Applicant shall promptly notify the Department and include a summary of the steps taken. The Department may, as it deems appropriate and within its authority, assist Applicant in obtaining same.

2. If an interest in property is needed to implement an institutional control required by a Work Plan and such interest cannot be obtained, the Department may require Applicant to modify the Work Plan pursuant to 6 NYCRR § 375-1.6(d)(3) to reflect changes necessitated by Applicant's inability to obtain such interest.

E. The paragraph headings set forth in this Agreement are included for convenience of reference only and shall be disregarded in the construction and interpretation of any provisions of this Agreement.

F. 1. The terms of this Agreement shall constitute the complete and entire agreement between the Department and Applicant concerning the implementation of the activities required by this Agreement. No term, condition, understanding, or agreement purporting to modify or vary any term of this Agreement shall be binding unless made in writing and subscribed by the party to be bound. No informal advice, guidance, suggestion, or comment by the Department shall be construed as relieving Applicant of its obligation to obtain such formal approvals as may be required by this Agreement. In the event of a conflict between the terms of this Agreement and any Work Plan submitted pursuant to this Agreement, the terms of this Agreement shall control over the terms of the Work Plan(s). Applicant consents to and agrees not to contest the authority and jurisdiction of the Department to enter into or enforce this Agreement.

2. i. Except as set forth herein, if Applicant desires that any provision of this Agreement be changed, Applicant shall make timely written application to the Commissioner with copies to the parties in Subparagraph IV.A.1 of the Agreement.

ii. If Applicant seeks to modify an approved Work Plan, a written request shall be made to the Department's project manager, with copies to the parties listed in Subparagraph IV.A.1 of the Agreement.

iii. Requests for a change to a time frame set forth in this Agreement shall be made in writing to the Department's project attorney and project manager; such requests shall not be unreasonably denied and a written response to such requests shall be sent to Applicant promptly.

G. 1. If there are multiple parties signing this Agreement, the term "Applicant" shall be read in the plural, the obligations of each such party under this Agreement are joint and several, and the insolvency of or failure by any Applicant to implement any obligations under this Agreement shall not affect the obligations of the remaining Applicant(s) under this Agreement.

2. If Applicant is a partnership, the obligations of all general partners (including limited partners who act as general partners) under this Agreement are joint and several and the insolvency or failure of any general partner to implement any obligations under this Agreement shall not affect the obligations of the remaining partner(s) under this Agreement.

3. Notwithstanding the foregoing Subparagraphs XIV.G.1 and 2, if multiple parties sign this Agreement as Applicants but not all of the signing parties elect to implement a Work Plan, all Applicants are jointly and severally liable for each and every obligation under this Agreement through the completion of activities in such Work Plan that all such parties consented to; thereafter, only those Applicants electing to perform additional work shall be jointly and severally liable under this Agreement for the obligations and activities under such additional Work Plan(s). The parties electing not to implement the additional Work Plan(s) shall have no obligations under this Agreement relative to the activities set forth in such Work Plan(s). Further, only those Applicants electing to implement such additional Work Plan(s) shall be eligible to receive the Liability Limitation referenced in Paragraph VI.

4. Any change to parties pursuant to this Agreement, including successors and assigns through acquisition of title, is subject to approval by the Department, after submittal of an application acceptable to the Department.

H. Applicant shall be entitled to receive contribution protection and/or to seek contribution to the extent authorized by ECL § 27-1421(6) and 6 NYCRR § 375-1.5(b)(5).

I. Applicant shall not be considered an operator of the Site solely by virtue of having executed and/or implemented this Agreement.

J. Applicant and Applicant's agents, grantees, lessees, sublessees, successors, and assigns shall be bound by this Agreement. Any change in ownership of Applicant including, but not limited to, any transfer of assets or real or personal property, shall in no way alter Applicant's responsibilities under this Agreement.

K. Unless otherwise expressly provided herein, terms used in this Agreement which are defined in ECL Article 27 or in regulations promulgated thereunder shall have the meaning assigned to them under said statute or regulations.

L. Applicant's obligations under this Agreement shall not be deemed to constitute any type of fine or penalty.

M. In accordance with 6 NYCRR § 375-1.6(a)(4), the Department shall be notified at least 7 days in advance of, and be allowed to attend, any field activities to be conducted under a Department approved work plan, as well as any pre-bid meetings, job progress meetings, substantial completion meeting and inspection, and final inspection and meeting; provided, however that the Department may be excluded from portions of meetings where privileged matters are discussed.

N. In accordance with 6 NYCRR § 375-1.11(a), all work plans; reports, including all attachments and appendices, and certifications, submitted by a remedial party shall be submitted in print, as well as in an electronic format acceptable to the Department.

O. This Agreement may be executed for the convenience of the parties hereto, individually or in combination, in one or more counterparts, each of which shall be deemed to have the status of an executed original and all of which shall together constitute one and the same.

APPENDIX B – ENVIRONMENTAL EASEMENT

Knauf Shaw LLP
ATTORNEYS AT LAW

October 4, 2018 **VIA FED EX**

Bradford Burns, Esq.
Senior Attorney
New York State Department of
Environmental Conservation
Office of General Counsel
625 Broadway, 14th Floor
Albany, New York 12233

Richard Mustico, Project Manager
New York State Department of
Environmental Conservation
Division of Environmental Remediation, Bureau A
625 Broadway, 12th Floor
Albany, New York 12233

Michael C. Murphy, Project Attorney
New York State Department of
Environmental Conservation
Division of Legal Affairs
625 Broadway, 14th Floor
Albany, New York 12233

RE:	**Environmental Easement Package**
Parties:	**441 Eastern Parkway LLC**
Site Name:	**BH Aircraft Site**
BCP Site No.:	**C152247**
Site Address:	**441 Eastern Parkway East Farmingdale, NY 11735**

Dear Mr. Burns, Mr. Murphy, and Mr. Mustico:

Enclosed please find an Environmental Easement Package for the aforementioned site. Mr. Murphy and Mr. Mustico are only receiving electronic copies.

Please do not hesitate to contact me if you have any questions. Thank you.

Sincerely,

KNAUF SHAW LLP

LINDA R. SHAW

Enclosures
Cc: 441 Eastern Parkway LLC
GZA

EXHIBIT A

Bargain and Sale Deed with Covenant Against Grantor's Acts - Individual or Corporation (Single Sheet)

CONSULT YOUR LAWYER BEFORE SIGNING THIS INSTRUMENT- THIS INSTRUMENT SHOULD BE USED BY LAWYERS ONLY

THIS INDENTURE, made the 16th day of November, in the year 2016

BETWEEN

EASTERN PARKWAY FARMINGDALE, LLC, a New York limited liability company, having an address at 3355 Veterans Memorial Highway, Ronkonkoma, New York 11779,

party of the first part, and

441 EASTERN PARKWAY, LLC, a New York limited liability company, having an address at 36-11 Northern Boulevard, Long Island City, New York 11101,

party of the second part,

WITNESSETH, that the party of the first part, in consideration of Ten Dollars and other valuable consideration paid by the party of the second part, does hereby grant and release unto the party of the second part, the heirs or successors and assigns of the party of the second part forever,

ALL that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the

SEE SCHEDULE A ANNEXED HERETO AND MADE A PART HEREOF.

BEING AND INTENDED to be the same premises conveyed to grantor by Deed dated October 23, 2002 and recorded in the Office of the Suffolk County Clerk on November 4, 2002 in Liber 12218, cp 378.

Premises also known as 441 Eastern Parkway, East Farmingdale, New York 11735.

TOGETHER with all right, title and interest, if any, of the party of the first part of, in and to any streets and roads abutting the above-described premises to the center lines thereof; TOGETHER with the appurtenances and all the estate and rights of the party of the first part in and to said premises; TO HAVE AND TO HOLD the premises herein granted unto the party of the second part, the heirs or successors and assigns of the party of the second part forever,

AND the party of the first part covenants that the party of the first part has not done or suffered anything whereby the said premises have been incumbered in any way whatever, except as aforesaid.

AND the party of the first part, in compliance with Section 13 of the Lien Law, covenants that the party of the first part will receive the consideration for this conveyance and will hold the right to receive such consideration as a trust fund to be applied first for the purpose of paying the cost of the improvement and will apply the same first to the payment of the cost of the improvement before using any part of the total of the same for any other purpose.

The word "party" shall be construed as if it read "parties" whenever the sense of this indenture so requires.

IN WITNESS WHEREOF, the party of the first part has duly executed this deed the day and year first above written.

IN PRESENCE OF :

EASTERN PARKWAY FARMINGDALE, LLC
By: VMH Real Estate Holding, LLC

By: _____
Ronald A. Baumann, Member

ist. 0100

ec.: 046.00

lk.: 01.00

ot: 020.000

USE ACKNOWLEDGMENT FORM BELOW WITHIN NEW YORK STATE ONLY:

State of New York, County of Suffolk } ss.:

On the 16th day of November in the year 2016 before me, the undersigned, personally appeared RONALD A. BAUMANN, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

Pat Kelly

Notary Public

PAT KELLY
Notary Public, State of New York
No 01KE6029733
Qualified in Nassau County
Commission Expires August 30, 2017

ACKNOWLEDGMENT FORM FOR USE WITHIN NEW YORK STATE ONLY:
{New York Subscribing Witness Acknowledgment Certificate}

STATE OF NEW YORK, COUNTY OF }ss:

On the day of in the year before me, the undersigned, personally appeared
the subscribing witness to the foregoing instrument, with whom I am personally acquainted, who, being by me duly sworn, did depose and say that he/she/they reside(s) in

(if the place of residence is in a city, include the street and street number, if any, thereof); that he/she/they know(s)
to be the individual described in and who executed the foregoing instrument; that said subscribing witness was present and saw said execute the same; and that said witness at the same time subscribed his/her/their name(s) as a witness thereto.

Notary Public

USE ACKNOWLEDGMENT FORM BELOW WITHIN NEW YORK STATE ONLY:

State of New York, County of } ss.:

On the day of in the year before me, the undersigned, personally appeared
personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

Notary Public

ACKNOWLEDGMENT FORM FOR USE OUTSIDE NEW YORK STATE ONLY:
{Out of State of Foreign General Acknowledgment Certificate}

_____} ss:
{Complete Venue with State, County, Province or Municipality}

On the day of in the year before me, the undersigned, personally appeared
personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) 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, and that such individual made such appearance before the undersigned in the
(Insert the city or other political subdivision and the state or country or other place the acknowledgment was taken).

Notary Public

BARGAIN AND SALE DEED
WITH COVENANT AGAINST GRANTOR'S ACTS

TITLE NO. 3019-819162

EASTERN PARKWAY FARMINGDALE, LLC

TO

441 EASTERN PARKWAY, LLC

DISTRICT	0100
SECTION	046.00
BLOCK	01.00
LOT	020.000
COUNTY	SUFFOLK

RETURN BY MAIL TO:

Marvin Natiss, Esq.
Natiss & Gordon, P.C.
277 Willis Avenue
Roslyn Heights, NY 11577

SCHEDULE A

ALL THOSE LOTS OR PARCELS OF LAND, IN OR NEAR THE VILLAGE OF FARMINGDALE, TOWN OF BABYLON, COUNTY OF SUFFOLK, STATE OF NEW YORK AND BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE NORTHERLY SIDE OF EASTERN PARKWAY DISTANT 931.69 FEET EASTERLY FROM THE CORNER FORMED BY THE INTERSECTION OF THE NORTHERLY SIDE OF EAST PARKWAY WITH THE EASTERLY SIDE OF OAKVIEW AVENUE;

RUNNING THENCE 06° 35' 00" WEST A DISTANCE OF 213.83 FEET;

THENCE NORTH 83° 25' 00" EAST A DISTANCE OF 725.52 FEET;

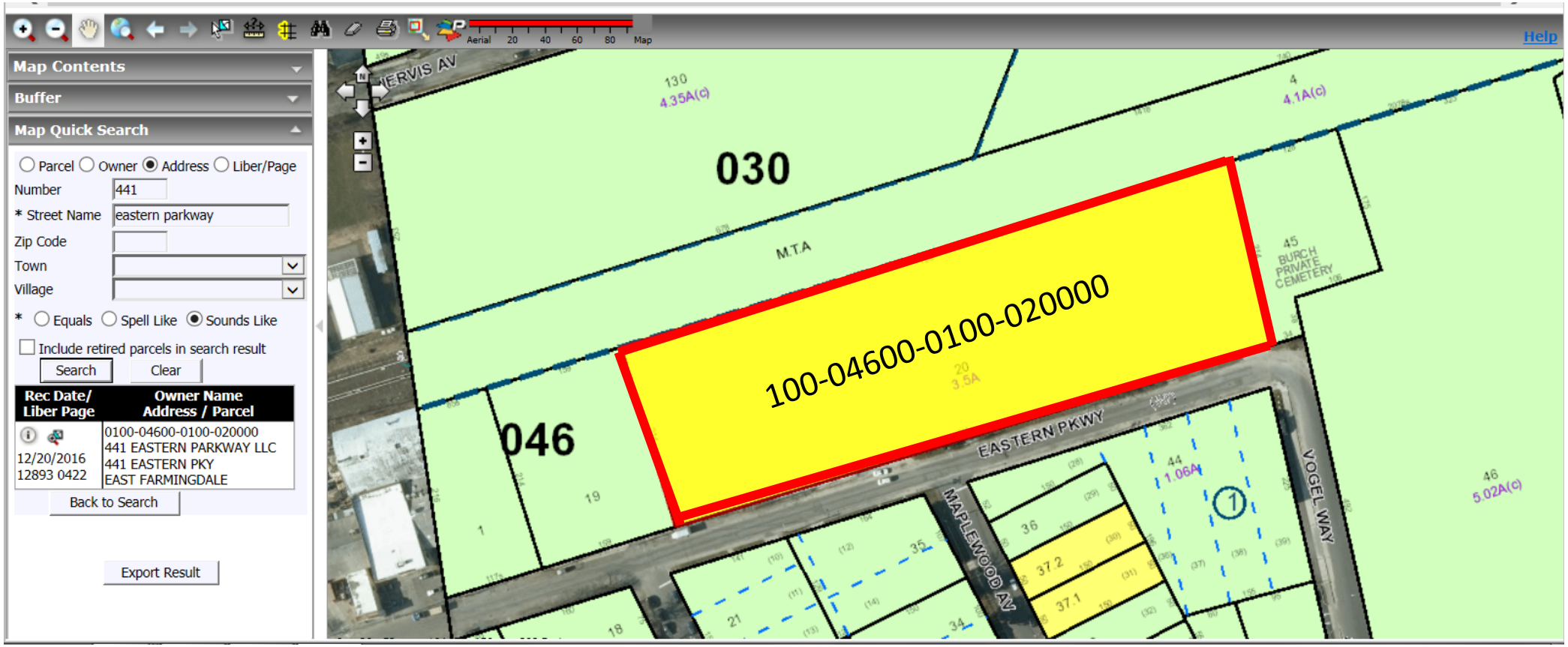
THENCE SOUTH 02° 34' 00" EAST A DISTANCE OF 214.36 FEET (ACTUAL) 216.92 FEET (DEED);

THENCE SOUTH 83° 25' 25" WEST A DISTANCE OF 710.50 FEET (ACTUAL) 708.22 FEET (DEED) TO THE POINT OR PLACE OF BEGINNING.

EXHIBIT B

TAX MAP

BH Aircraft Site
441 Eastern Parkway
Farmingdale,
New York
Town of Babylon



All feature locations are approximate. This map is intended as a schematic to be used in conjunction with associated Application and Support Information, and should not be relied upon as a survey for planning and other activities.

March 30, 2017
Source: Suffolk County
Scale: 1” = 100’ approximately

Legend:
Site Property Boundary

N
True North

EXHIBIT C

WRITTEN CONSENT

The undersigned, being the sole Member of JANS Realty, L.P., which is the sole member of 441 Eastern Parkway, LLC, does hereby certify as follows:

1. 441 Eastern Parkway, LLC is the prospective volunteer for the Former B&H Aircraft Site located at 441 Eastern Parkway, Farmingdale, New York, 11735 in the Town of Babylon (the "Site").

2. JANS Realty, L.P. is the sole member of 441 Eastern Parkway, LLC

3. I, Michael Cohen, am the sole member of JANS Realty, L.P., and am therefore authorized to execute any documents required by the New York State Department of Environmental Conservation on behalf of JANS Realty LLC and Brownfield Site Volunteer 441 Eastern Parkway, LLC.

4. I am authorized to execute any document required as a result of the Site's participation in the Brownfield Cleanup Program on behalf of JANS Realty, L.P. and 441 Eastern Parkway, LLC, including the Brownfield Cleanup Agreement (BCA), any Change of Use applications, BCA Amendments, and if required, an environmental easement.

IN WITNESS WHEREOF, the undersigned has executed this Certificate on this 28 day of March 2017.

Michael Cohen
Sole Member, JANS Realty, L.P.

EXHIBIT D

EASEMENT AREA LEGAL DESCRIPTION

ALL those lots or parcels of land, in or near the Village of Farmingdale, Town of Babylon, County of Suffolk and State of New York, bounded and described as follows:

BEGINNING at a point on the northerly side of Eastern Parkway distant 931.69 feet easterly from the corner formed by the intersection of the northerly side of Eastern Parkway with the easterly side of Oakview Avenue;

RUNNING THENCE North 06 degrees 35 minutes 00 seconds West, a distance of 213.83 feet;

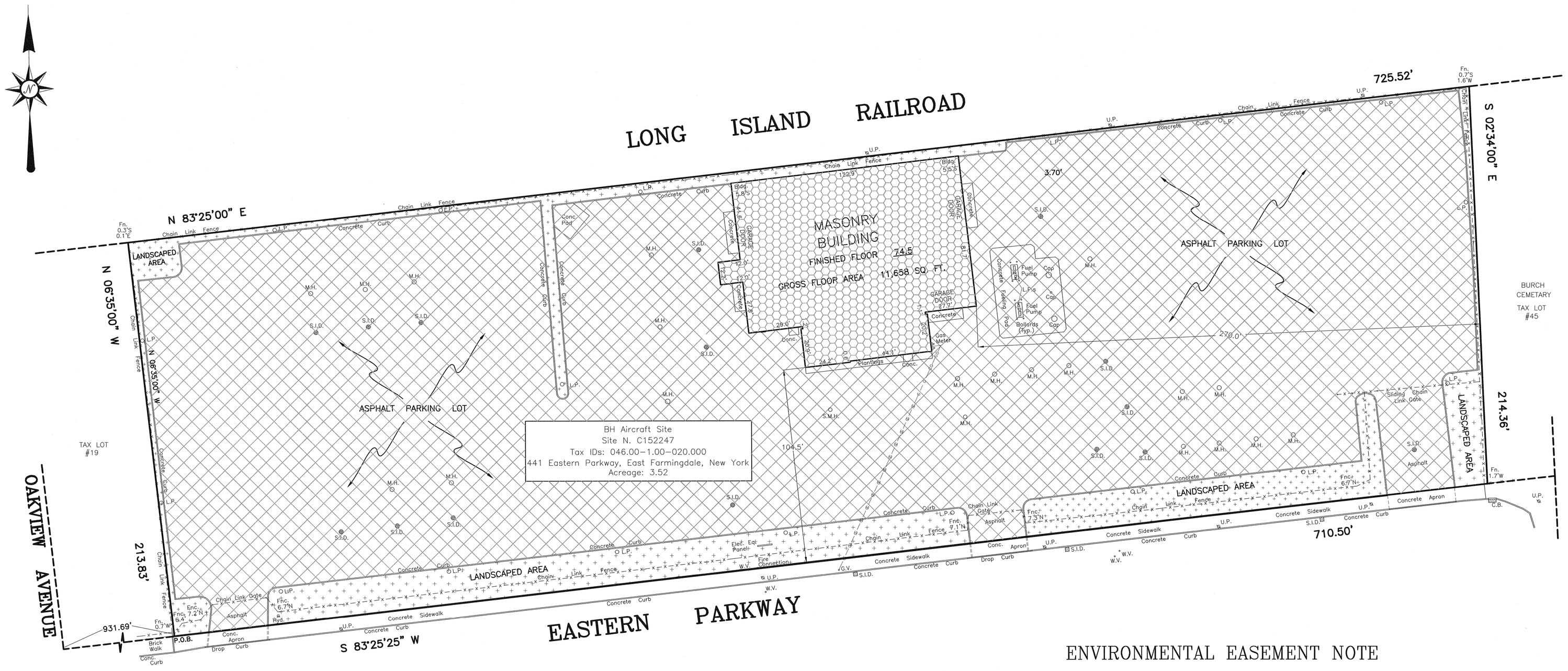
THENCE North 83 degrees 25 minutes 00 seconds East, a distance of 725.52 feet;

THENCE South 02 degrees 34 minutes 00 seconds East, a distance of 214.36 feet;

THENCE South 83 degrees 25 minutes 25 seconds West, a distance of 710.50 feet to the point or place of BEGINNING.

AREA: 153,504.5 SQ. FT. or 3.52 Acres

EXHIBIT E



LEGEND

▨	C.B.	Catch Basin
□	G.V.	Gas Valve
(M)	M.H.	Manhole
(S)	S.M.H.	Sanitary Manhole
	Hyd.	Hydrant
	L.P.	Light Pole
	S.I.D.	Surface Inlet Drain
	U.P.	Utility Pole
(WM)	W.M.	Water Meter
	W.V.	Water Valve
		Street Sign
— OHP — OHP —		Overhead Wires
— E — E —		Electric Service
— W — W —		Water Service
— G — G —		Gas Service
		Proposed Building Area Cover System
		Proposed Asphalt / Concrete Cover System
		Proposed Landscaped Cover System

CERTIFICATIONS ON THIS BOUNDARY SURVEY MAP SIGNIFY THAT THE MAP WAS PREPARED IN ACCORDANCE WITH THE CURRENT EXISTING CODE OF PRACTICE FOR LAND SURVEYORS ADOPTED BY THE NEW YORK STATE ASSOCIATION OF PROFESSIONAL LAND SURVEYORS.

GUARANTEES INDICATED HEREON SHALL RUN ONLY TO THE PERSON FOR WHOM THE SURVEY IS PREPARED, AND ON THEIR BEHALF TO THE TITLE COMPANY, GOVERNMENTAL AGENCY, AND LENDING INSTITUTION LISTED. THE ASSIGNEES OF THE LENDING INSTITUTION GUARANTEES ARE NOT TRANSFERABLE TO ADDITIONAL INSTITUTIONS OR SUBSEQUENT OWNERS.

NO GUARANTEE IS IMPLIED BY THIS MAP AS TO THE EXISTENCE OR NONEXISTENCE OF ANY EASEMENTS OF RECORD THAT WOULD AFFECT SUBJECT PROPERTY, UNLESS SURVEYOR HAS BEEN FURNISHED WITH A COMPLETE COPY OF THE TITLE REPORT.

THE LOCATION OF UNDERGROUND IMPROVEMENTS OR ENCROACHMENTS ARE NOT ALWAYS KNOWN AND OFTEN MUST BE ESTIMATED. IF ANY UNDERGROUND IMPROVEMENTS OR ENCROACHMENTS ARE NOT COVERED BY THIS CERTIFICATE.

THE OFFSETS (OR DIMENSIONS) SHOWN HEREON FROM THE STRUCTURES TO THE PROPERTY LINES ARE FOR A SPECIFIC PURPOSE AND USE AND THEREFORE ARE NOT INTENDED TO GUIDE THE ERECTION OF FENCES, RETAINING WALLS, POOLS, AND ANY OTHER CONSTRUCTION.

UNAUTHORIZED ALTERATION OR ADDITION TO THIS SURVEY IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW.

COPIES OF THIS SURVEY MAP NOT BEARING THE LAND SURVEYOR'S INKED SEAL OR EMBOSSED SEAL SHALL NOT BE CONSIDERED AS A VALID, TRUE COPY.

PROPERTY AND ENVIRONMENTAL EASEMENT
LEGAL DESCRIPTION

Dist. 100 Sec. 46 Blk. 1 Lot 20

ALL those lots or parcels of land, in or near the Village of Farmingdale, Town of Babylon, County of Suffolk and State of New York, bounded and described as follows:

BEGINNING at a point on the northerly side of Eastern Parkway distant 931.69 feet easterly from the corner formed by the intersection of the northerly side of Eastern Parkway with the easterly side of Oakview Avenue;

RUNNING THENCE North 06 degrees 35 minutes 00 seconds West, a distance of 213.83 feet;

THENCE North 83 degrees 25 minutes 00 seconds East, a distance of 725.52 feet;

THENCE South 02 degrees 34 minutes 00 seconds East, a distance of 214.36 feet;

THENCE South 83 degrees 25 minutes 25 seconds West, a distance of 710.50 feet to the point or place of BEGINNING.

AREA: 153,504.5 SQ. FT or 3.52 Acres

SURVEY GUARANTEED TO:

441 Eastern Parkway, LLC
Knauf Shaw LLP
New York State Department of Environmental Conservation

GRAPHIC SCALE

20 0 20 40 60 120
(IN FEET)
SCALE: 1" = 30'

5 0 5 15 35
(IN METERS)

NOTE: ELEVATIONS SHOWN ARE BASED ON THE NAVD '88

ENVIRONMENTAL EASEMENT NOTE

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 New York Environmental Conservation Law. The engineering and institutional controls for this Easement are set forth in the Site Management Plan (SMP). A copy of the SMP must be obtained by any party with an interest in the property. The SMP can be obtained from NYS Department of Environmental Conservation, Division of Environmental Remediation, Site Control Section, 625 Broadway, Albany NY 12233 or at derweb@dec.ny.gov

LOT AREA:
153,504.5 SQ. FT.
3.52 ACRES

FINAL SURVEY 6/13/2018

Suffolk County Tax Map Designation:
Dist. 100 Sec. 46 Blk. 1 Lot 20

LICENSED PROFESSIONAL ENGINEER * STATE OF NEW YORK * CHARLES F. PANETTA * No. 068914 No. 050429 * SURVEYOR

Charles Panetta, P.E., L.S.
N.Y. State Lic. No. 050429
N.Y. State Lic. No. 068914

ENVIRONMENTAL EASEMENT SURVEY

Of Property
Situated In The
Village of Farmingdale
Suffolk County, N.Y.

Drawn by:	Date:
GT	11/4/2016
SCALE: 1" = 30'	

BLADYKAS & PANETTA
L.S. & P.E., P.C.
23 Spring Street
Oyster Bay, NY 11771
516-922-3031

EXHIBIT F

Notice to County

Date: _____

Jennifer Casey, Chair
Suffolk County Planning Commission
H. Lee Dennison Bldg., 11th Floor,
100 Veterans Memorial Hwy.,
Hauppauge, NY 11788-0099

Re: Environmental Easement

Dear Ms. Casey:

Attached please find copies of environmental easements granted to the New York State Department of Environmental Conservation ("Department")

Recorded on _____
by 441 Eastern Parkway, LLC
for property at 441 Eastern Parkway, East Farmingdale, NY 11735
Tax Map No(s): 046.00-1.00-020.000
DEC Site No: C152247

This Environmental Easement restricts future use of the above-referenced property to 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.

Very truly yours,

Michael Cohen
Owner, 441 Eastern Parkway, LLC
Volunteer

Notice to Municipality

Date: _____

Patrick Halpin, Chairperson
Town of Babylon Planning Board
200 E. Sunrise Highway
Lindenhurst, NY 11757

Re: Environmental Easement

Dear Mr. Halpin:

Attached please find copies of environmental easements granted to the New York State Department of Environmental Conservation ("Department")

Recorded on _____
by 441 Eastern Parkway, LLC
for property at 441 Eastern Parkway, East Farmingdale, NY 11735
Tax Map No(s): 046.00-1.00-020.000
DEC Site No: C152247

This Environmental Easement restricts future use of the above-referenced property to 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.)

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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.

Very truly yours,

Michael Cohen
Owner, 441 Eastern Parkway, LLC
Volunteer

EXHIBIT G

ENVIRONMENTAL EASEMENT
CHECKLIST/CERTIFICATION
SITE No. C152247

The following requirements and attachments must be included as part of the submission to the Department for an Environmental Easement. Upon completion of the review, an attorney must sign the checklist indicating that they have fully completed the checklist. The Department will not accept submissions which have not been signed as being accurate and complete by both the Remedial Party and Attorney. Where the property owner is not the Remedial Party, the Department also requires the Owner to sign the checklist.

1) **Special Circumstances**

The last owner search was completed and the deed transfer is by Quit Claim or other restricted transfer deed ☐Yes ☑No **See Exhibit A**

The property in the Brownfield Cleanup Agreement includes lands under water ☐Yes ☑No

The property has multiple owners ☐Yes ☑No

If you answered "Yes" to any of these items, contact the Department's Environmental Easement contact person for a determination as to whether further title work is necessary.

2) **Verification of ownership of the property**

- ☑ Submit documentation (such as a corporate resolution) that the signatory on the easement has authority to sign the Easement **See Exhibit C**
- ☑ Ownership of the property matches the current deed. **See Exhibit A**
- ☑ Verification reviewed and included for authority to sign Easement. **See Exhibit C**
- ☑ Updated copies of legal organizational documents have been reviewed and are included. Examples of the appropriate documentation will include, for: **See Exhibit C**
  - corporations: articles of incorporation, organizational agreements, minutes of annual meetings, resolutions, authorities for signature;
  - partnerships: a copy of the partnership agreement; verification that necessary parties are participating in the Easement;
  - trusts: trust agreement, affidavit of no change in the trust; and
  - estates: estate letters, powers of attorney.

3) **Verification of Property Subject to Easement**

- ☑ Description of the property for the Easement and DEC Agreement/Order/SAC matches description of property in the deed (Separate submittal must be included to explain to the satisfaction of the Department why there is any discrepancy). **See Exhibit A and D**
- ☑ The Tax Map identifier (SBL) matches on all documents. **See Exhibit B**

4) Survey Review **See Exhibit E**

- ☑ Survey includes metes and bounds description.
- ☑ Survey includes a graphic scale.
- ☑ Survey includes Tax Map Section, Block and Lot.
- ☑ Survey includes physical address and is consistent with the DEC Agreement/Order/SAC.
- ☑ The survey must bear the name, address, telephone number, signature and certification of the professional land surveyor who performed the survey, his or her official seal and registration number, the date the survey was completed, the dates of all of the surveyor's revisions.
- ☑ The survey boundaries must be drawn to a convenient scale, with that scale clearly indicated. A graphic scale, shown in feet and meters, must be included.
- ☑ The symbols and abbreviations that are used on the survey must be identified by the use of a legend.
- ☑ Diagrams must be accurately presented.
- ☑ The point of beginning of the legal description must be shown.
- ☑ The legal description must be correct.
- ☑ The legal description must state the acreage.
- ☑ If the deed(s) description differs from the measured bearings/angles/distances, both must be indicated on the survey.
- ☑ The survey must show the location of all buildings/monuments/overlaps/encroachments upon the surveyed property with their locations defined by measurement perpendicular to the nearest perimeter boundaries.
- ☑ The survey must depict the location of visible improvements within five feet of each side of boundary lines.
- ☑ The survey must show ponds, lakes, springs, rivers or a natural water boundary bordering on or running through the surveyed property; the survey must measure the location of the natural water boundary and note on the survey the date of the measurement.
- ☑ The survey must correctly depict the environmental easement area with corresponding metes & bounds description and acreage, and include the following sentence: "*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 New York Environmental Conservation Law. The engineering and institutional controls for this Easement are set forth in the Site Management Plan (SMP). A copy of the SMP must be obtained by any party with an interest in the property. The SMP can be obtained from NYS Department of Environmental Conservation, Division of Environmental Remediation, Site Control Section, 625 Broadway, Albany, NY 12233 or at derweb@dec.ny.gov*". This reference must be located on the face of the survey and be in at least 15-point type.
- ☑ If the survey consists of more than one sheet, sheets must be numbered and the total number of sheets must be indicated on each sheet.

☑ In addition to county-specific requirements, submittal of the approved survey to the Department must include the following: **See Exhibit E**

- A "D" sized copy (24" x 36") of the final signed, stamped map
- A 600 DPI scan of the final signed, stamped map
- An Autocad .dwg or exported .dxf file of the polyline (at a minimum) of the final survey

5) Submissions

☑ The Environmental Easement Package being submitted to the Department includes the applicable documents set forth in Attachment A.

PLEASE READ THE FOLLOWING CAREFULLY

The Remedial Party and the Remedial Party's attorney understand and acknowledge that the New York State Department of Environmental Conservation will rely on each and every answer in this statement: (1) to determine whether the Easement Package can be reviewed in a timely fashion; and (2) to determine whether the Easement Package should be approved. The Remedial Party and the Remedial Party's attorney understand and acknowledge that any false statement or misrepresentation herein will constitute cause for the revocation of the Certificate of Completion issued in reliance on this checklist and accompanying documentation. The Remedial Party and the Remedial Party's attorney further acknowledge that the failure to provide the Department with valid and enforceable Environmental Easement on the property may be grounds for the Department to revoke any Certificate of Completion for the site.

Statement of Certification and Signatures

I have reviewed the information being submitted in relation to this Easement Package and this information, to the best of my knowledge and belief, is accurate and correct. I further acknowledge that the failure to provide the Department with valid and enforceable Environmental Easement on the property may be grounds for the Department to revoke any Certificate of Completion for the site.

1) By Remedial Party:
I hereby affirm that information provided on this form and its attachments is true and complete to the best of my knowledge and belief. I further acknowledge that the failure to provide the Department with valid and enforceable Environmental Easement on the property may be grounds for the Department to revoke any Certificate of Completion for the site.

Date: 9/20/18 Signature: _____

Print Name: Michael Cohen

2) By Remedial Party's Attorney:
I hereby affirm that I am the attorney for 441 Eastern Parkway LLC (entity); that I am authorized by that entity to make this certification; that this certification was prepared by me or under my supervision and direction; and that information provided on this form and its attachments is true and complete to the best of my knowledge and belief.

Date: 10/3/18 Signature: _____

Print Name: Linda R. Shaw, Esq.

Attachment

Attachment A

Documents required to be sent in hard copy with electronic formats copied to the Project Manager and Project Attorney for a complete Environmental Easement package:

1) Copy(ies) of current deed(s) and supporting title documentation (see Department Title Requirements). **See Exhibit A**

2) Copy of tax map. **See Exhibit B**

3) Proof of authority to obligate owner of property as set forth in "Verification of ownership of property" on the Easement checklist. **See Exhibit C**

4) Legal description of the easement area, electronic copy to be in an electronic text format (i.e., MS Word or Rich Text Format). **See Exhibit D**

5) One full-sized, signed Survey and an electronic Survey submitted as a fully rendered PDF (not scanned). **See Exhibit E**

6) A draft Notice to Municipality, with appropriate site-specific provisions. **See Exhibit F**

7) Easement Checklist with certification signed by Remedial Party and Remedial Party's attorney. **See Exhibit G**

8) Signed transfer tax forms (TP-584 or ACRIS Forms). **See Exhibit H**

Hard copy submission shall be sent to:

Bradford Burns, Esq.
New York State Department of Environmental Conservation
Office of General Counsel
625 Broadway
Albany, NY 12233-1500

EXHIBIT H

INSTRUCTIONS(RP-5217-PDF-INS): www.orps.state.ny.us

FOR COUNTY USE ONLY

C1. SWIS Code

C2. Date Deed Recorded (Month / Day / Year)

C3. Book C4. Page

New York State Department of **Taxation and Finance**

Office of Real Property Tax Services

RP- 5217-PDF

Real Property Transfer Report (8/10)

PROPERTY INFORMATION

1. Property Location: 441 (* STREET NUMBER) Eastern Parkway (* STREET NAME)
Babylon (* CITY OR TOWN) East Farmingdale (VILLAGE) 11735 (* ZIP CODE)

2. Buyer Name: People of the State of NY (* LAST NAME/COMPANY) (FIRST NAME)
Through Comm. of NYSDEC (LAST NAME/COMPANY) (FIRST NAME)

3. Tax Billing Address: Indicate where future Tax Bills are to be sent if other than buyer address(at bottom of form) (LAST NAME/COMPANY) (FIRST NAME)
(STREET NUMBER AND NAME) (CITY OR TOWN) (STATE) (ZIP CODE)

4. Indicate the number of Assessment Roll parcels transferred on the deed: 1 # of Parcels OR ☐ Part of a Parcel

5. Deed Property Size: ____ (* FRONT FEET) X ____ (* DEPTH) OR 3.52 (* ACRES)

(Only if Part of a Parcel) Check as they apply:
4A. Planning Board with Subdivision Authority Exists ☐
4B. Subdivision Approval was Required for Transfer ☐
4C. Parcel Approved for Subdivision with Map Provided ☐

6. Seller Name: 441 Eastern Parkway, LLC (* LAST NAME/COMPANY) (FIRST NAME)
(LAST NAME/COMPANY) (FIRST NAME)

*7. Select the description which most accurately describes the use of the property at the time of sale:
F. Commercial

Check the boxes below as they apply:
8. Ownership Type is Condominium ☐
9. New Construction on a Vacant Land ☐
10A. Property Located within an Agricultural District ☐
10B. Buyer received a disclosure notice indicating that the property is in an Agricultural District ☐

SALE INFORMATION

11. Sale Contract Date

*12. Date of Sale/Transfer

*13. Full Sale Price 0.00

(Full Sale Price is the total amount paid for the property including personal property. This payment may be in the form of cash, other property or goods, or the assumption of mortgages or other obligations.) *Please round to the nearest whole dollar amount.*

14. Indicate the value of personal property included in the sale 0.00

15. Check one or more of these conditions as applicable to transfer:
☐ A. Sale Between Relatives or Former Relatives
☐ B. Sale between Related Companies or Partners in Business
☐ C. One of the Buyers is also a Seller
☒ D. Buyer or Seller is Government Agency or Lending Institution
☒ E. Deed Type not Warranty or Bargain and Sale (Specify Below)
☐ F. Sale of Fractional or Less than Fee Interest (Specify Below)
☐ G. Significant Change in Property Between Taxable Status and Sale Dates
☐ H. Sale of Business is Included in Sale Price
☒ I. Other Unusual Factors Affecting Sale Price (Specify Below)
☐ J. None

*Comment(s) on Condition:
BCP Easement

ASSESSMENT INFORMATION - Data should reflect the latest Final Assessment Roll and Tax Bill

16. Year of Assessment Roll from which information taken(YY) 18

*17. Total Assessed Value 18,410

*18. Property Class 716 - ____

*19. School District Name East Farmingdale

*20. Tax Map Identifier(s)/Roll Identifier(s) (If more than four, attach sheet with additional identifier(s))
0100-46.00-1.00-20.000

CERTIFICATION

I Certify that all of the items of information entered on this form are true and correct (to the best of my knowledge and belief) and I understand that the making of any willful false statement of material fact herein is subject me to the provisions of the penal law relative to the making and filing of false instruments.

SELLER SIGNATURE

SELLER SIGNATURE 9/20/18 DATE

BUYER SIGNATURE

BUYER SIGNATURE DATE

BUYER CONTACT INFORMATION

(Enter information for the buyer. Note: If buyer is LLC, society, association, corporation, joint stock company, estate or entity that is not an individual agent or fiduciary, then a name and contact information of an individual responsible party who can answer questions regarding the transfer must be entered. Type or print clearly.)

People of the State of NY (* LAST NAME) Through Comm. of NYSDEC (FIRST NAME)

(518) (* AREA CODE) 402-9647 (* TELEPHONE NUMBER (Ex: 9999999))

625 (* STREET NUMBER) Broadway, 12th Floor (* STREET NAME)

Albany (* CITY OR TOWN) NY (* STATE) 12233 (* ZIP CODE)

BUYER'S ATTORNEY

Murphy (LAST NAME) Michael (FIRST NAME)

(518) (AREA CODE) 402-9509 (TELEPHONE NUMBER (Ex: 9999999))

TP-584 (4/13)

New York State Department of Taxation and Finance

Combined Real Estate Transfer Tax Return, Credit Line Mortgage Certificate, and Certification of Exemption from the Payment of Estimated Personal Income Tax

Recording office time stamp

See Form TP-584-I, Instructions for Form TP-584, before completing this form. Print or type.

Schedule A – Information relating to conveyance

Grantor/Transferor
☐ Individual
☐ Corporation
☐ Partnership
☐ Estate/Trust
☒ Single member LLC
☐ Other

Name *(if individual, last, first, middle initial)* (☐ *check if more than one grantor)*: 441 Eastern Parkway, LLC
Social security number:

Mailing address: 36-11 Northern Boulevard
Social security number:

City: Long Island City | State: NY | ZIP code: 11101
Federal EIN: 81-4215938

Single member's name if grantor is a single member LLC *(see instructions)*: JANS Realty, L.P.
Single member EIN or SSN: 36-4499178

Grantee/Transferee
☐ Individual
☐ Corporation
☐ Partnership
☐ Estate/Trust
☐ Single member LLC
☐ Other

Name *(if individual, last, first, middle initial)* (☐ *check if more than one grantee)*: People of the State of NY through Comm. of NYSDEC
Social security number:

Mailing address: 625 Broadway, 14th Floor
Social security number:

City: Albany | State: NY | ZIP code: 12233-1500
Federal EIN: 14-6013200

Single member's name if grantee is a single member LLC *(see instructions)*:
Single member EIN or SSN:

Location and description of property conveyed

Tax map designation – Section, block & lot *(include dots and dashes)*	SWIS code (six digits)	Street address	City, town, or village	County
46.00-1.00-20.000	472089	441 Eastern Parkway	East Farmingdale	Suffolk

Type of property conveyed *(check applicable box)*

1 ☐ One- to three-family house
2 ☐ Residential cooperative
3 ☐ Residential condominium
4 ☐ Vacant land
5 ☐ Commercial/Industrial
6 ☐ Apartment building
7 ☐ Office building
8 ☒ Other OTHER

Date of conveyance: ____ (month) ____ (day) 2018 (year)

Percentage of real property conveyed which is residential real property 0 %
(see instructions)

Condition of conveyance *(check all that apply)*

a. ☐ Conveyance of fee interest
b. ☐ Acquisition of a controlling interest (state percentage acquired _____ %)
c. ☐ Transfer of a controlling interest (state percentage transferred _____ %)
d. ☐ Conveyance to cooperative housing corporation
e. ☐ Conveyance pursuant to or in lieu of foreclosure or enforcement of security interest *(attach Form TP-584.1, Schedule E)*
f. ☐ Conveyance which consists of a mere change of identity or form of ownership or organization *(attach Form TP-584.1, Schedule F)*
g. ☐ Conveyance for which credit for tax previously paid will be claimed *(attach Form TP-584.1, Schedule G)*
h. ☐ Conveyance of cooperative apartment(s)
i. ☐ Syndication
j. ☐ Conveyance of air rights or development rights
k. ☐ Contract assignment
l. ☐ Option assignment or surrender
m. ☐ Leasehold assignment or surrender
n. ☐ Leasehold grant
o. ☒ Conveyance of an easement
p. ☒ Conveyance for which exemption from transfer tax claimed *(complete Schedule B, Part III)*
q. ☐ Conveyance of property partly within and partly outside the state
r. ☐ Conveyance pursuant to divorce or separation
s. ☒ Other *(describe)* Env. Easement

For recording officer's use	Amount received	Date received	Transaction number
	Schedule B., Part I $ Schedule B., Part II $		

Schedule B — Real estate transfer tax return (Tax Law, Article 31)

Part I – Computation of tax due

1	Enter amount of consideration for the conveyance *(if you are claiming a total exemption from tax, check the exemption claimed box, enter consideration and proceed to Part III)* ☒ **Exemption claimed**	1.	0 00
2	Continuing lien deduction *(see instructions if property is taken subject to mortgage or lien)*	2.	0 00
3	Taxable consideration *(subtract line 2 from line 1)*	3.	0 00
4	Tax: $2 for each $500, or fractional part thereof, of consideration on line 3	4.	0 00
5	Amount of credit claimed for tax previously paid *(see instructions and attach Form TP-584.1,* Schedule G*)*	5.	0 00
6	Total tax due* *(subtract line 5 from line 4)*	6.	0 00

Part II – Computation of additional tax due on the conveyance of residential real property for $1 million or more

1	Enter amount of consideration for conveyance *(from* Part I*, line 1)*	1.	0 00
2	Taxable consideration *(multiply line 1 by the percentage of the premises which is residential real property, as shown in* Schedule A*)*	2.	0 00
3	Total additional transfer tax due* *(multiply line 2 by 1% (.01))*	3.	0 00

Part III – Explanation of exemption claimed on Part I, line 1 *(check any boxes that apply)*

The conveyance of real property is exempt from the real estate transfer tax for the following reason:

a. Conveyance is to the United Nations, the United States of America, the state of New York, or any of their instrumentalities, agencies, or political subdivisions (or any public corporation, including a public corporation created pursuant to agreement or compact with another state or Canada) ..... a ☒

b. Conveyance is to secure a debt or other obligation ..... b ☐

c. Conveyance is without additional consideration to confirm, correct, modify, or supplement a prior conveyance ..... c ☐

d. Conveyance of real property is without consideration and not in connection with a sale, including conveyances conveying realty as bona fide gifts ..... d ☐

e. Conveyance is given in connection with a tax sale ..... e ☐

f. Conveyance is a mere change of identity or form of ownership or organization where there is no change in beneficial ownership. (This exemption cannot be claimed for a conveyance to a cooperative housing corporation of real property comprising the cooperative dwelling or dwellings.) Attach Form TP-584.1, Schedule F ..... f ☐

g. Conveyance consists of deed of partition ..... g ☐

h. Conveyance is given pursuant to the federal Bankruptcy Act ..... h ☐

i. Conveyance consists of the execution of a contract to sell real property, without the use or occupancy of such property, or the granting of an option to purchase real property, without the use or occupancy of such property ..... i ☐

j. Conveyance of an option or contract to purchase real property with the use or occupancy of such property where the consideration is less than $200,000 and such property was used solely by the grantor as the grantor's personal residence and consists of a one-, two-, or three-family house, an individual residential condominium unit, or the sale of stock in a cooperative housing corporation in connection with the grant or transfer of a proprietary leasehold covering an individual residential cooperative apartment ..... j ☐

k. Conveyance is not a conveyance within the meaning of Tax Law, Article 31, section 1401(e) *(attach documents supporting such claim)* ..... k ☐

*The total tax (from Part I, line 6 and Part II, line 3 above) is due within 15 days from the date conveyance. Please make check(s) payable to the county clerk where the recording is to take place. If the recording is to take place in the New York City boroughs of Manhattan, Bronx, Brooklyn, or Queens, make check(s) payable to the ***NYC Department of Finance.*** If a recording is not required, send this return and your check(s) made payable to the ***NYS Department of Taxation and Finance,*** directly to the NYS Tax Department, RETT Return Processing, PO Box 5045, Albany NY 12205-0045.

Schedule C — Credit Line Mortgage Certificate (Tax Law, Article 11)

Complete the following only if the interest being transferred is a fee simple interest.
I (we) certify that: *(check the appropriate box)*

1. ☐ The real property being sold or transferred is not subject to an outstanding credit line mortgage.

2. ☐ The real property being sold or transferred is subject to an outstanding credit line mortgage. However, an exemption from the tax is claimed for the following reason:
   - ☐ The transfer of real property is a transfer of a fee simple interest to a person or persons who held a fee simple interest in the real property (whether as a joint tenant, a tenant in common or otherwise) immediately before the transfer.
   - ☐ The transfer of real property is (A) to a person or persons related by blood, marriage or adoption to the original obligor or to one or more of the original obligors or (B) to a person or entity where 50% or more of the beneficial interest in such real property after the transfer is held by the transferor or such related person or persons (as in the case of a transfer to a trustee for the benefit of a minor or the transfer to a trust for the benefit of the transferor).
   - ☐ The transfer of real property is a transfer to a trustee in bankruptcy, a receiver, assignee, or other officer of a court.
   - ☐ The maximum principal amount secured by the credit line mortgage is $3,000,000 or more, and the real property being sold or transferred is **not** principally improved nor will it be improved by a one- to six-family owner-occupied residence or dwelling.

     Please note: for purposes of determining whether the maximum principal amount secured is $3,000,000 or more as described above, the amounts secured by two or more credit line mortgages may be aggregated under certain circumstances. See TSB-M-96(6)-R for more information regarding these aggregation requirements.
   - ☐ Other *(attach detailed explanation)*.

3. ☐ The real property being transferred is presently subject to an outstanding credit line mortgage. However, no tax is due for the following reason:
   - ☐ A certificate of discharge of the credit line mortgage is being offered at the time of recording the deed.
   - ☐ A check has been drawn payable for transmission to the credit line mortgagee or his agent for the balance due, and a satisfaction of such mortgage will be recorded as soon as it is available.

4. ☐ The real property being transferred is subject to an outstanding credit line mortgage recorded in _____ (insert liber and page or reel or other identification of the mortgage). The maximum principal amount of debt or obligation secured by the mortgage is _____. No exemption from tax is claimed and the tax of _____ is being paid herewith. *(Make check payable to county clerk where deed will be recorded or, if the recording is to take place in New York City but not in Richmond County, make check payable to the **NYC Department of Finance.**)*

Signature (both the grantor(s) and grantee(s) must sign)

The undersigned certify that the above information contained in schedules A, B, and C, including any return, certification, schedule, or attachment, is to the best of his/her knowledge, true and complete, and authorize the person(s) submitting such form on their behalf to receive a copy for purposes of recording the deed or other instrument effecting the conveyance.

Grantor signature	Title	Grantee signature	Title
[signature]	Member		
Grantor signature	Title	Grantee signature	Title

Reminder: Did you complete all of the required information in Schedules A, B, and C? Are you required to complete Schedule D? If you checked *e*, *f*, or *g* in Schedule A, did you complete Form TP-584.1? Have you attached your check(s) made payable to the county clerk where recording will take place or, if the recording is in the New York City boroughs of Manhattan, Bronx, Brooklyn, or Queens, to the ***NYC Department of Finance***? If no recording is required, send your check(s), made payable to the ***Department of Taxation and Finance***, directly to the NYS Tax Department, RETT Return Processing, PO Box 5045, Albany NY 12205-0045.

Schedule D - Certification of exemption from the payment of estimated personal income tax (Tax Law, Article 22, section 663)

Complete the following only if a fee simple interest or a cooperative unit is being transferred by an individual or estate or trust.

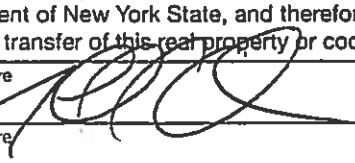
If the property is being conveyed by a referee pursuant to a foreclosure proceeding, proceed to Part II, and check the second box under *Exemptions for nonresident transferor(s)/seller(s)* and sign at bottom.

Part I - New York State residents

If you are a New York State resident transferor(s)/seller(s) listed in Schedule A of Form TP-584 (or an attachment to Form TP-584), you must sign the certification below. If one or more transferors/sellers of the real property or cooperative unit is a resident of New York State, **each** resident transferor/seller must sign in the space provided. If more space is needed, please photocopy this Schedule D and submit as many schedules as necessary to accommodate all resident transferors/sellers.

Certification of resident transferor(s)/seller(s)

This is to certify that at the time of the sale or transfer of the real property or cooperative unit, the transferor(s)/seller(s) as signed below was a resident of New York State, and therefore is not required to pay estimated personal income tax under Tax Law, section 663(a) upon the sale or transfer of this real property or cooperative unit.

Signature	Print full name	Date
	Michael Cohen	9/20/18
Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date

Note: A resident of New York State may still be required to pay estimated tax under Tax Law, section 685(c), but not as a condition of recording a deed.

Part II - Nonresidents of New York State

If you are a nonresident of New York State listed as a transferor/seller in Schedule A of Form TP-584 (or an attachment to Form TP-584) but are not required to pay estimated personal income tax because one of the exemptions below applies under Tax Law, section 663(c), check the box of the appropriate exemption below. If any one of the exemptions below applies to the transferor(s)/seller(s), that transferor(s)/seller(s) is not required to pay estimated personal income tax to New York State under Tax Law, section 663. **Each** nonresident transferor/seller who qualifies under one of the exemptions below must sign in the space provided. If more space is needed, please photocopy this Schedule D and submit as many schedules as necessary to accommodate all nonresident transferors/sellers.

If none of these exemption statements apply, you must complete Form IT-2663, *Nonresident Real Property Estimated Income Tax Payment Form*, or Form IT-2664, *Nonresident Cooperative Unit Estimated Income Tax Payment Form*. For more information, see *Payment of estimated personal income tax*, on page 1 of Form TP-584-I.

Exemption for nonresident transferor(s)/seller(s)

This is to certify that at the time of the sale or transfer of the real property or cooperative unit, the transferor(s)/seller(s) (grantor) of this real property or cooperative unit was a nonresident of New York State, but is not required to pay estimated personal income tax under Tax Law, section 663 due to one of the following exemptions:

☐ The real property or cooperative unit being sold or transferred qualifies in total as the transferor's/seller's principal residence (within the meaning of Internal Revenue Code, section 121) from _____ (Date) to _____ (Date) *(see instructions)*.

☐ The transferor/seller is a mortgagor conveying the mortgaged property to a mortgagee in foreclosure, or in lieu of foreclosure with no additional consideration.

☐ The transferor or transferee is an agency or authority of the United States of America, an agency or authority of the state of New York, the Federal National Mortgage Association, the Federal Home Loan Mortgage Corporation, the Government National Mortgage Association, or a private mortgage insurance company.

Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date

NEW YORK STATE

Department of Taxation and Finance

Change in Mailing Address for Certain Real Estate Transfer Tax Forms if Using a Private Delivery Service

TP-39
(1/17)

There has been a change to the address that must be used when submitting certain forms through a private delivery service rather than by U.S. Mail.

Send **Form TP-584**, *Combined Real Estate Transfer Tax Return, Credit Line Mortgage Certificate, and Certification of Exemption from the Payment of Estimated Personal Income Tax*, to:

NYS TAX DEPARTMENT
RETT PROCESSING UNIT
90 COHOES AVE
GREEN ISLAND NY 12183-1515

Send **Form TP-588**, *Cooperative Housing Corporation Information Return*, to:

NYS TAX DEPARTMENT
TDAB – TRANSFER TAX
90 COHOES AVE
GREEN ISLAND NY 12183-1515

See Publication 55, *Designated Private Delivery Services*, for information about establishing the date you filed, and for the address to use for other forms.

NEW YORK STATE

Department of Taxation and Finance

Important Notice to Home Buyers

TP-41
(6/16)

If you are buying residential property and you plan to make it your primary residence, you may be entitled to school tax relief through the New York State STAR credit. To receive this credit, you must register with the Tax Department after you have taken title to the property. To register or to get more information, visit our website at *www.tax.ny.gov* or call 518-457-2036. Do **not** file an application for the STAR "exemption" with your assessor, since new STAR exemptions will no longer be granted. School tax relief is now provided to new applicants through the STAR credit.

APPENDIX C – LIST OF SITE CONTACTS

The following table summarizes the immediate site contact details:

Name	Phone/Email Address
Michael Cohen	(516) 817-2709 mcohen@silverstarny.com
David Winslow	(973) 774-3300 David.winslow@gza.com
Ernest Hanna	(267) 464-3612 Ernest.hanna@gza.com
Richard Mustico	(518) 402-9647 Richard.mustico1@dec.ny.gov
Walter Parish	(631) 444-0240 Walter.parish@dec.ny.gov
Kelly Lewandowski	(518) 402-9543 Kelly.Lewandowski@dec.ny.gov
On Site Access Contact - Rob	(718) 916-9768
Linda Shaw	(585) 546-8430 lshaw@nyenylaw.com

APPENDIX D – SITE SPECIFIC BORING LOGS

GZA
GeoEnvironmental, Inc.

Boring Log **GZA-1**

Sheet 1 of 2

Project: Eastern Parkway		Location: 441 Eastern Parkway	
Project No.: 12.0076545.00		Client: 441 Eastern Parkway, LLC	
Drilling Company: Aquifer Drilling and Testing, Inc.		Elevation and Datum: Approx.	
Drilling Equipment: Geoprobe	Drilling Method:	Date Started: 11/10/17	Date Finished: 11/10/17
Sampler:		Final Boring Depth: 25 ft	Depth to Rock:
Sampler Hammer:	Weight (lbs): / Drop (in):	Groundwater Depth (ft): Initial ▽	Completion ▼ / 24 Hours ▼
Drilling Foreman: Chris Iodice		GZA Inspector: Ben Romagnoli	Checked By:

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Type	Recov. (in)	Remarks
0	0-0.4: Dark grey/black M SAND and CLAY	0				PUSH	29	
	0.4-1: CONCRETE	0						
1	1-1.3: Black M SAND and CLAY	0						
	1.3-2: CONCRETE	0						
2	2-2.5: Light brown M-F SAND and CLAY	0						
3								
4								
5	5-5.5: Light brown M-F SAND and CLAY					PUSH	60	
	5.5-8: Light brown M-C SAND, some Gravel, little cobble	0						
6		0						
7		0						
		0						
8	8-9: Light brown M SAND, little gravel	0						
		0						
9	9-10: Brown M SAND, trace clay, trace gravel	0						
		0						
10	10-11: Very light brown F-M SAND, trace gravel, trace silt	0				PUSH	48	
		0						
11	11-12: Light brown M SAND, some C Sand, trace quartz gravel	0						
		0						
12	12-14: Very light brown M-C SAND, trace gravel, trace quartz gravel	0						
		0						
13		0						
		0						
14								
15	15-16.5: Light brown M SAND, some C Sand, trace gravel	0				PUSH	53	
		0						
16		0						
	16.5-17: Very light brown M-C SAND, some Gravel	0						
17	17-17.5: Brown M-C SAND, little gravel	0						
	17.5-19.5: Very light brown M-C SAND, little gravel	0						
18		0						
		0						
19		0						
		0						
20								

J:\GINT PROJECT DATABASES\12.0076545.00.GPJ ... 12/1/2017 3:45:14 PM ... Report: Log - NJ-GZA_ENVIRONMENTAL WITHOUT WELL ... Template TEMPLATE.GDT

GZA
GeoEnvironmental, Inc.

Boring Log **GZA-1**

Sheet 2 of 2

Project: Eastern Parkway	Location: 441 Eastern Parkway
Project No.: 12.0076545.00	Client: 441 Eastern Parkway, LLC
Drilling Company: Aquifer Drilling and Testing, Inc.	Elevation and Datum: Approx.

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
20	20-21: Very light brown M-C SAND, little gravel, trace cobble	0						
21		0						
	21-24.8: Light brown M-C SAND, little gravel, trace cobble, trace quartz gravel	0.6				PUSH	60	Sample GZA1 (21-21.5) at 12:15
22		0.1						
		0						
23		0						
		0						
24		0						
		0						Sample GZA1 (24.5-25) at 12:20
25	24.8-25: Light brown M-C SAND, little gravel, trace cobble, trace quartz gravel, wet							
26								
27								
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42								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-10**

Sheet 1 of 2

Project: Eastern Parkway		Location: 441 Eastern Parkway	
Project No.: 12.0076545.00		Client: 441 Eastern Parkway, LLC	
Drilling Company: Aquifer Drilling and Testing, Inc.		Elevation and Datum: Approx.	
Drilling Equipment: Geoprobe	Drilling Method:	Date Started: 11/6/17	Date Finished: 11/6/17
Sampler:		Final Boring Depth: 25 ft	Depth to Rock:
Sampler Hammer:	Weight (lbs): / Drop (in):	Groundwater Depth (ft): Initial ▽	Completion ▼ / 24 Hours ▼
Drilling Foreman: Chris Iodice		GZA Inspector: Ben Romagnoli	Checked By:

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Type	Recov. (in)	Remarks
0	0-0.75: Dark grey M-C SAND, trace brick/gravel	0.1				PUSH	29	
		0.2						
1	0.75-1: White M-C SAND, trace gravel	0						
	1-2.5: Light brown M-C SAND, some Gravel	0						
2		0						
3								
4								
5	5-5.75: Dark grey/black CLAY and C SAND	1.3				PUSH	29	Sample GZA10 (5.5-6) at 12:40
		1.9						
6	5.75-6: Black C SAND	0						
	6-6.25: Grey CLAY and C SAND	0						
7	6.25-7.5: Light brown M-C SAND, little gravel	0						
8								
9								
10	10-10.5: Light brown M-C SAND, little gravel					PUSH	48	
	10.5-10.75: Black M-C SAND	0						
11	10.75-14: Light brown C SAND, little gravel	0.8						
12		0						
		0.1						
13		0						
		0						
14		0						
15	15-16: Light brown M-C SAND, little gravel					PUSH	41	
		0.1						
16	16-16.25: Black M-C SAND	0.6						
	16.25-18.5: Light brown M-C SAND, some Gravel	1.8						
17		0						
		0.1						
18		0						
19								
20								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-10**

Sheet 2 of 2

Project	Location
Eastern Parkway	441 Eastern Parkway
Project No.	Client
12.0076545.00	441 Eastern Parkway, LLC
Drilling Company	Elevation and Datum
Aquifer Drilling and Testing, Inc.	Approx.

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
20	20-21: Light brown M-C SAND, trace gravel	0				PUSH	48	
21	21-21.25: Grey/black M-C SAND	0.5						
	21.25-23.5: Very light brown/white M-C SAND, little gravel	0.4						
22		0						
23		0						
	23.5-24: Very light brown/white M-C SAND, little gravel, wet	0						Sample GZA10 (23.5-24) at 12:30
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-11**

Sheet 1 of 2

Project: Eastern Parkway		Location: 441 Eastern Parkway	
Project No.: 12.0076545.00		Client: 441 Eastern Parkway, LLC	
Drilling Company: Aquifer Drilling and Testing, Inc.		Elevation and Datum: Approx.	
Drilling Equipment: Geoprobe	Drilling Method:	Date Started: 11/6/17	Date Finished: 11/6/17
Sampler:		Final Boring Depth: 25 ft	Depth to Rock:
Sampler Hammer:	Weight (lbs): Drop (in):	Groundwater Depth (ft): Initial ▽	Completion ▼ 24 Hours ▼
Drilling Foreman: Chris Iodice		GZA Inspector: Ben Romagnoli	Checked By:

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Type	Recov. (in)	Remarks
0	0-1: Black M-C SAND, some Gravel	6.4				PUSH	41	Sample GZA10 (0-0.5) at 11:20
		0.8						
1	1-1.25: White C SAND and quartz GRAVEL	0.1						
	1.25-3.5: Orange M-C SAND, some Quartz, some Gravel, trace cobble, dry	0.3						
2		0.4						
3		0.4						
4								
5	5-6: Orange M-C SAND, some Quartz, some Gravel, trace cobble, dry	0.5				PUSH	60	
		0.6						
6	6-6.25: Grey C SAND, some Gravel	0.5						
	6.25-8: Very light brown M-C SAND, trace gravel	0						
7		0						
		0						
8	8-8.2: Grey M-C SAND, some Clay	0						
	8.2-10: Very light brown M-C SAND, trace gravel	0						
9		0						
		0						
10	10-11.5: Grey/black C SAND, some Gravel	0.5				PUSH	60	
		1.1						
11		1.4						
	11.5-12.5: White M-C SAND, some Gravel	0.1						
12		0						
	12.5-15: Light orange M-C SAND, trace gravel	0						
13		0						
		0						
14		0						
15	15-16: White/grey M-C SAND, trace gravel	0				PUSH	53	
		0.5						
16	16-16.25: Orange M-C SAND, trace gravel	0.8						
	16.25-17.5: Grey/black M-C SAND, some Gravel	0.1						
17		0						
	17.5-19: Very light brown C SAND and GRAVEL	0						
18		0						
		0						
19	19-19.25: Maroon C SAND and GRAVEL	0						
	19.25-19.5: Light brown M-C SAND, trace gravel	0						
20								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-11**

Sheet 2 of 2

Project	Location
Eastern Parkway	441 Eastern Parkway
Project No.	Client
12.0076545.00	441 Eastern Parkway, LLC
Drilling Company	Elevation and Datum
Aquifer Drilling and Testing, Inc.	Approx.

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
20	20-21.5: Grey M-C SAND, trace gravel	0.2				PUSH	60	
21		0.5						
		0.4						
	21.5-22: Light brown/grey M-C SAND, trace gravel	0						
22	22-24: White M-C SAND, trace gravel	0						
		0						
23		0						
		0						Sample GZA10 (23.5-24) at 11:10
24	24-25: White M-C SAND, trace gravel, wet	0						
		0						
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-12**

Sheet 1 of 2

Project: Eastern Parkway		Location: 441 Eastern Parkway	
Project No.: 12.0076545.00		Client: 441 Eastern Parkway, LLC	
Drilling Company: Aquifer Drilling and Testing, Inc.		Elevation and Datum: Approx.	
Drilling Equipment: Geoprobe	Drilling Method:	Date Started: 11/8/17	Date Finished: 11/8/17
Sampler:		Final Boring Depth: 25 ft	Depth to Rock:
Sampler Hammer:	Weight (lbs): / Drop (in):	Groundwater Depth (ft): Initial ▽	Completion ▼ / 24 Hours ▼
Drilling Foreman: Chris Iodice		GZA Inspector: Ben Romagnoli	Checked By:

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Type	Recov. (in)	Remarks
0	0-0.5: Brown M-C SAND, some Clay, trace gravel, wet	0				PUSH	29	
0.5	0.5-0.75: Orange M-C SAND	0						
0.75	0.75-1.25: Brown M-C SAND, trace gravel	0						
1.25	1.25-2.5: Light brown M-C SAND, little gravel	0						
2.5		0						
5	5-5.5: Very light brown M-C SAND, trace gravel	0				PUSH	48	
5.5	5.5-6.5: Orange M-C SAND, little gravel	0						
6.5	6.5-7: Grey F SAND and CLAY, trace gravel	0						
7	7-9: Very light brown M-C SAND, trace gravel	0						
9		0						
10	10-11.5: Light brown M-C SAND, trace gravel, trace cobble	0				PUSH	53	
11.5	11.5-13.5: Very light brown M-C SAND, some Gravel, trace cobble	0						
13.5	13.5-14.5: Very light brown/white M-C SAND, some Gravel, trace cobble	0						
15	15-17: Light grey M-C SAND, trace gravel, trace cobble	0				PUSH	48	
17	17-19: Very light brown M-C SAND, some Gravel, trace cobble	0						
19		0						
20								

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GZA
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Boring Log **GZA-12**

Sheet 2 of 2

Project	Location
Eastern Parkway	441 Eastern Parkway
Project No. 12.0076545.00	Client 441 Eastern Parkway, LLC
Drilling Company Aquifer Drilling and Testing, Inc.	Elevation and Datum Approx.

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
20	20-21.5: Very light grey M-C SAND, trace gravel	0				PUSH	60	
21		0						
		0						
22	21.5-24.8: Light brown M-C SAND, little gravel, trace cobble	0						
23		0						
		0						
24		0						
		0						Sample GZA12 (24.5-25) at 10:00
25	24.8-25: Light brown M-C SAND, little gravel, trace cobble, wet							
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-13**

Sheet 1 of 2

Project: Eastern Parkway		Location: 441 Eastern Parkway	
Project No.: 12.0076545.00		Client: 441 Eastern Parkway, LLC	
Drilling Company: Aquifer Drilling and Testing, Inc.		Elevation and Datum: Approx.	
Drilling Equipment: Geoprobe	Drilling Method:	Date Started: 11/8/17	Date Finished: 11/8/17
Sampler:		Final Boring Depth: 25 ft	Depth to Rock:
Sampler Hammer:	Weight (lbs): / Drop (in):	Groundwater Depth (ft): Initial ▽	Completion ▼ / 24 Hours ▼
Drilling Foreman: Chris Iodice		GZA Inspector: Ben Romagnoli	Checked By:

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
0	0-1: Brown M SAND and CLAY, trace gravel, wet	1.5				PUSH	24	
1	1-1.2: Orange M-C SAND, trace cobble	0						
	1.2-1.5: White quartz angular GRAVEL	0						
2	1.5-2: Light orange M-C SAND, trace gravel							
3								
4								
5	5-5.5: Light orange M-C SAND, trace gravel	0				PUSH	60	
	5.5-5.7: Brown M SAND and CLAY	0						
6	5.7-6: Quartz angular GRAVEL	0						
	6-10: Light brown M-C SAND, trace gravel, trace cobble	0						
7		0						
8		0						
9		0						
10	10-11: Grey M-C SAND, M-C quartz angular GRAVEL, trace gravel	0				PUSH	36	
		0						
11	11-12: Light brown M-C SAND, trace gravel	0						
12	12-12.1: Quartz angular GRAVEL	0						
	12.1-13: Very light brown M-C SAND, trace gravel	0						
13								
14								
15	15-16: Very light brown M-C SAND, little gravel	0				PUSH	60	
		2						
16	16-16.4: Light grey M-C SAND	0.8						
	16.4-17.4: Light brown M SAND, trace gravel	5.2						
17		0.4						
	17.4-18.4: Very light brown M-C SAND, some Gravel	0						
18		0						
	18.4-20: Brown M-C SAND, some Gravel, trace cobble	0						
19		0						
20		0						

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-13**

Sheet 2 of 2

Project: Eastern Parkway	Location: 441 Eastern Parkway
Project No.: 12.0076545.00	Client: 441 Eastern Parkway, LLC
Drilling Company: Aquifer Drilling and Testing, Inc.	Elevation and Datum: Approx.

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
20	20-22.5: Light grey M-C SAND, some Gravel	0				PUSH	60	
21		4.1						
22		6.4						Sample GZA13 (21.5-22) at 08:45
23	22.5-23.5: Very light brown M-C SAND, little gravel	5.3						
24	23.5-25: Light brown M-C SAND, little gravel, wet	1.1						
25		0						
26		0						
27		0						
28		0						Sample GZA13 (24.5-25) at 08:50
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-14**

Sheet 1 of 2

Project: Eastern Parkway		Location: 441 Eastern Parkway	
Project No.: 12.0076545.00		Client: 441 Eastern Parkway, LLC	
Drilling Company: Aquifer Drilling and Testing, Inc.		Elevation and Datum: Approx.	
Drilling Equipment: Geoprobe	Drilling Method:	Date Started: 11/9/17	Date Finished: 11/9/17
Sampler:		Final Boring Depth: 25 ft	Depth to Rock:
Sampler Hammer:	Weight (lbs): Drop (in):	Groundwater Depth (ft): Initial ▽	Completion ▼ 24 Hours ▼
Drilling Foreman: Chris Iodice		GZA Inspector: Ben Romagnoli	Checked By:

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Type	Recov. (in)	Remarks
0	0-0.5: CONCRETE	0				PUSH	29	
	0.5-0.7: Light brown M-C SAND, sub-base	0						
1	0.7-1: Black M SAND	0						
	1-2.25: Dark brown M SAND and CLAY, trace gravel	0						
2		0						
	2.25-2.5: Orange M-C SAND, little gravel							
3								
4								
5	5-6.5: Light brown M-C SAND, trace gravel and cobble	0				PUSH	41	
		0						
6		0						
	6.5-7.5: Dark orange M-C SAND, some Gravel and Cobble, trace quartz gravel	0						
7		0						
	7.5-8.5: Light brown CLAY and M SAND, trace gravel	0						
8		0						
9								
10	10-10.5: Light grey/black M SAND, trace gravel	3.3				PUSH	53	
	10.5-10.6: Dark orange M-C SAND	2.4						
11	10.6-14: Light brown M-C SAND, little gravel, trace cobble	0.6						
		0.4						
12		1.1						
		0.2						
13		0						
		0						
14	14-14.1: Dark orange M-C SAND and GRAVEL	0						
	14.1-14.5: Light brown M-C SAND, little gravel, trace cobble							
15	15-16: Light brown M-C SAND, little gravel, trace cobble	0.1				PUSH	41	
		2.3						
16	16-16.2: Dark grey M-C SAND with orange M SAND	3.1						
	16.2-16.8: Brown M-C SAND, trace gravel, trace quartz	3.7						
17	16.8-18.5: Very light brown M-C SAND, some Gravel, little cobble	0.6						
		0.7						
18		0						
19								
20								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-14**

Sheet 2 of 2

Project: Eastern Parkway	Location: 441 Eastern Parkway
Project No.: 12.0076545.00	Client: 441 Eastern Parkway, LLC
Drilling Company: Aquifer Drilling and Testing, Inc.	Elevation and Datum: Approx.

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
20	20-24: Light brown M-C SAND, little gravel, trace cobble, trace quartz gravel	0				PUSH	60	
21		3.7						
		1.4						Sample GZA14 (21-21.5) at 11:40
22		4.1						
		0.3						
23		2.2						
		1						
24		0.4						Sample GZA14 (23.5-24) at 11:45
	24-25: Light brown M-C SAND, little gravel, trace cobble, trace quartz gravel, wet	0						
25		0						
26								
27								
28								
29								
30								
31								
32								
33								
34								
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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-15**

Sheet 1 of 2

Project: Eastern Parkway		Location: 441 Eastern Parkway	
Project No.: 12.0076545.00		Client: 441 Eastern Parkway, LLC	
Drilling Company: Aquifer Drilling and Testing, Inc.		Elevation and Datum: Approx.	
Drilling Equipment: Geoprobe	Drilling Method:	Date Started: 11/6/17	Date Finished: 11/6/17
Sampler:		Final Boring Depth: 25 ft	Depth to Rock:
Sampler Hammer:	Weight (lbs): / Drop (in):	Groundwater Depth (ft): Initial ▽	Completion ▼ / 24 Hours ▼
Drilling Foreman: Chris Iodice		GZA Inspector: Ben Romagnoli	Checked By:

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Type	Recov. (in)	Remarks
0	0-0.3: Brown/dark brown M-C SAND, trace gravel, dry	0				PUSH	17	
	0.3-0.8: Brown/grey M-C SAND, trace gravel, dry	0						
1	0.8-1.5: Light brown C SAND, some Gravel, moist	0						
2								
3								
4								
5	5-5.5: Light brown C SAND, some Gravel, moist	0				PUSH	36	
	5.5-6.2: Grey/orange CLAY, little M sand	0.9						
6	6.2-7.2: Orange/brown C SAND, some Quartz, little gravel, dry	0						
7		0						
	7.2-8.5: Light orange/white M-C SAND, little gravel	0						
8		0						
9								
10	10-11: Orange C SAND, little gravel	0.2				PUSH	53	
		7.1						
11	11-11.1: Dark brown M SAND, dry	0.5						Sample GZA15 (11-11.5) at 10:30
	11.1-14.5: Very light brown C SAND and QUARTZ, little gravel, dry	0						
12		0.1						
13		0						
		0						
14		0						
15	15-15.5: Very light brown C SAND and QUARTZ, little gravel	0.3				PUSH	53	
	15.5-15.8: Orange C SAND, little gravel	0.6						
16	15.8-16: Dark brown M SAND	2.6						
	16-19.5: White C SAND, little gravel	0						
17		0						
		0						
18		0						
		0						
19		0						
20								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-15**

Sheet 2 of 2

Project: Eastern Parkway	Location: 441 Eastern Parkway
Project No.: 12.0076545.00	Client: 441 Eastern Parkway, LLC
Drilling Company: Aquifer Drilling and Testing, Inc.	Elevation and Datum: Approx.

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
20	20-21: Light brown/white C SAND, trace gravel	0				PUSH	60	
21	21-21.2: Orange C SAND	0						
	21.2-21.3: Dark brown C SAND	0						
22	21.3-24: White M-C SAND, trace gravel, dry	0						
23		0						
24		0						Sample GZA15 (23.5-24) at 10:40
	24-25: White M-C SAND, trace gravel, wet	0						
25		0						
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-16**

Sheet 1 of 2

Project: Eastern Parkway		Location: 441 Eastern Parkway	
Project No.: 12.0076545.00		Client: 441 Eastern Parkway, LLC	
Drilling Company: Aquifer Drilling and Testing, Inc.		Elevation and Datum: Approx.	
Drilling Equipment: Geoprobe	Drilling Method:	Date Started:	Date Finished:
Sampler:		Final Boring Depth: 25 ft	Depth to Rock:
Sampler Hammer:	Weight (lbs): / Drop (in):	Groundwater Depth (ft): Initial ▽	Completion ▼ / 24 Hours ▼
Drilling Foreman: Chris Iodice		GZA Inspector: Ben Romagnoli	Checked By:

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Type	Recov. (in)	Remarks
0	0-0.5: Dark grey M SAND, trace cobble	0				PUSH	29	
0.5	0.5-1: Brown CLAY and F-M SAND, moist	0						
1	1-1.5: Black M SAND, trace gravel	0						
1.5	1.5-2: Light brown CLAY, trace M sand, trace gravel	0						
2	2-2.5: Light brown M-C SAND, trace gravel	0						
5	5-5.5: Light brown M-C SAND, little clay, little gravel, wood chips, moist	0				PUSH	53	
5.5	5.5-7.5: Light grey CLAY, some F silt, trace C sand	0						
7.5	7.5-8.5: Orange M-C SAND and quartz GRAVEL	0						
8.5	8.5-9.5: Very light brown/white M-C SAND, trace cobble	0						
10	10-10.5: Very light brown/white M-C SAND, trace cobble	0				PUSH	41	
10.5	10.5-13.5: Light brown M-C SAND, little gravel, trace quartz gravel	0						
15	15-16.5: Light brown M SAND, trace C sand	0				PUSH	36	
		1.3						
		0						
16.5	16.5-16.6: Black M SAND	1.3						
16.6	16.6-18: Very light brown/white M SAND, little C sand, trace gravel	1						
18		0						
20								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-16**

Sheet 2 of 2

Project	Eastern Parkway	Location	441 Eastern Parkway
Project No.	12.0076545.00	Client	441 Eastern Parkway, LLC
Drilling Company	Aquifer Drilling and Testing, Inc.	Elevation and Datum	Approx.

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
20	20-24.8: Light brown M-C SAND, little gravel, trace quartz gravel	0						
21		0						Sample GZA16 (21-21.5) at 09:45
22		1.5				PUSH	60	
23		1.3						
24		0.8						
25	24.8-25: Light brown M-C SAND, little gravel, trace quartz gravel, wet	0.4						Sample GZA16 (24.5-25) at 09:50
26		0						
27		0						
28		0						
29								
30								
31								
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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-17**

Sheet 1 of 2

Project: Eastern Parkway		Location: 441 Eastern Parkway	
Project No.: 12.0076545.00		Client: 441 Eastern Parkway, LLC	
Drilling Company: Aquifer Drilling and Testing, Inc.		Elevation and Datum: Approx.	
Drilling Equipment: Geoprobe	Drilling Method:	Date Started: 11/6/17	Date Finished: 11/6/17
Sampler:		Final Boring Depth: 25 ft	Depth to Rock:
Sampler Hammer:	Weight (lbs): / Drop (in):	Groundwater Depth (ft): Initial ▽	Completion ▼ / 24 Hours ▼
Drilling Foreman: Chris Iodice		GZA Inspector: Ben Romagnoli	Checked By:

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Type	Recov. (in)	Remarks
0	0-1: Dark grey M-C SAND, trace gravel, trace cobble	0				PUSH	36	
1	1-1.5: Brown M-C SAND, trace clay, trace gravel	0						
	1.5-3: Light orange M-C SAND, little gravel	0						
2		0						
3		0						
4								
5	5-5.25: Light grey CLAY, little F sand	0				PUSH	41	
	5.25-6.5: Orange M-C SAND, trace gravel	0						
6		0						
7	6.5-8.5: Very light brown/white M-C SAND, trace gravel, trace cobble	0						
8		0						
9								
10	10-10.5: White F-M SAND	0				PUSH	60	Sample GZA17 (10.5-11) at 13:55
	10.5-10.75: Orange M-C SAND	4.1						
11	10.75-11: Dark grey M-C SAND, trace gravel	17.3						
	11-13: Very light brown/white M-C SAND, trace gravel	0						
12		0						
		0						
13	13-15: Very light brown C SAND, little gravel	0						
		0						
14		0						
		0						
15	15-15.25: Dark grey M SAND, trace gravel	1				PUSH	48	
	15.25-16: White M SAND, trace gravel	0						
16	16-16.25: Orange M-C SAND, trace gravel	0						
	16.25-18.5: Very light brown M-C SAND, little gravel	0						
17		0						
		0						
18		0						
	18.5-19: White M SAND	0						
19								
20								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-17**

Sheet 2 of 2

Project: Eastern Parkway	Location: 441 Eastern Parkway
Project No.: 12.0076545.00	Client: 441 Eastern Parkway, LLC
Drilling Company: Aquifer Drilling and Testing, Inc.	Elevation and Datum: Approx.

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
20	20-20.5: Light grey M SAND, trace gravel	0				PUSH	48	
	20.5-21: White M-C SAND	0						
21	21-21.5: Grey/brown M SAND, trace gravel	1.7						
	21.5-23.75: White M-C SAND, trace gravel	0						
22		0						
		0						
23		0						
		0						Sample GZA17 (23.5-24) at 13:45
24	23.75-24: Orange C SAND and GRAVEL, wet							
25								
26								
27								
28								
29								
30								
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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-18**

Sheet 1 of 2

Project: Eastern Parkway		Location: 441 Eastern Parkway	
Project No.: 12.0076545.00		Client: 441 Eastern Parkway, LLC	
Drilling Company: Aquifer Drilling and Testing, Inc.		Elevation and Datum: Approx.	
Drilling Equipment: Geoprobe	Drilling Method:	Date Started: 11/6/17	Date Finished: 11/6/17
Sampler:		Final Boring Depth: 25 ft	Depth to Rock:
Sampler Hammer:	Weight (lbs): / Drop (in):	Groundwater Depth (ft): Initial ▽	Completion ▼ / 24 Hours ▼
Drilling Foreman: Chris Iodice		GZA Inspector: Ben Romagnoli	Checked By:

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Type	Recov. (in)	Remarks
0	0-1: Dark brown M SAND, trace gravel	0				PUSH	36	
		1.5						
1	1-1.25: Brown M SAND	4.6						
	1.25-2: Very light brown M-C SAND, little gravel	0.1						Sample GZA18 (1.5-2) at 14:50
2	2-3: Light orange M-C SAND, little gravel	0						
		0						
3								
4								
5	5-5.5: Light brown/grey M-C SAND, little gravel	0				PUSH	53	
	5.5-6.5: Light brown C SAND and GRAVEL	0						
6		0						
	6.5-9: Orange M-C SAND, little gravel	0						
7		0						
8		0						
		0						
9	9-9.5: Very light brown/white M-C SAND, trace gravel	0						
10	10-11.5: Light grey M SAND, little gravel	0				PUSH	48	
		0						
11		0						
	11.5-12: Brown M SAND, trace gravel	0						
12	12-14: Very light brown M-C SAND, little gravel	0						
		0						
13		0						
		0						
14								
15	15-15.5: Light brown M SAND, trace gravel	0				PUSH	53	
	15.5-15.6: Orange M SAND, trace gravel	0						
16	15.6-17: Light grey M-C SAND, little gravel	0						
		0						
17	17-19.5: White M SAND, trace gravel	0						
		0						
18		0						
		0						
19		0						
20								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-18**

Sheet 2 of 2

Project: Eastern Parkway	Location: 441 Eastern Parkway
Project No.: 12.0076545.00	Client: 441 Eastern Parkway, LLC
Drilling Company: Aquifer Drilling and Testing, Inc.	Elevation and Datum: Approx.

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
20	20-23.5: Light grey M-C SAND, little gravel	0				PUSH	48	
21		0						
22		0						
23		0						
24	23.5-24: Light grey M-C SAND, little gravel, wet	0.1						Sample GZA18 (23.5-24) at 15:00
		0						
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-2**

Sheet 1 of 2

Project: Eastern Parkway		Location: 441 Eastern Parkway	
Project No.: 12.0076545.00		Client: 441 Eastern Parkway, LLC	
Drilling Company: Aquifer Drilling and Testing, Inc.		Elevation and Datum: Approx.	
Drilling Equipment: Geoprobe	Drilling Method:	Date Started: 11/10/17	Date Finished: 11/10/17
Sampler:		Final Boring Depth: 25 ft	Depth to Rock:
Sampler Hammer:	Weight (lbs): Drop (in):	Groundwater Depth (ft): Initial ▽	Completion ▼ 24 Hours ▼
Drilling Foreman: Chris Iodice		GZA Inspector: Ben Romagnoli	Checked By:

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Type	Recov. (in)	Remarks
0	0-1.5: Brown M SAND and GRAVEL, trace cobble	63				PUSH	36	Sample GZA2 (0-0.5) at 11:05
1		7.5						
		2.3						
	1.5-1.7: Brown M SAND, some Clay	0.9						
2	1.7-3: Light brown M-C SAND, some Gravel, trace cobble	0						
		0						
3								
4								
5	5-6.5: Very light brown M-C SAND, some Gravel	0				PUSH	29	
		0						
6		0.1						
	6.5-7.5: Very light brown/white M SAND, trace C sand, trace gravel	0						
7		0						
8								
9								
10	10-10.2: Brown M-C SAND, trace gravel, trace clay	10.2				PUSH	60	
	10.2-15: Very light M-C SAND, trace gravel, trace cobble	0						
11		0						
		0.1						
12		0						
		0						
13		0						
		0						
14		0						
		0						
15	15-16: White F-M SAND, trace gravel	0.3				PUSH	48	
		0.4						
16	16-17: Light brown M SAND, trace C sand and gravel	0.1						
		0.5						
17	17-17.5: White/light grey F SAND and SILT	0						
	17.5-19: Light brown M-C SAND, some Gravel, little cobble	0						
18		0						
		0						
19								
20								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-2**

Sheet 2 of 2

Project	Location
Eastern Parkway	441 Eastern Parkway
Project No.	Client
12.0076545.00	441 Eastern Parkway, LLC
Drilling Company	Elevation and Datum
Aquifer Drilling and Testing, Inc.	Approx.

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
20	20-22.5: Very light brown/white M-C SAND, trace gravel and cobble	0.1						
21		0.4						
22		2.2						
		0.1						
		0.2						
	22.5-22.7: Brown M SAND and CLAY	0				PUSH	60	
23	22.7-24.8: Very light brown/white M-C SAND, trace gravel and cobble	0						
		0						
24		0						
		0						Sample GZA2 (24.5-25) at 11:00
25	24.8-25: Very light brown/white M-C SAND, trace gravel and cobble, wet	0						
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
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41								
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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-3**

Sheet 1 of 2

Project: Eastern Parkway		Location: 441 Eastern Parkway	
Project No.: 12.0076545.00		Client: 441 Eastern Parkway, LLC	
Drilling Company: Aquifer Drilling and Testing, Inc.		Elevation and Datum: Approx.	
Drilling Equipment: Geoprobe	Drilling Method:	Date Started: 11/8/17	Date Finished: 11/8/17
Sampler:		Final Boring Depth: 25 ft	Depth to Rock:
Sampler Hammer:	Weight (lbs): / Drop (in):	Groundwater Depth (ft): Initial ▽	Completion ▼ / 24 Hours ▼
Drilling Foreman: Chris Iodice		GZA Inspector: Ben Romagnoli	Checked By:

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Type	Recov. (in)	Remarks
0	0-2.5: Dark grey M SAND and GRAVEL, little cobble	0				PUSH	41	Sample GZA3 (2.5-3) at 14:00
1		0						
2		0						
		1.3						
		0						
	2.5-3: Brown/orange M-C SAND, little gravel, little cobble, quartz gravel	0						
3		0						
	3-3.5: Very light brown M-C SAND, trace gravel							
4								
5	5-5.1: Orange/black M-C SAND, trace gravel	0				PUSH	48	
	5.1-7.5: Light brown/white M-C SAND, trace gravel, quartz gravel	0						
6		0						
		0						
7		0						
	7.5-8.5: Grey/brown M SAND, trace gravel	0						
8		0						
	8.5-9: Orange M-C SAND, little gravel	0						
9								
10	10-11: Very light brown/white M-C SAND	0				PUSH	60	
		0						
11	11-15: Light brown M-C SAND, trace gravel	0						
		0						
12		0						
		0						
13		0						
		0						
14		0						
		0						
15	15-17: Grey/brown M SAND, trace gravel	0				PUSH	53	
		0						
16		0.1						
		0						
17	17-17.1: Black M SAND	0						
	17.1-18.5: Very light brown M-C SAND, trace gravel	0						
18		0						
		0						
19	18.5-19: Light brown M SAND	0						
	19-19.5: Brown M-C SAND, little gravel	0						
20								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-3**

Sheet 2 of 2

Project: Eastern Parkway	Location: 441 Eastern Parkway
Project No.: 12.0076545.00	Client: 441 Eastern Parkway, LLC
Drilling Company: Aquifer Drilling and Testing, Inc.	Elevation and Datum: Approx.

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
20	20-22.5: Light grey/brown M SAND, trace gravel, trace C sand	0				PUSH	60	
21		0						
22		0						
22		0						
22.5	22.5-24: Light Brown M-C SAND, trace gravel, little quartz	0						
23		0						
24		0						
24	24-24.2: Orange C SAND and GRAVEL	0						
24.2	24.2-25: White M-C SAND, little gravel, wet	0						Sample GZA3 (24.5-25) at 14:05
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
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39								
40								
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42								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-4**

Sheet 1 of 2

Project: Eastern Parkway		Location: 441 Eastern Parkway	
Project No.: 12.0076545.00		Client: 441 Eastern Parkway, LLC	
Drilling Company: Aquifer Drilling and Testing, Inc.		Elevation and Datum: Approx.	
Drilling Equipment: Geoprobe	Drilling Method:	Date Started: 11/8/17	Date Finished: 11/8/17
Sampler:		Final Boring Depth: 25 ft	Depth to Rock:
Sampler Hammer:	Weight (lbs): Drop (in):	Groundwater Depth (ft): Initial ▽	Completion ▼ 24 Hours ▼
Drilling Foreman: Chris Iodice		GZA Inspector: Ben Romagnoli	Checked By:

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Type	Recov. (in)	Remarks
0	0-0.5: Light grey M-C SAND and GRAVEL	0.1				PUSH	29	
1	0.5-1.5: Black M-C SAND, little angular gravel	0.2						
		2.4						
	1.5-2: Orange/brown CLAY, little F-M sand	0						
2	2-2.5: White M-C SAND, trace gravel	0						
3								
4								
5	5-5.2: White M-C SAND, trace gravel	0				PUSH	48	
	5.2-7: Very light grey CLAY, tight, trace silt	0						
6		0						
		0						
7	7-7.2: Orange M-C SAND	0						
	7.2-9: Very light brown M SAND, little C sand, trace gravel, trace quartz	0						
8		0						
		0						
9								
10	10-10.5: Very light brown M SAND, little C sand, trace gravel, trace quartz	0.1				PUSH	48	
	10.5-10.7: Black M-C SAND	0						
11	10.7-13: Very light brown M-C SAND, trace gravel	0						
12		0						
		0						
13	13-13.5: Very light brown M SAND	0						
	13.5-14: Very light brown M-C SAND, trace gravel	0						
14								
15	15-16.5: Very light brown/white M-C SAND, trace gravel	0				PUSH	53	
		0						
16		2.3						
	16.5-16.8: Black M-C SAND	0						
17	16.8-17.8: Very light brown M-C SAND, trace gravel	0						
		0						
18	17.8-19.5: Light brown M-C SAND, little gravel, trace quartz cobble	0						
		0						
19		0						
20								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-4**

Sheet 2 of 2

Project	Location
Eastern Parkway	441 Eastern Parkway
Project No.	Client
12.0076545.00	441 Eastern Parkway, LLC
Drilling Company	Elevation and Datum
Aquifer Drilling and Testing, Inc.	Approx.

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
20	20-21.5: Light brown M-C SAND, little gravel	0				PUSH	60	
21		0						
		2.5						
	21.5-21.7: Black M-C SAND	0.6						Sample GZA4 (21.5-22) at 11:55
22	21.7-23: Light brown M-C SAND, trace gravel	0						
		0						
23	23-24: Very light brown M SAND	0						
		0						
24	24-25: Light brown M-C SAND, trace gravel, wet	0						
		0						Sample GZA4 (24.5-25) at 12:00
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
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42								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-5**

Sheet 1 of 2

Project: Eastern Parkway		Location: 441 Eastern Parkway	
Project No.: 12.0076545.00		Client: 441 Eastern Parkway, LLC	
Drilling Company: Aquifer Drilling and Testing, Inc.		Elevation and Datum: Approx.	
Drilling Equipment: Geoprobe	Drilling Method:	Date Started: 11/9/17	Date Finished: 11/9/17
Sampler:		Final Boring Depth: 25 ft	Depth to Rock:
Sampler Hammer:	Weight (lbs): / Drop (in):	Groundwater Depth (ft): Initial ▽	Completion ▼ / 24 Hours ▼
Drilling Foreman: Chris Iodice		GZA Inspector: Ben Romagnoli	Checked By:

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Type	Recov. (in)	Remarks
0	0-0.8: Dark brown M SAND, some Clay, trace gravel and cobble	0				PUSH	24	
1	0.8-1: Light brown M-C SAND	0						
	1-2: Orange M-C SAND, trace gravel	0						
2		0						
3								
4								
5	5-5.5: Orange M-C SAND, trace gravel	0				PUSH	48	
	5.5-6.5: Light orange M-C SAND, trace quartz gravel	0						
6		0						
	6.5-6.6: Angular quartz GRAVEL	0						
7	6.6-9: Light brown M-C SAND, little gravel, trace cobble	0						
8		0						
		0						
9								
10	10-11: Light brown M-C SAND, little gravel, trace cobble	0				PUSH	60	
		0.3						
11	11-11.2: Dark orange M-C SAND	0						
	11.2-12: Very light brown M SAND, trace gravel	0						
12	12-15: Very light brown M-C SAND, little gravel, trace quartz cobble	0						
13		0						
		0						
14		0						
		0						
15	15-15.5: Light brown M-C SAND, trace gravel	0				PUSH	48	
	15.5-16.5: Dark brown M SAND, trace gravel	0						
16		0						
	16.5-17: Very light brown M SAND, trace gravel	0						
17	17-19: Very light brown/white M-C SAND, some Gravel, little cobble	0						
18		0						
		0						
19								
20								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-5**

Sheet 2 of 2

Project: Eastern Parkway	Location: 441 Eastern Parkway
Project No.: 12.0076545.00	Client: 441 Eastern Parkway, LLC
Drilling Company: Aquifer Drilling and Testing, Inc.	Elevation and Datum: Approx.

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
20	20-22.5: Dark brown M-C SAND, little gravel, trace cobble	0				PUSH	60	Sample GZA5 (20.5-21) at 08:00
21		1.3						
22		0						
23		0.4						
24	22.5-23.5: Very light brown M SAND, trace gravel	0						
25	23.5-24: Light orange M-C SAND, some Gravel	0						
26	24-24.8: Very light brown/white M SAND, trace gravel	0						Sample GZA5 (24.5-25) at 08:05
27	24.8-25: Very light brown/white M SAND, trace gravel, wet	0						DUP-11917 (24.5-25) at 08:30
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-6**

Sheet 1 of 2

Project: Eastern Parkway		Location: 441 Eastern Parkway	
Project No.: 12.0076545.00		Client: 441 Eastern Parkway, LLC	
Drilling Company: Aquifer Drilling and Testing, Inc.		Elevation and Datum: Approx.	
Drilling Equipment: Geoprobe	Drilling Method:	Date Started: 11/7/17	Date Finished: 11/7/17
Sampler:		Final Boring Depth: 25 ft	Depth to Rock:
Sampler Hammer:	Weight (lbs): / Drop (in):	Groundwater Depth (ft): Initial ▽	Completion ▼ / 24 Hours ▼
Drilling Foreman: Chris Iodice		GZA Inspector: Ben Romagnoli	Checked By:

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Type	Recov. (in)	Remarks
0	0-1: Grey M-C SAND, trace gravel	0				PUSH	24	
1	1-1.5: Dark grey/black M-C SAND, little gravel, moist	0						
	1.5-2: Grey/brown M-C SAND, trace gravel, moist	0						
2								
3								
4								
5	5-6: Dark brown M-C SAND, trace cobble	0				PUSH	17	
		0						
6	6-6.1: Black M SAND	0						
	6.1-6.4: BRICK layer, brick Gravel							
7								
8								
9								
10	10-11.5: Dark brown M SAND and GRAVEL, trace brick, trace cobble	0				PUSH	29	
		0						
11		0						
	11.5-12.5: Very light brown M-C SAND, moist, trace gravel	0						
12		0						
13								
14								
15	15-15.3: Very light brown M-C SAND, moist, trace gravel	0				PUSH	48	
	15.3-15.5: Dark brown M SAND	0						
	15.5-16: Very light brown C SAND, little M sand	0						
16	16-18: Very light brown M SAND, little C sand	0						
17		0						
		0						
18	18-19: Very light brown C SAND, little M sand, trace gravel	0						
		0						
19								
20								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-6**

Sheet 2 of 2

Project: Eastern Parkway	Location: 441 Eastern Parkway
Project No.: 12.0076545.00	Client: 441 Eastern Parkway, LLC
Drilling Company: Aquifer Drilling and Testing, Inc.	Elevation and Datum: Approx.

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
20	20-21.5: Very light brown M-C SAND, trace gravel	0				PUSH	56	
21		0						
		0						
	21.5-22: Light grey M-C SAND, little gravel	0						
22	22-24.5: Very light brown M-C SAND, trace gravel	0						
		0						
23		0						
		0						
24		0						Sample GZA6 (24-24.5) at 14:00
	24.5-24.8: Very light brown M-C SAND, trace gravel, wet	0						No second sample (no PID readings)
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-7**

Sheet 1 of 2

Project: Eastern Parkway		Location: 441 Eastern Parkway	
Project No.: 12.0076545.00		Client: 441 Eastern Parkway, LLC	
Drilling Company: Aquifer Drilling and Testing, Inc.		Elevation and Datum: Approx.	
Drilling Equipment: Geoprobe	Drilling Method:	Date Started: 11/7/17	Date Finished: 11/7/17
Sampler:		Final Boring Depth: 25 ft	Depth to Rock:
Sampler Hammer:	Weight (lbs): / Drop (in):	Groundwater Depth (ft): Initial ▽	Completion ▼ / 24 Hours ▼
Drilling Foreman: Chris Iodice		GZA Inspector: Ben Romagnoli	Checked By:

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
0	0-1.5: Dark grey M-C SAND, Brick material, some Gravel, some Cobble	0				PUSH	36	
1		0						
	1.5-1.6: Light brown M-C SAND	0						
2	1.6-1.8: Black M-C SAND and CLAY, wet	0						
	1.8-2: Grey M SAND, some Clay, wet	0						
3	2-3: Light grey M SAND, trace clay, trace gravel, wet							
4								
5	5-6: Light grey M SAND and CLAY, trace gravel, wet	0				PUSH	48	
		0						
6	6-7: Orange M-C SAND, trace gravel	0						
		0						
7	7-8.5: Very light brown M-C SAND, trace gravel	0						
		0						
8		0						
9	8.5-9: White M-C SAND, trace gravel	0						
10	10-11: Light brown M SAND, little C sand, moist	0				PUSH	48	
		0						
11	11-11.1: Dark grey/black M SAND	2.9						Sample GZA7 (11-11.5) at 13:20
	11.1-11.3: Quartz GRAVEL, moist	0						
12	11.3-14: Light brown M-C SAND, trace gravel, moist	0						
		0						
13		0						
		0						
14								
15	15-19: Light brown M-C SAND, trace gravel, moist	0				PUSH	48	
		0						
16		0.5						
17		0						
		0						
18		0						
		0						
19								
20								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-7**

Sheet 2 of 2

Project	Eastern Parkway	Location	441 Eastern Parkway
Project No.	12.0076545.00	Client	441 Eastern Parkway, LLC
Drilling Company	Aquifer Drilling and Testing, Inc.	Elevation and Datum	Approx.

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
20	20-22: Light brown M-C SAND, trace gravel	0						
21		0						
		0.3						
22		0						
	22-22.1: Quartz GRAVEL	0.5				PUSH	36	Sample GZA7 (22.5-23) at 13:30
23	22.1-23: Very light brown/white M-C SAND, little gravel, trace cobble	0						DUP-11/7/17 (GZA7 22.5-23) at 14:20
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-8**

Sheet 1 of 2

Project: Eastern Parkway		Location: 441 Eastern Parkway	
Project No.: 12.0076545.00		Client: 441 Eastern Parkway, LLC	
Drilling Company: Aquifer Drilling and Testing, Inc.		Elevation and Datum: Approx.	
Drilling Equipment: Geoprobe	Drilling Method:	Date Started: 11/7/17	Date Finished: 11/7/17
Sampler:		Final Boring Depth: 25 ft	Depth to Rock:
Sampler Hammer:	Weight (lbs): / Drop (in):	Groundwater Depth (ft): Initial ▽	Completion ▼ / 24 Hours ▼
Drilling Foreman: Chris Iodice		GZA Inspector: Ben Romagnoli	Checked By:

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Type	Recov. (in)	Remarks
0	0-0.5: Dark grey M-C SAND, some Gravel	0				PUSH	36	
	0.5-1: Dark grey M-C SAND, little clay, trace gravel	0						
1	1-2: Orange M-C SAND, trace gravel	0						
		0						
2	2-3: Light orange M-C SAND, trace gravel	0						
3								
4								
5	5-6: Light orange M-C SAND, trace gravel	0				PUSH	60	
		0.2						
6	6-6.5: Light grey tight CLAY	0						
	6.5-10: Light orange M-C SAND, little gravel	0						
7		0						
		0						
8		0						
		0						
9		0						
		0						
10	10-11.5: Light orange M-C SAND, little gravel	0				PUSH	53	
		1.4						
11		0.3						
	11.5-11.6: Quartz GRAVEL	0						
12	11.6-13: Light orange M-C SAND, trace gravel	0						
		0						
13	13-14.5: White M-C SAND, little gravel	0						
		0						
14		0						
15	15-16: Light grey M-C SAND, little gravel	0				PUSH	48	
		0						
16	16-17: Light orange M-C SAND, little clay, trace gravel	2.5						
		2.3						
17	17-17.25: Dark grey/black M-C SAND, trace gravel	0						
	17.25-19: Light orange M-C SAND, little gravel	0						
18		0						
		0						
19								
20								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-8**

Sheet 2 of 2

Project: Eastern Parkway	Location: 441 Eastern Parkway
Project No.: 12.0076545.00	Client: 441 Eastern Parkway, LLC
Drilling Company: Aquifer Drilling and Testing, Inc.	Elevation and Datum: Approx.

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
20	20-21.5: Very light brown M-C SAND, trace gravel	0				PUSH	60	
21		0						
	21.5-22: Orange M-C SAND, trace gravel	0.3						Sample GZA8 (21.5-22) at 09:10
22	22-22.5: Grey/black M-C SAND, trace gravel	1.4						
	22.5-23: White M-C quartz GRAVEL	13.3						
23	23-24: Very light brown M-C SAND, trace gravel	0.2						
		0						Sample GZA8 (23.5-24) at 09:15
24	24-25: Very light brown M-C SAND, trace gravel, wet	0						
		0.1						
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-9**

Sheet 1 of 2

Project: Eastern Parkway		Location: 441 Eastern Parkway	
Project No.: 12.0076545.00		Client: 441 Eastern Parkway, LLC	
Drilling Company: Aquifer Drilling and Testing, Inc.		Elevation and Datum: Approx.	
Drilling Equipment: Geoprobe	Drilling Method:	Date Started: 11/7/17	Date Finished: 11/7/17
Sampler:		Final Boring Depth: 25 ft	Depth to Rock:
Sampler Hammer:	Weight (lbs): / Drop (in):	Groundwater Depth (ft): Initial ▽	Completion ▼ / 24 Hours ▼
Drilling Foreman: Chris Iodice		GZA Inspector: Ben Romagnoli	Checked By:

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
0	0-1: Dark grey/black M SAND, trace angular gravel, trace quartz	0				PUSH	41	
1	1-1.1: WOOD chunks	0						
	1.1-1.5: Brown M SAND, little clay, trace gravel	0						
2	1.5-3.2: Light orange M-C SAND, little gravel	0						
3		0						
	3.2-3.5: White F SAND and SILT, trace quartz gravel							
4								
5	5-6: Light orange M SAND, some Gravel	0				PUSH	53	
		0						
6	6-7: White quartz GRAVEL	0						
		0						
7	7-9.5: Orange/white M-C SAND, little round gravel, trace cobble	0						
8		0						
		0						
9		0						
10	10-11: White M SAND, trace round gravel	0				PUSH	53	
		0						
11	11-11.1: Dark grey M SAND, trace gravel	1.5						Sample GZA9 (11-11.5) at 10:50
	11.1-11.5: White quartz GRAVEL	0						
12	11.5-12.5: Light orange M-C SAND, trace gravel	0						
13	12.5-14.5: White M-C SAND, little gravel	0						
		0						
14		0						
		0						
15	15-15.5: Very light brown M SAND, little C sand, trace gravel	0				PUSH	36	
	15.5-15.75: Very light brown F SAND and SILT	0						
16	15.75-16: Very light brown M-C SAND, trace gravel	0						
	16-17.5: Light brown M-C SAND	0.1						
17		0						
	17.5-17.75: F-C quartz GRAVEL	0						
18	17.75-18: Light brown C SAND, trace gravel							
19								
20								

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GZA
GeoEnvironmental, Inc.

Boring Log **GZA-9**

Sheet 2 of 2

Project: Eastern Parkway	Location: 441 Eastern Parkway
Project No.: 12.0076545.00	Client: 441 Eastern Parkway, LLC
Drilling Company: Aquifer Drilling and Testing, Inc.	Elevation and Datum: Approx.

Depth (ft)	Sample Description	PID Reading (ppm)	Elev. (ft)	MATERIAL SYMBOL	Sample Data: Number	Sample Data: Type	Sample Data: Recov. (in)	Remarks
20	20-24: Light brown M-C SAND, little gravel, trace cobbles	0				PUSH	53	
21		0						
22		0.1						
23		0.1						
24		0						
		0						
		0.1						
	24-24.5: Light brown M-C SAND, little gravel, trace cobbles, wet	0.1						Sample GZA9 (24-24.5) at 10:45
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								

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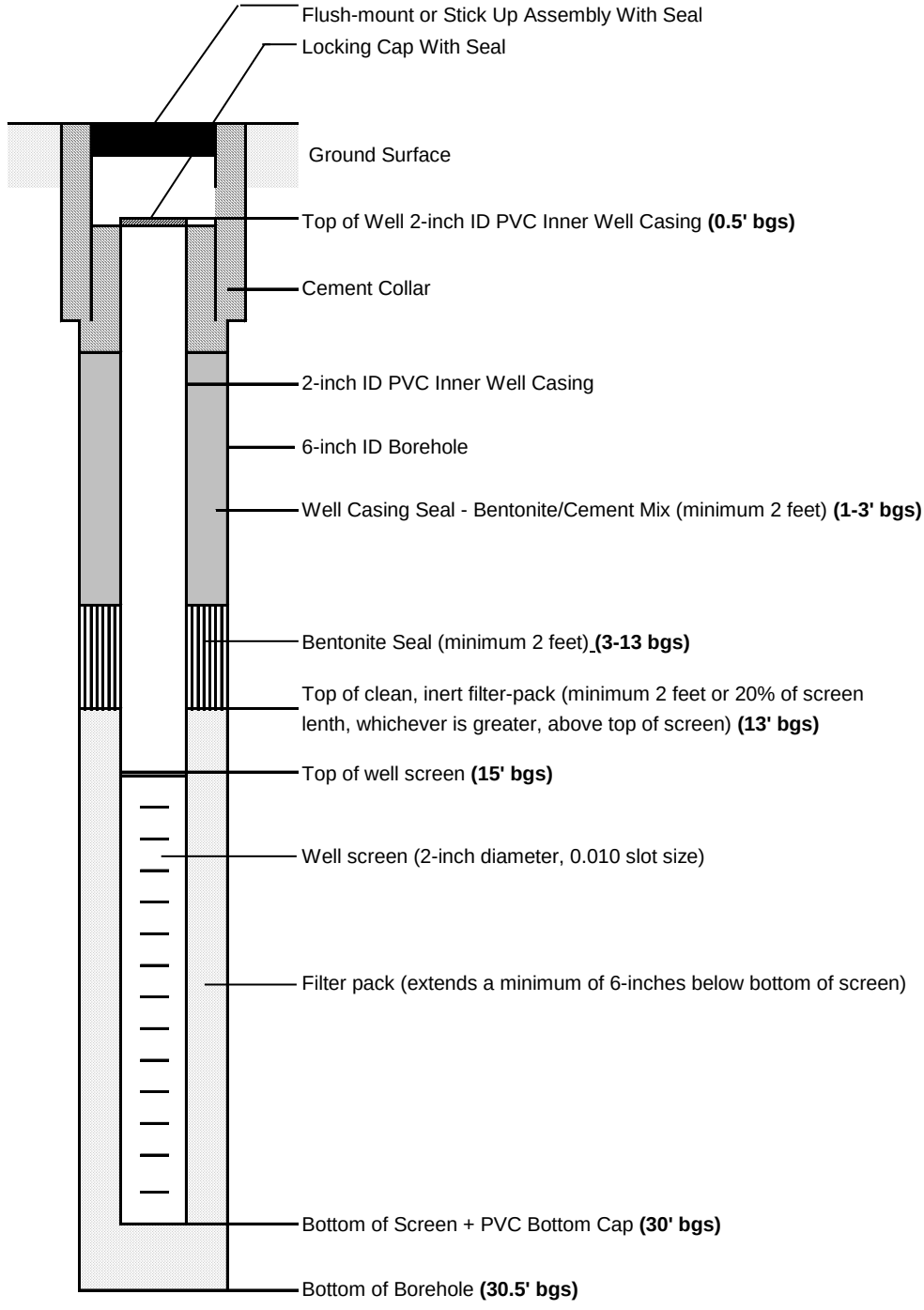
APPENDIX E – PERMANENT MONITORING WELL CONSTRUCTION LOGS

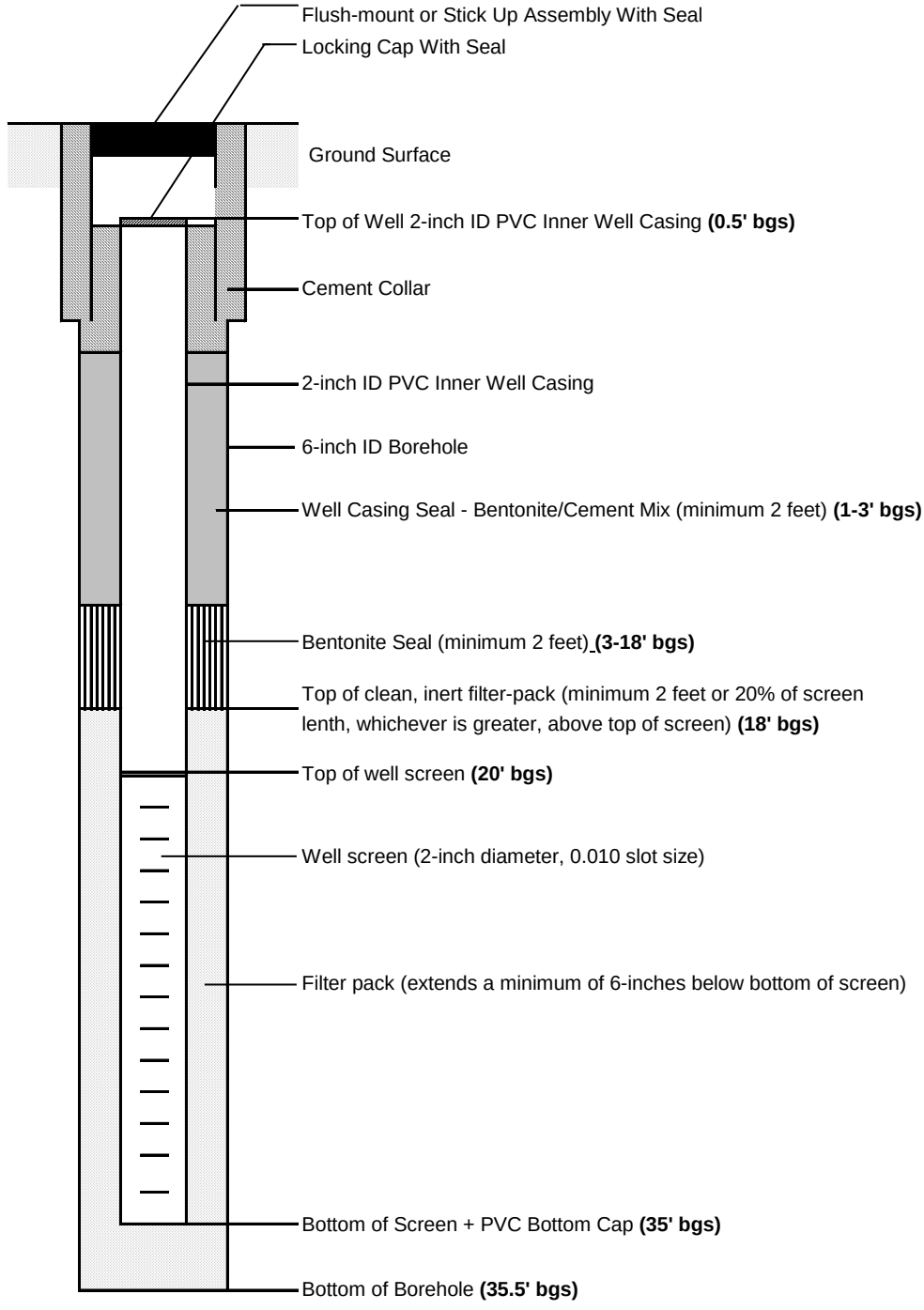
GROUNDWATER MONITORING WELL CONSTRUCTION
MW-1

(UNCONSOLIDATED FORMATION)



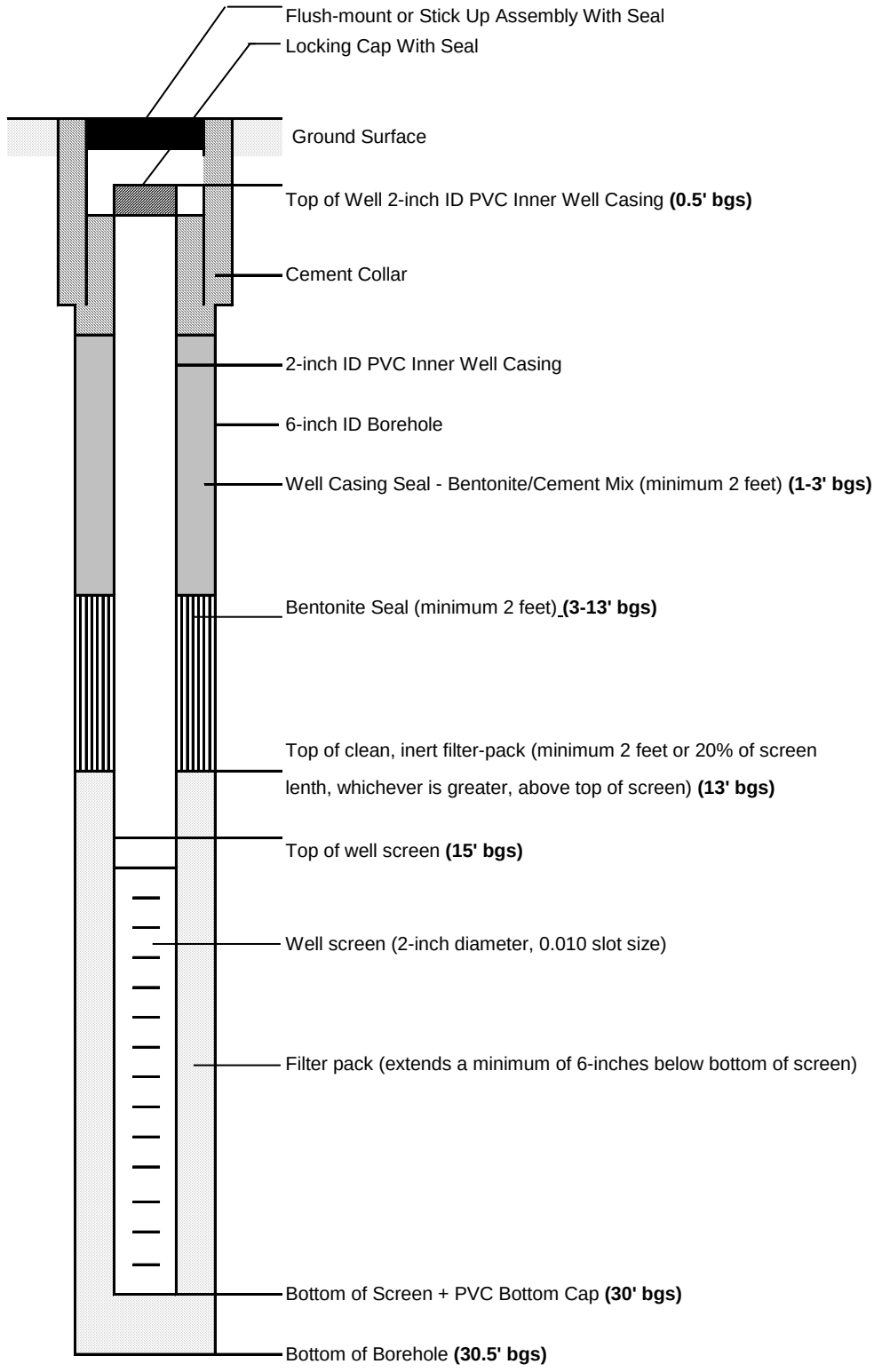
GROUNDWATER MONITORING WELL CONSTRUCTION
MW-2

(UNCONSOLIDATED FORMATION)



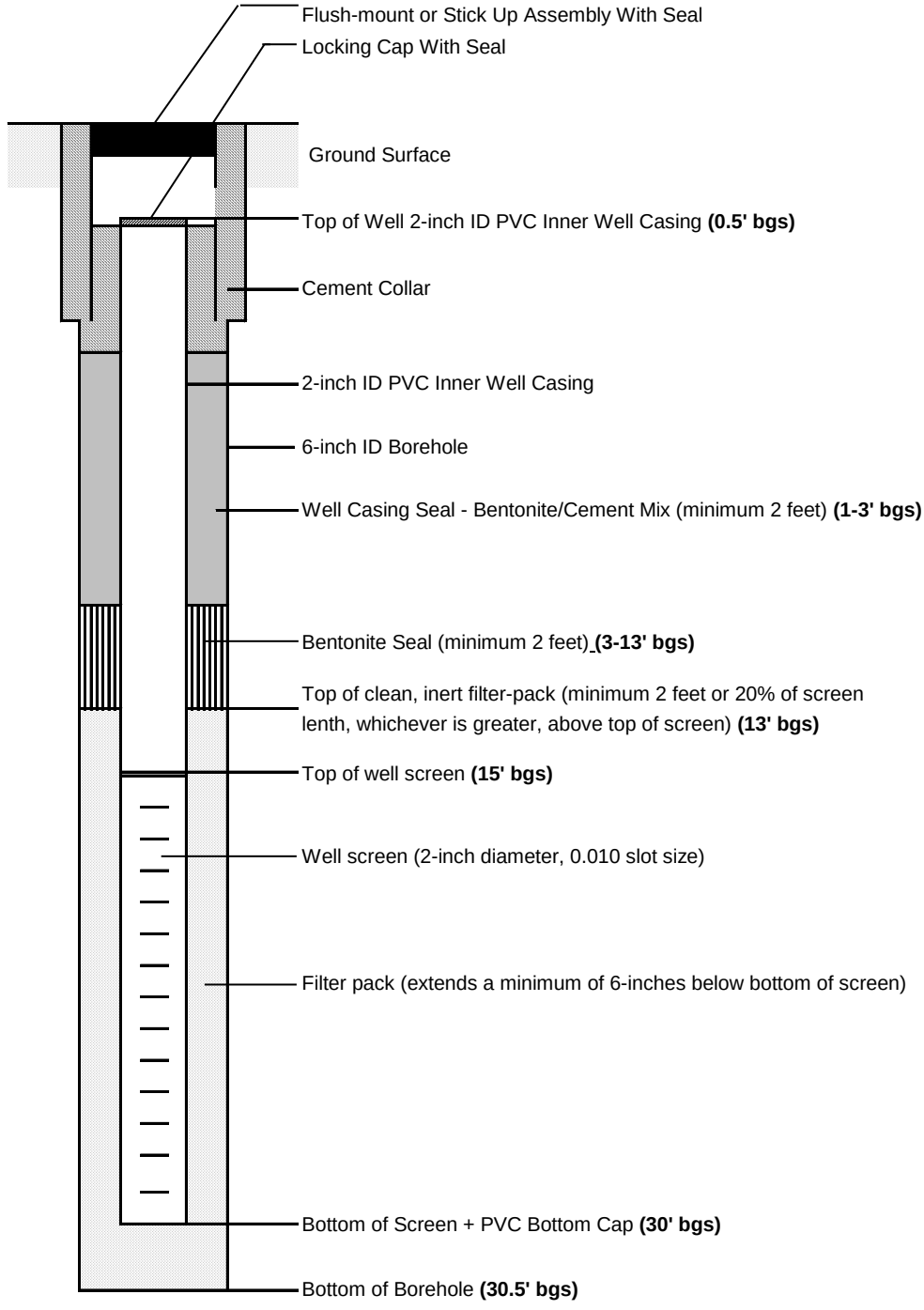
GROUNDWATER MONITORING WELL CONSTRUCTION
MW-3

(UNCONSOLIDATED FORMATION)



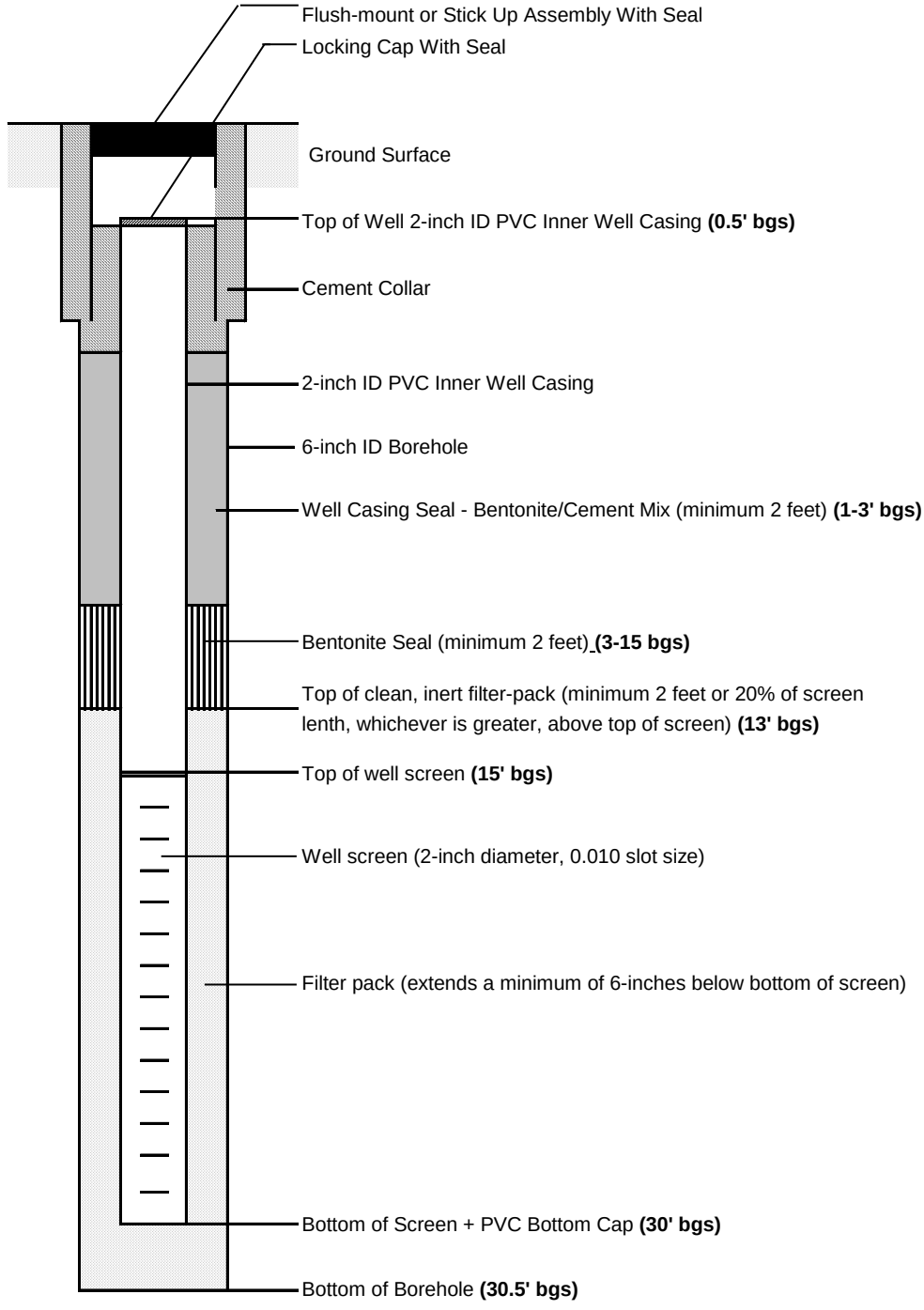
GROUNDWATER MONITORING WELL CONSTRUCTION
MW-4

(UNCONSOLIDATED FORMATION)



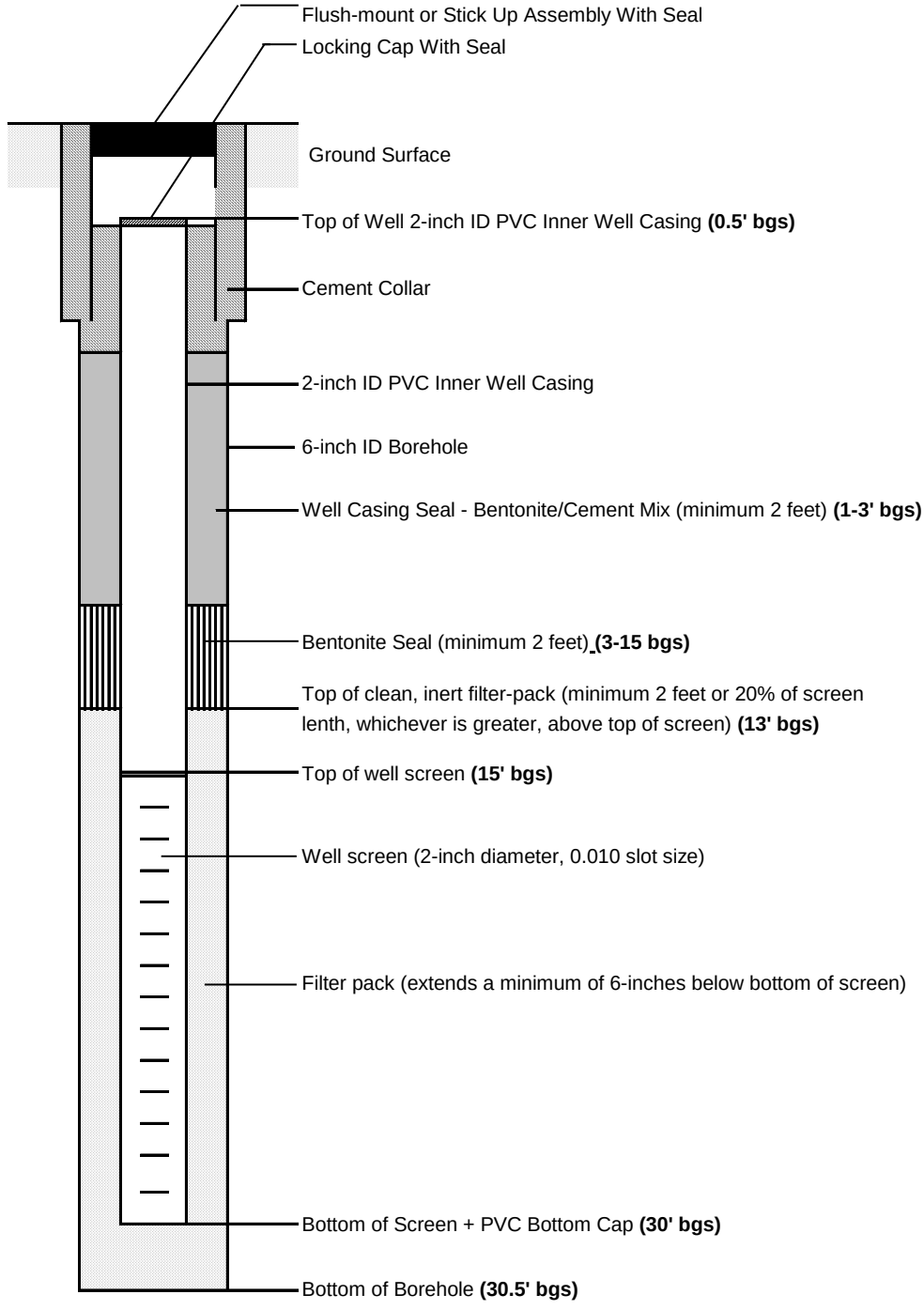
GROUNDWATER MONITORING WELL CONSTRUCTION
MW-5

(UNCONSOLIDATED FORMATION)



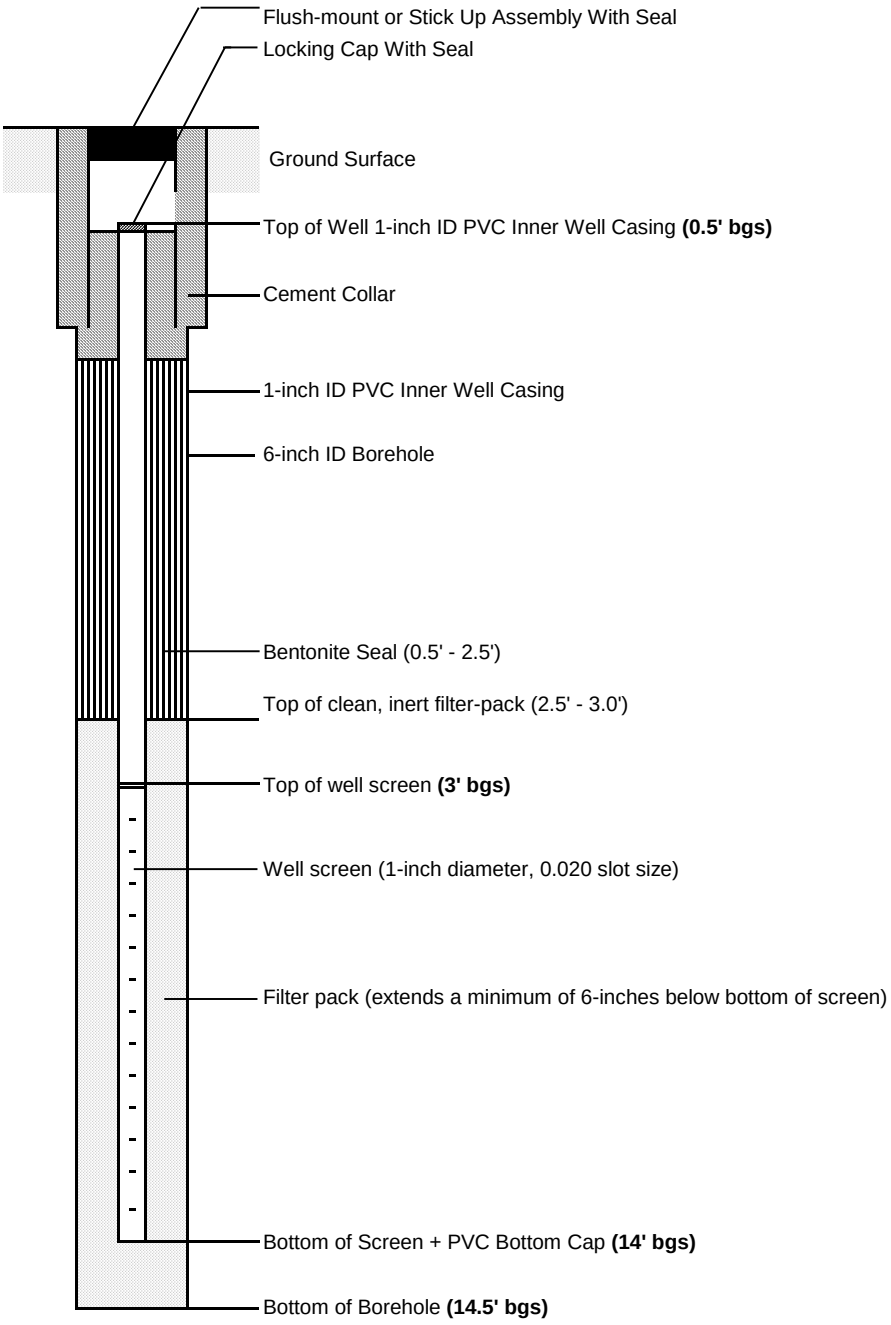
GROUNDWATER MONITORING WELL CONSTRUCTION
MW-6

(UNCONSOLIDATED FORMATION)



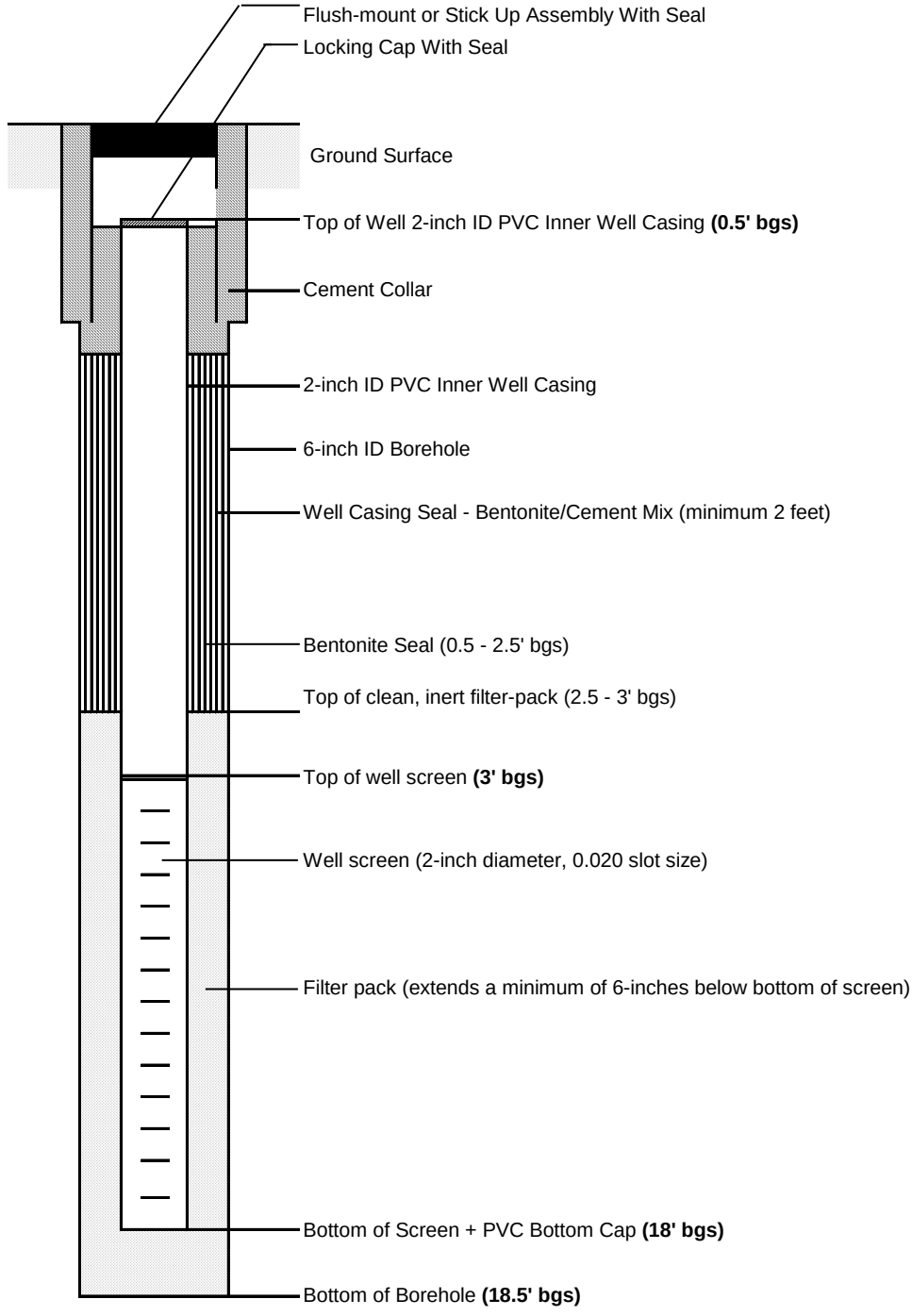
VAPOR MONITORING POINT CONSTRUCTION
VP-1 THROUGH VP-5

(UNCONSOLIDATED FORMATION)



SVE WELL CONSTRUCTION
SVE-1 THROUGH SVE-5

(UNCONSOLIDATED FORMATION)



APPENDIX F – EXCAVATION WORK PLAN (EWP)

F-1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination, the site owner or their representative will notify the NYSDEC. Table 1 includes contact information for the above notification. 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 C.

Table 1: Notifications*

Richard Mustico Project Manager, NYSDEC	Phone: (518) 402-9647 Email: Richard.mustico1@dec.ny.gov
Walter Parish NYSDEC Regional Hazardous Waste Engineer	Phone: (631) 444-0240 Email: Walter.parish@dec.ny.gov
Kelly Lewandowski NYSDEC-DER/BTS Site Control Section	Phone: (518) 402-9543 Email: Kelly.Lewandowski@dec.ny.gov
Andrew Guglielmi NYSDEC OGC Section Chief Remediation Bureau	Phone: (518) 402-9507 Email: Andrew.guglielmi@dec.ny.gov

* 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 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;
- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120;
- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in Appendix G of this SMP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

F-2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g. photoionization detector) soil screening will be performed by a qualified environmental professional during all excavations into known or potentially contaminated material (remaining contamination). 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. Further discussion of off-site disposal of materials and on-site reuse is provided in Section F-7 of this Appendix.

F-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.

F-4 MATERIALS EXCAVATION AND LOAD-OUT

A qualified environmental professional or person under their supervision 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.

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).

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.

F-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 tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

Truck transport routes are shown in Figure F-1. 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.

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.

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

F-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 in accordance with all local, State (including 6NYCRR Part 360) 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. Unregulated off-site management of materials from this site will not occur without formal NYSDEC 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, i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc. Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include: 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, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

F-7 MATERIALS REUSE ON-SITE

Material reuse on-site will comply with the requirements of NYSDEC DER-10 Section 5.4(e)4. Soil which exists at, or is imported to, a site which is used to construct a soil cover, site cap system or as excavation backfill must meet the requirements of 6 NYCRR 375-6.7(d), and the material should not exceed the allowable constituent levels for imported fill or soil for the use of the site (Appendix 5 of DER-10).

The qualified environmental professional will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material 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 a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

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.

F-8 FLUIDS MANAGEMENT

All liquids to be removed from the site, including but not limited to, excavation dewatering will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Purge and development fluids from permanent groundwater monitoring wells will be stored on-Site pending the review of groundwater sampling data. If the results of the groundwater sampling event indicates any contaminant above Ambient Water Quality Standards (AWQS), the 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. If the results of the groundwater sampling event indicates all contaminants are below Ambient Water Quality Standards (AWQS), the fluids will be treated via in a 5-gallon GAC vessel and discharged into an on-site storm sewer.

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.

F-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 decision document. The existing cover system is comprised of a minimum of 12 inches of clean soil, asphalt pavement and/or concrete building floor slab. 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.

F-10 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the site will be approved by the qualified environmental professional 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, or 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 6NYCRR 375-6.7(d). Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, the resulting soil quality standards are listed in Table F-1. Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC. 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.

F-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.

F-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.

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, TCL pesticides and PCBs), unless the site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone 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.

F-13 COMMUNITY AIR MONITORING PLAN

Real time air monitoring for VOCs and particulate levels at the perimeter of the work area will be performed during construction breaching any aspect of the cover system for the Site. All curing/intrusive work will be performed using wet methods to prevent the release of dust. Continuous air monitoring will be performed during ground intrusive activities and during the handling of contaminated or potentially contaminated media.

A figure showing the location of air sampling stations based on generally prevailing wind conditions is shown in Figure F-2. 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.

F-14 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-site and on-site. 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.

F-15 DUST CONTROL PLAN

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 though the use of 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.

F-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 G – HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

441 EASTERN PARKWAY

SUFFOLK COUNTY

FARMINGDALE, NEW YORK

NYSDEC Site Number C152247

PREPARED FOR:

441 Eastern Parkway, LLC

37-14 36th Street

Long Island City, NY 11101

PREPARED BY:

Goldberg-Zoino Associates of New York P.C.

d/b/a GZA GeoEnvironmental of New York (GZA)

104 West 29th Street, 10th Floor

New York, NY 10001

212-594-8140

July 2019

File No. 12.0076545.00

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APPENDICES

1.0 INTRODUCTION

1.1 Overview

This project-specific Health and Safety Plan (HASP) has been developed by GZA GeoEnvironmental of New York (GZA) on behalf of 441 Eastern Parkway LLC (Client) to establish the procedures necessary for protection from potential contaminated soil/groundwater/soil vapor resulting from excavation Work at 441 Eastern Parkway located in Farmingdale, New York (Site) due to future re-development plans. The procedures in this HASP plan have been developed based on current knowledge regarding the hazards which are known or anticipated for the operations to be conducted at this Site.

1.2 Site Hazards

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

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

1.3 Project Team

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

Name	Project Title/Assigned Role	Phone Numbers
Ben Romagnoli	Project Manager/Site Supervisor	Work: 973-774-3341 Mobile: 315-382-6774
Lauren Schoenemann	Site Health and Safety Officer	Work:973-774-3308 Mobile:201-274-4622

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

2.0 HAZARD ASSESSMENT

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

2.1 Chemical Hazards and Known/ Suspect Chemicals of Concern

Past remediation of the Site consisted of excavation and off-site disposal of subsurface materials within the former drywells and leaching pools found throughout the Site. All of leaching pools and drywells ranged in depth from 8 to 13 feet below ground surface (bgs) with approximately ten-foot diameters. All pools and tanks were dry and partially filled with sand. GZA and previous consultants excavated these pools, collected end point samples, and closed the pools under Suffolk County Department of Health oversight.

During the RI phase of work, the predominant classes of contamination found in Site soils consisted of the following:

- The VOC contamination at the Site consists of solvent-related contaminants in soil and groundwater at a depth of approximately 22 ft bgs in the southwestern corner of the Site. Soil

vapor in the southwestern vicinity contains high concentrations of VOCs at depth of six to eight feet bgs.

- Low-level exceedances of SVOCs were found in groundwater in the vicinity of the previously closed USTs on the eastern portion of the Site.
- Low-level exceedances of various pesticides were found in groundwater throughout the entire Site.
- Low-level exceedances of chromium were found in groundwater at various locations across the Site.

Constituents with exceeding concentrations and their respective health effects are listed below for reference. Information presented is based upon established Occupational Safety and Health Administration (OSHA) permissible exposure limits (PEL) and The National Institute for Occupational Safety and Health (NIOSH) recommended exposure limits (RELs). All other analytical parameters were reported within acceptable levels for Site urban residential land use. See Section 4.0 for a description of the PPE that should be used for this Site.

Chemicals	REL/PEL/STEL (ppm)	Health Hazards
Chromium	PEL = 1.0 mg/m^3 REL = 0.5 mg/m^3	Potential Symptoms: Occupational asthma, eye irritation and damage, perforated eardrums, respiratory irritation, kidney damage, liver damage, pulmonary congestion and edema, upper abdominal pain, nose irritation and damage, respiratory cancer, skin irritation, and erosion and discoloration of the teeth.
Dieldrin	PEL = 0.25 mg/m^3 REL = 0.25 mg/m^3	Potential Symptoms: Paresthesia of tongue, lips, face; tremors; apprehension, dizziness, fatigue, confusion, malaise; headaches; convulsions; paresis of hands; vomiting; eye, skin irritation; (carcinogenic)

Chemicals	REL/PEL/STEL (ppm)	Health Hazards
Chlordane	PEL = 0.5 mg/m3 REL = 0.5 mg/m3	Potential Symptoms: Paresthesia of tongue, lips, face; tremors; apprehension, dizziness, fatigue, confusion, malaise; headaches; convulsions; paresis of hands; vomiting; eye, skin irritation; (carcinogenic)
Tetrachloroethene	PEL = 100 ppm REL = 50 ppm TWA	Affects the central nervous system and liver; Prolonged exposure to 200 ppm causes dizziness, headache, confusion, nausea, and eye and mucous membrane irritation, reversible changes to the liver; headaches, vertigo, tremors, nausea with vomiting, fatigue, intoxication, unconsciousness, and even death.
Trichloroethene	PEL = 100 ppm REL = 25 ppm TWA	Irritation of eyes, skin; headache; visual disturbance; lassitude (weakness, exhaustion), dizziness; tremor; drowsiness, nausea; vomiting; dermatitis; cardiac arrhythmias; paresthesia; liver injury; potential male reproductive toxin; affects Kidneys, liver, eyes, skin, CNS, cardiovascular system; potential occupational carcinogen.

2.2 Volatile Organic Compounds (VOCs)

Concentrations of VOCs (Trichloroethylene, 1,1,1-trichloroethane, toluene and tetrachloroethylene) exist deep below the ground surface in the southwestern corner of the Site and have been capped as part of the Site remedy. These soils are not expected to be encountered unless major construction and excavation is proposed in the future.

2.3 Semi-Volatile Organic Compounds (SVOCs)

Low levels of benzo(a)pyrene, benzo(a)anthracene, benzo(b)flouranthene identified in the groundwater at various locations throughout the Site. These are within the groundwater (23-25 feet bgs) and do not expected to be encountered unless major construction and excavation is proposed in the future.

2.4 Metals

Metals including chromium and mercury were detected in concentrations exceeding NYSDEC AWQS standards. These are within the groundwater (23-25 feet bgs) and do not expected to be encountered unless major construction and excavation is proposed in the future.

Chromium was not detected in any soil samples throughout the Site. Therefore, an airborne exposure assessment is not necessary.

2.5 Pesticides

The pesticides dieldrin and chlordane were detected at concentrations exceeding the AWQS in at samples collected at the Site. Overexposure to pesticides has been associated with a variety of local and systemic health hazards, both acute and chronic in nature. Exposure to pesticides is most commonly through inhalation and ingestion of dust. Therefore, this is not a concern as these pesticides were only detected within groundwater

3.0 **AIR MONITORING**

Air monitoring falls into two separate categories: direct reading/environmental monitoring, and personal exposure monitoring. The following Sections summarize the types of environmental

monitoring as well as the appropriate response actions applicable to the Site.

3.1 Organic Vapor Monitoring

Volatile organic vapor hazards have been identified for the Site (see Section 2.0). Therefore, organic vapor monitoring with a photoionization detector (PID) is expected to be required for the Site.

AIR MONITORING INSTRUMENTS AND ACTION LEVELS: PHOTO-IONIZATION DETECTOR

Organic Vapor Detector (H-Nu, OVM, OVA) - Breathing Zone Readings

0 to 5 ppm	Remain in Level D. Use colorimetric tubes or other chemical specific device to verify PID readings do not contain low PEL toxic materials.
5 to 25ppm	Withdraw from work area and contact Project Management. Proceed to Level C protection for re-entry, or discontinue operation
> 25 ppm	Secure operations, withdraw from work area, and discontinue work at that location until contaminants can be evaluated, and detailed (SSHP) plan implemented.

3.2 Total Particulates

Due to the presence of VOCs in soil and SVOCs, VOCs and metals in groundwater on-Site, total respirable particulates may be a concern. Dust levels should be visually monitored and if levels become noticeable, soils should be wetted down to control dusty conditions. Wetting may be accomplished using various methods, including a hose connected to a fire hydrant or other on-Site source of water. The Client's Project Superintendent shall be responsible for determining when the

wetting of soils is needed and the most appropriate method to use. In addition, recommended measurements for particulate monitoring are detailed below.

Upwind concentrations should be measured at the start of each work day during active handling of excavated materials and periodically thereafter to establish background conditions. The particulate air monitoring work will be conducted using a pDR-1200 personal airborne particulate monitor (or approved equivalent) calibrated daily.

The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers (um) in size (PM-10) and capable of integrating over a period of 5-minutes or less for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate excess of the action level.

Dust migration will be visually assessed during all work activities, and at no time will the downwind perimeter particulate levels be allowed to exceed a total standard of 10 mg/m^3 (or "nuisance" dust levels).

If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/m^3) greater than the background (upwind perimeter) for a 5-minute period, or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques (e.g., soil wetting) provided the downwind PM-10 particulate levels do not exceed 150 ug/m^3 above the upwind level and no visible dust is migrating from the work area.

If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 ug/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentrations to within 150 ug/m^3 of the upwind level and in preventing visible dust migration.

3.3 Particulate Monitoring, Response Levels, and Actions

Parameter	Monitoring Instrument	Response Levels (above background)	**Actions**	Conditions for Continuing Work Activities
Particulates < 10 um (PM-10)	Dust Meter	Fugitive dust migration	1. implement dust suppression techniques	dust suppression techniques are in place
		>100 ug/m^3 but <150 ug/m^3	1. implement dust suppression techniques	levels must not exceed 150 ug/m^3 with dust suppression techniques in place
		>150 ug/m^3	1. halt activity 2. re-evaluate activities	levels decrease below 150 ug/m^3 and fugitive dust migration is prevented

3.4 Personal Exposure Monitoring

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

4.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) will be donned as described below for the activities covered by this HASP. Based on available analytical data and the proposed intrusive activities, the China Perfect Construction Corp. (Contractor), anticipates that all activities will require Level D or Modified Level D PPE.

4.1 General Site Work

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

- Hardhat
- Eye protection
- Hearing protection (with site workers at all times and donned when appropriate)
- Steel-toed work boots
- Work clothes

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

4.2 Excavation Areas and Other Soil Handling

Personnel working in the areas of active excavation, but not operating heavy equipment, and any other personnel potentially contacting contaminated materials will be required to wear Modified Level D PPE. Modified Level D is defined as:

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

Level C PPE and Level B are not expected to be required.

5.0 SITE CONTROL

To prevent both exposure of unprotected personnel and migration of contamination due to tracking by personnel or equipment, work areas along with personal protective equipment requirements will be clearly identified with signage. Pedestrian traffic will be managed to the extent possible by the Contractor's Traffic and Pedestrian Control Plan.

The Contractor will designate a work zone and support zone as defined below.

5.1 Work Zone

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

5.2 Support Zone

The support zone will consist of an area outside the areas of active excavation installation and soil handling, where equipment and support vehicles will be located. Eating, drinking and smoking will be permitted only in this area. Sanitary facilities will be located on Site. In addition, potable water and water and soap for hand washing will be available at the Site.

5.3 Other Site Control and Safety Measures

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

- The Site hazards will be evaluated by the Client's Project Superintendent using the Site Safety Checklist as defined by the CSMP.
- No one is to perform field work alone. Team members must be intimately familiar with the procedures for initiating an emergency response.
- Avoidance of contamination is of the utmost importance. Whenever possible, avoid contact with contaminated (or potentially contaminated) surfaces or materials. Walk around (not

through) puddles and dis-colored surfaces. Do not kneel on the ground or set equipment on the ground.

- Eating, drinking, chewing gum or tobacco, smoking or any practice that increases the probability of hand-to-mouth transfer and ingestion of materials is prohibited except in the support zone after proper decontamination as defined in Section 6.0.
- The use of alcohol or drugs is prohibited during the conduct or field operations.
- Safety equipment (PPE) will be required for all field personnel unless otherwise approved by the subcontractor's health and safety representatives and/or the Project Superintendent.

5.4 Site Security

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

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

6.0 **DECONTAMINATION**

Proper decontamination will be performed for personnel and equipment before leaving the Site. All solid waste generated during decontamination will be bagged by the Contractor personnel and stored on Site for disposal. Water will be disposed of by on-Site infiltration into soil within an exclusion zone.

6.1 Personal Decontamination

Personal decontamination will be accomplished by following a systematic procedure of cleaning and removal of personal protective equipment (PPE). The Contractor will supply decontamination equipment to allow PPE to be brushed to remove gross contamination and then scrubbed clean in a

detergent solution and then rinsed clean. To facilitate this, a three-basin wash system will be set up on site by the Contractor.

Disposable PPE, such as Tyvek coveralls, gloves, and hearing protection, etc. will be placed in trash bags in an on-Site container pending a disposal. Alternative chemical decontamination procedures, such as steam-cleaning reusable rubber outer boots, may be used if necessary.

Steps required in a decontamination sequence will depend on the level of protection worn in accordance with Section 4.0:

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

6.2 Equipment Decontamination

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

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

Prior to leaving the Site, large equipment will be inspected to assure that excess material has not adhered to the equipment. If needed, the Contractor will clean the large equipment, including washing tires and undercarriages with a hose to remove excess adhered soil prior to leaving the Site.

7.0 MEDICAL MONITORING AND TRAINING REQUIREMENTS

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

7.1 Medical Monitoring

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

7.2 Training

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

Workers requiring access to the Site (laborers and operators) prior to completion of soil remedial activities will require 40-hour HAZWOPER training due to the presence of gasoline contaminated soils and underground storage tanks.

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

7.3 Subcontractors

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

7.4 Site Safety Meetings

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

8.0 **EMERGENCY ACTION PLAN**

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

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

8.1 Employee Information

General training regarding emergency evacuation procedures are included in the Contractor initial

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

8.2 Emergency Signal and Alarm Systems

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

8.3 Emergency Contacts

Police: 911

Fire: 911

Ambulance: 911

Saint Josephs Hospital: (516) 579-6000

8.4 Hospital Location

Saint Josephs Hospital is located at 4295 Hempstead Turnpike, Bethpage, New York 11714, Appendix B presents a hospital route map.

8.5 Incident Reporting Procedures

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

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

Appendix A

Tailgate Safety Form

TAILGATE SAFETY MEETING

CHECK ONE: _____ Initial H&S Orientation _____Periodic "Toolbox" Safety Meeting

Project Site/Location_____

Date_____ Time_____ Job No._____

PM_____ PIC_____

The undersigned have attended a Health and Safety briefing, consisting of a review of the provisions of the Site Specific H&S Plan, and/or appropriate prior H&S events or concerns, and/or review of anticipated H&S concerns and safety measures for the project.

SUMMARY OF HEALTH AND SAFETY TOPICS COVERED (required topics are listed below to be covered in addition to regular site-specific topics)		
NAME (printed)	**SIGNATURE**	**COMPANY**

Conducted by: _____ Date:_____

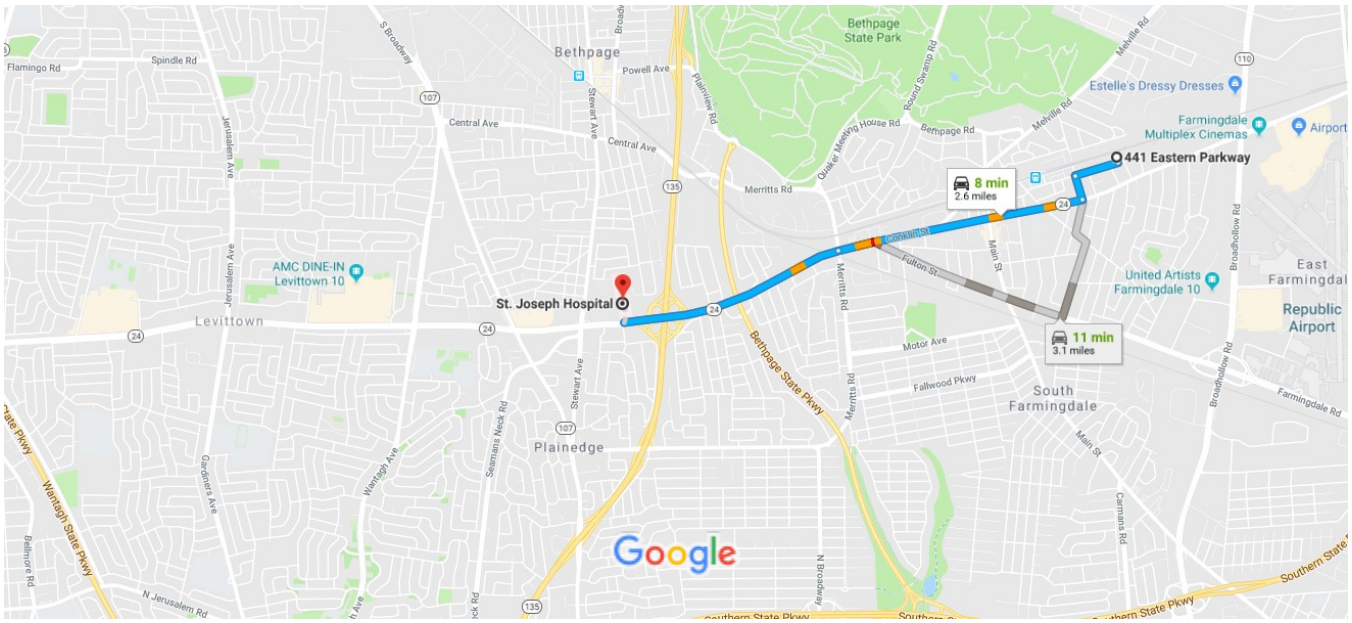
APPENDIX B

HOSPITAL DIRECTIONS

Google Maps

441 Eastern Pkwy, Farmingdale, NY 11735 to St. Joseph Hospital

Drive 2.6 miles, 8 min



Map data ©2018 Google 2000 ft

441 Eastern Pkwy

Farmingdale, NY 11735

1. Head west on Eastern Pkwy toward Denton Pl

0.2 mi

2. Turn left onto Oakview Ave

0.1 mi

3. Turn right onto Conklin St

Pass by Century 21 (on the left in 0.4 mi)

1.2 mi

4. Continue onto Hempstead Turnpike

1.1 mi

St. Joseph Hospital

4295 Hempstead Turnpike, Bethpage, NY 11714

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.

APPENDIX C

MATERIAL SAFETY DATA SHEETS

SAFETY DATA SHEET

Revision Date 19-Jan-2018 **Revision Number** 3

1. Identification

Product Name **Benzo[a]pyrene, 98%**

Cat No. : **AC105600010; AC105601000**

CAS-No 50-32-8
Synonyms Benzo[def]chrysene.; 3,4-Benzopyrene; 3,4-Benzpyrene

Recommended Use Laboratory chemicals.
Uses advised against Not for food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Sensitization	Category 1
Germ Cell Mutagenicity	Category 1A
Carcinogenicity	Category 1A
Reproductive Toxicity	Category 1A

Label Elements

Signal Word
Danger

Hazard Statements
May cause an allergic skin reaction
May cause genetic defects
May cause cancer
May damage fertility or the unborn child

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Avoid breathing dust/fume/gas/mist/vapors/spray
Contaminated work clothing should not be allowed out of the workplace
Wear protective gloves
Response
IF exposed or concerned: Get medical attention/advice
Skin
IF ON SKIN: Wash with plenty of soap and water
If skin irritation or rash occurs: Get medical advice/attention
Wash contaminated clothing before reuse
Storage
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects
WARNING. Cancer - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Benzo[a]pyrene	50-32-8	> 96

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes.

Inhalation Move to fresh air.

Ingestion Do not induce vomiting.

Most important symptoms and effects May cause allergic skin reaction. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point
Method - No information available

Autoignition Temperature No information available

Explosion Limits

Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
None known
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	0	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up No information available.

7. Handling and storage

Handling Ensure adequate ventilation.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Benzo[a]pyrene		TWA: 0.2 mg/m³		

Legend

OSHA - Occupational Safety and Health Administration

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Dark yellow
Odor	aromatic
Odor Threshold	No information available
pH	
Melting Point/Range	175 179 °C
Boiling Point/Range	°C @ 760 mmHg
Flash Point	
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Specific Gravity	No information available
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C20H12
Molecular Weight	252.31

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products None under normal use conditions

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Component Information

Toxicologically Synergistic Products No information available

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

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Benzo[a]pyrene	50-32-8	Group 1	Reasonably Anticipated	A2	X	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information No information available

Component	EU - Endocrine Disrupters Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Benzo[a]pyrene	Group III Chemical	Not applicable	Not applicable

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Do not empty into drains.

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility No information available.

Component	log Pow
Benzo[a]pyrene	6.06

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Benzo[a]pyrene - 50-32-8	U022	-

14. Transport information

DOT
- **UN-No** UN3077
- **Proper Shipping Name** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
- **Hazard Class** 9
- **Packing Group** III

TDG
- **UN-No** UN3077
- **Proper Shipping Name** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
- **Hazard Class** 9
- **Packing Group** III

IATA
- **UN-No** UN3077
- **Proper Shipping Name** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
- **Hazard Class** 9
- **Packing Group** III

IMDG/IMO

UN-No	UN3077
Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
Hazard Class	9
Packing Group	III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Benzo[a]pyrene	X	X	-	200-028-5	-		X	-	-	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Benzo[a]pyrene	50-32-8	> 96	0.1

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Benzo[a]pyrene	-	-	X	X

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA Not applicable

Component	Hazardous Substances RQs	CERCLA EHS RQs
Benzo[a]pyrene	1 lb	-

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

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Benzo[a]pyrene	50-32-8	Carcinogen	0.06 µg/day	Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Benzo[a]pyrene	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date 19-Jan-2018
Print Date 19-Jan-2018
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

Colonial Chemical Solutions, Inc.

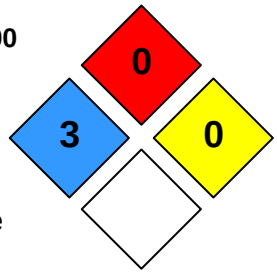
Material Safety Data Sheet – Perchloroethylene

SECTION I · PRODUCT IDENTIFICATION

CHEMTREC – 24HR Emergency Telephone 1-800-424-9300

Manufacturers Address:
916 West Lathrop Avenue
Savannah, Georgia 31415

Information Phone: (912) 443-6702
Date Prepared: 26 Sept 08
Preparer: F.Spaeth



NFPA Rating

0- Minimal 1- Slight 2- Moderate
3- Serious 4- Extreme

Synonym: PERC, Tetrachloroethylene
Chemical Family: Chlorinated Aliphatic

SECTION II · HAZARDOUS INGREDIENTS

CHEMICAL NAME	CAS Number	%WT	TLV	PEL
Tetrachloroethylene	127-18-4	100	25ppm	100 ppm

SECTION III · HAZARDOUS IDENTIFICATION

Potential Acute Health Effects: Irritating to skin and eye tissue. Slightly toxic by inhalation.
Potential Chronic Health Effects: Repeated abuse of high levels produces adverse effects on the liver and to a lesser extent on the kidneys

SECTION IV · PHYSICAL and CHEMICAL PROPERTIES

Boiling Point Range: 250°F
pH: NA
Solubility In Water: Insoluble
Appearance/Odor: Clear colorless liquid with sweet odor.
Melting Point/Freezing Point: No available data.

Vapor Density (Air=1): 5.8
Vapor Pressure (mmHg): 14
VOC %: No available data.
Specific Gravity (H_2O=1): 1.46

SECTION V · FIRE FIGHTING MEASURES

Flash Point: None
Auto Ignition: No Data
Extinguishing Media: As apparent to surrounding fire.
Flammable Limits: Lower: None Upper: None
Fire Fighting Procedures: Evacuate the area and fight from a safe distance. Cool fire-exposed containers with water spray to prevent container weakening and possible rupture. Do not enter fire zone without self-contained breathing apparatus (SCBA) and structural firefighter's protective clothing.
Unusual Fire and Explosion Hazards: Explosive mixtures of tetrachloroethylene and air can be formed, but are difficult to ignite and require high intensity sources of heat.

SECTION VI · STABILITY AND REACTIVITY

Stability: Stable.
Conditions to Avoid: Red hot surfaces and Open Flames
Incompatibility: Avoid contact with powdered metals and strong alkalis.
Hazardous Decomposition Products: Oxides of Carbon, hydrogen chloride and phosgene.
Hazardous Polymerization: Will not occur.

SECTION VII · STORAGE AND HANDLING

Precautions To Be Taken In Handling and Storage: Do not use in confined spaces. Always store in tightly sealed, properly labeled, original container. Store in a cool, dry well ventilated area.
Other Precautions: DO NOT get in eyes, on skin, or on clothing. DO NOT breath vapors, mist, or fumes. DO NOT swallow. May be aspirated into the lungs which could be fatal.

SECTION VIII · HEALTH AND FIRST AID

Skin: Slight/Mildly irritating. Can be absorbed through the skin.
Eyes: Vapors may be irritating. Irritation accompanied by redness.
Inhalation: High vapor concentrations may be irritating to respiratory system. Breathing of vapor may cause headaches, irritation of throat and may cause central nervous system depression.
Ingestion: May cause gastric distress, diarrhea and vomiting.

FIRST AID PROCEDURES:
Eyes: Flush with large amounts of cool running water for at least 15 minutes. If irritation persists get medical attention.
Skin: Wash skin with soap and water. If irritation persists seek medical attention.
Inhalation: For excessive inhalation remove to fresh air. If breathing is difficult seek medical attention.
Ingestion: DO NOT induce vomiting. Drink large amounts of water or milk. Seek medical attention immediately.

SECTION IX · EXPOSURE CONTROLS / PERSONAL PROTECTION

Eye Protection: Eye Protection when pouring. Goggles, safety glasses with side shields are recommended.
Respiratory Protection: Where adequate ventilation is not available an approved NIOSH respirator must be worn. In confined areas, use a self-contained breathing apparatus.
Skin Protection: Use suitable chemically resistant gloves, and clothing.
Ventilation: General Mechanical ventilation to prevent TLV from exceeding control limits.
Protective Clothing: Selection of protective clothing depends on potential exposure conditions and may include gloves, and other protective items.
Other Equipment: Eye wash station and shower in close proximity to use are advised

SECTION X · ACCIDENTAL RELEASE MEASURES

Small Spill: Isolate and stop source of spill provided it is safe to do so. Absorb on inert media and collect into suitable container. Wear necessary PPE.
Large Spill: Shut off or plug source of spill provided it is safe to do sol. Dike area to contain spill. Salvage as much liquid as possible into a suitable container. Absorb residual on inert media and collect into suitable container. Do not allow material to enter drains, sewers or waterways.
Personal Protection in Case of Large Spill: Wear protective equipment and/or garments as described in Section IX as conditions warrant.

SECTION XI · DISPOSAL CONSIDERATIONS

Waste Disposal Method: Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above 0.7 mg/L. Avoid contaminating ground and surface water. Do not flush to drain.
Follow local, state and federal applicable regulations for disposal.

SECTION XII · TRANSPORTAION

Proper Shipping Name: Tetrachloroethylene
Hazard Class: 6.1
UN Number: 1879
Packaging Group: III

SECTION XIII · TOXICOLOGY

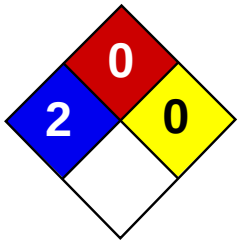
Carcinogenicity: Tetrachloroethylene is listed by NTP as 'reasonably anticipated to be a human carcinogen' and by IARC as a Group 2A carcinogen.
Mutagenicity: Data suggest this to be a Mutagenic.
Reproductive: Data suggest this to have reproductive effects.
Sensitization: No sensitizer data found.

SECTION XIV · REGULATORY

RMP/PSM: Not Listed
CERCLA-RQ: 100 LBS
EPCRA 311/312: Yes, See Sections III and VIII
EPCRA 313: Yes
FIFRA: No documented information available.
RCRA-CODE: U210; D039
TSCA: Listed

SECTION XV · OTHER INFORMATION

The information contained on this Material Safety Data Sheet is considered accurate as of the date of publication. It is not necessarily all inclusive nor fully adequate in every circumstance. The suggestions should not be confused with, nor followed in violation of applicable laws, regulations, rules or insurance requirements. No warranty, express or implied, of merchantability, fitness, accuracy of data, or the results to be obtained from the use thereof is made. The vendor assumes no responsibility for injury or damages resulting from the inappropriate use of this product.



Health	2
Fire	0
Reactivity	0
Personal Protection	G

Material Safety Data Sheet
Tetrachloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Tetrachloroethylene

Catalog Codes: SLT3220

CAS#: 127-18-4

RTECS: KX3850000

TSCA: TSCA 8(b) inventory: Tetrachloroethylene

CI#: Not available.

Synonym: Perchloroethylene; 1,1,2,2-Tetrachloroethylene; Carbon bichloride; Carbon dichloride; Ankilostin; Didakene; Dilatin PT; Ethene, tetrachloro-; Ethylene tetrachloride; Perawin; Perchlor; Perclene; Perclene D; Percosolvel; Tetrachloroethene; Tetraleno; Tetralex; Tetravec; Tetroguer; Tetropil

Chemical Name: Ethylene, tetrachloro-

Chemical Formula: C2-Cl4

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Tetrachloroethylene	127-18-4	100

Toxicological Data on Ingredients: Tetrachloroethylene: ORAL (LD50): Acute: 2629 mg/kg [Rat]. DERMAL (LD): Acute: >3228 mg/kg [Rabbit]. MIST(LC50): Acute: 34200 mg/m 8 hours [Rat]. VAPOR (LC50): Acute: 5200 ppm 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (anticipated carcinogen) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, peripheral nervous system, respiratory tract, skin, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with skin. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, metals, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:
Safety glasses. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 25 (ppm) from OSHA (PEL) [United States] TWA: 25 STEL: 100 (ppm) from ACGIH (TLV) [United States] TWA: 170 (mg/m3) from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Ethereal.

Taste: Not available.

Molecular Weight: 165.83 g/mole

Color: Clear Colorless.

pH (1% soln/water): Not available.

Boiling Point: 121.3°C (250.3°F)

Melting Point: -22.3°C (-8.1°F)

Critical Temperature: 347.1°C (656.8°F)

Specific Gravity: 1.6227 (Water = 1)

Vapor Pressure: 1.7 kPa (@ 20°C)

Vapor Density: 5.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 5 - 50 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.4

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Miscible with alcohol, ether, chloroform, benzene, hexane. It dissolves in most of the fixed and volatile oils. Solubility in water: 0.015 g/100 ml @ 25 deg. C It slowly decomposes in water to yield Trichloroacetic and Hydrochloric acids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Oxidized by strong oxidizing agents. Incompatible with sodium hydroxide, finely divided or powdered metals such as zinc, aluminum, magnesium, potassium, chemically active metals such as lithium, beryllium , barium. Protect from light.

Special Remarks on Corrosivity: Slowly corrodes aluminum, iron, and zinc.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2629 mg/kg [Rat]. Acute dermal toxicity (LD50): >3228 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5200 4 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (Some evidence.) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidneys, liver, peripheral nervous system, upper respiratory tract, skin, central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of ingestion.

Special Remarks on Toxicity to Animals:
Lowest Publishe Lethal Dose/Conc: LDL [Rabbit] - Route: Oral; Dose: 5000 mg/kg LDL [Dog] - Route: Oral; Dose: 4000 mg/kg LDL [Cat] - Route: Oral; Dose: 4000 mg/kg

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects and birth defects(teratogenic). May affect genetic material (mutagenic). May cause cancer.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation with possible dermal blistering or burns. Symtoms may include redness, itching, pain, and possible dermal blistering or burns. It may be absorbed through the skin with possible systemic effects. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts. Eyes: Contact causes transient eye irritation, lacrimation. Vapors cause eye/conjunctival irritation. Symptoms may include redness and pain. Inhalation: The main route to occupational exposure is by inhalation since it is readily absorbed through the lungs. It causes respiratory tract irritation, . It can affect behavior/central nervous system (CNS depressant and anesthesia ranging from slight inebriation to death, vertigo, somnolence, anxiety, headache, excitement, hallucinations, muscle incoordination, dizziness, lightheadness, disorentiation, seizures, enotional instability, stupor, coma). It may cause pulmonary edema Ingestion: It can cause nausea, vomiting, anorexia, diarrhea, bloody stool. It may affect the liver, urinary system (proteinuria, hematuria, renal failure, renal tubular disorder), heart (arrhythmias). It may affect behavior/central nervous system with symptoms similar to that of inhalation. Chronic Potential Health Effects: Skin: Prolonged or repeated skin contact may result in excessive drying of the skin, and irritation. Ingestion/Inhalation: Chronic exposure can affect the liver(hepatitis,fatty liver degeneration), kidneys, spleen, and heart (irregular heartbeat/arrhythmias, cardiomyopathy, abnormal EEG), brain, behavior/ central nervous system/peripheral nervous system (impaired memory, numbness of extremeties, peripheral neuropathy and other

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 18.4 mg/l 96 hours [Fish (Fatthead Minnow)]. 18 mg/l 48 hours [Daphnia (daphnia)]. 5 mg/l 96 hours [Fish (Rainbow Trout)]. 13 mg/l 96 hours [Fish (Bluegill sunfish)].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Tetrachloroethylene UNNA: 1897 PG: III

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Tetrachloroethylene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Tetrachloroethylene Connecticut hazardous material survey.: Tetrachloroethylene Illinois toxic substances disclosure to employee act: Tetrachloroethylene Illinois chemical safety act: Tetrachloroethylene New York release reporting list: Tetrachloroethylene Rhode Island RTK hazardous substances: Tetrachloroethylene Pennsylvania RTK: Tetrachloroethylene Minnesota: Tetrachloroethylene Michigan critical material: Tetrachloroethylene Massachusetts RTK: Tetrachloroethylene Massachusetts spill list: Tetrachloroethylene New Jersey: Tetrachloroethylene New Jersey spill list: Tetrachloroethylene Louisiana spill reporting: Tetrachloroethylene California Director's List of Hazardous Substances: Tetrachloroethylene TSCA 8(b) inventory: Tetrachloroethylene TSCA 8(d) H and S data reporting: Tetrachloroethylene: Effective date: 6/1/87; Sunset date: 6/1/97 SARA 313 toxic chemical notification and release reporting: Tetrachloroethylene CERCLA: Hazardous substances.: Tetrachloroethylene: 100 lbs. (45.36 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R40- Possible risks of irreversible effects. R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S23- Do not breathe gas/fumes/vapour/spray S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S37- Wear suitable gloves. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: g

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:29 PM

Last Updated: 06/09/2012 12:00 PM

Safety Data Sheet

Revision Date: 12/23/16
www.restek.com

1. IDENTIFICATION

Catalog Number / Product Name:	**32218 / Dieldrin Standard**
Company:	Restek Corporation
Address:	110 Benner Circle Bellefonte, Pa. 16823
Phone#:	814-353-1300
Fax#:	814-353-1309
Emergency#:	800-424-9300 (CHEMTREC) 703-527-3887 (Outside the US)
Email:	www.restek.com
Revision Number:	6
Intended use:	For Laboratory use only

2. HAZARD(S)IDENTIFICATION

Emergency Overview:

GHS Hazard Symbols:

GHS Classification:
Specific Target Organ Systemic Toxicity (STOT) - Single Exposure Category 1
Flammable Liquid Category 2
Acute Toxicity - Inhalation Dust / Mist Category 3
Acute Toxicity - Dermal Category 3
Acute Toxicity - Oral Category 3

GHS Signal Word:
Danger

GHS Hazard:
Highly flammable liquid and vapour.
Toxic if swallowed, in contact with skin or if inhaled.
Causes damage to organs.

GHS Precautions:

Safety Precautions:
Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilation and lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe dust/fume/gas/mist/vapours/spray.
Wash hands and skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.

First Aid Measures:
IF SWALLOWED: Immediately call a POISON CENTER/doctor/....
IF ON SKIN: Wash with plenty of soap and water.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF exposed: Call a POISON CENTER or doctor/physician.
Call a POISON CENTER or doctor/physician.
Call a POISON CENTER or doctor/physician if you feel unwell.
Specific treatment see section 4.
Rinse mouth.
Take off immediately all contaminated clothing and wash it before reuse.
In case of fire: Use extinguishing media in section 5 for extinction.

Storage: Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.

Disposal: Dispose of contents/container according to section 13 of the SDS.

Single Exposure Target Organs: No data available.

Repeated Exposure Target Organs: No data available.

3. COMPOSITION / INFORMATION ON INGREDIENT

Chemical Name	CAS #	EINEC #	% Composition
methanol	67-56-1	200-659-6	99.900000
dieldrin	60-57-1	200-484-5	0.100000

4. FIRST-AID MEASURES

Inhalation: Remove to fresh air. If breathing is difficult, have a trained individual administer oxygen. If not breathing, give artificial respiration and have a trained individual administer oxygen. Get medical attention immediately

Eyes: Flush eyes with plenty of water for at least 20 minutes retracting eyelids often. Tilt the head to prevent chemical from transferring to the uncontaminated eye. Get immediate medical attention.

Skin Contact: Wash with soap and water. Remove contaminated clothing and launder. Get medical attention if irritation develops or persists.

Ingestion: Do not induce vomiting and seek medical attention immediately. Drink two glasses of water or milk to dilute. Provide medical care provider with this SDS.

5. FIRE- FIGHTING MEASURES

Extinguishing Media: Use alcohol resistant foam, carbon dioxide, or dry chemical extinguishing agents. Water may be ineffective but water spray can be used extinguish a fire if swept across the base of the flames. Water can absorb heat and keep exposed material from being damaged by fire.

Fire and/or Explosion Hazards: Vapors may be ignited by sparks, flames or other sources of ignition if material is above the flash point giving rise to a fire (Class B). Vapors are heavier than air and may travel to a source of ignition and flash back.

Fire Fighting Methods and Protection: Do not enter fire area without proper protection including self-contained breathing apparatus and full protective equipment. Fight fire from a safe distance and a protected location due to the potential of hazardous vapors and decomposition products. Flammable component(s) of this material may be lighter than water and burn while floating on the surface.

Hazardous Combustion Products: Carbon dioxide, Carbon monoxide

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions and Equipment: Exposure to the spilled material may be severely irritating or toxic. Follow personal protective equipment recommendations found in Section 8 of this SDS. Personal protective equipment needs must be evaluated based on information provided on this sheet and the special circumstances created by the spill including; the material spilled, the quantity of the spill, the area in which the spill occurred, and the expertise of employees in the area responding to the spill. Never exceed any occupational exposure limits.

Methods for Clean-up: Prevent the spread of any spill to minimize harm to human health and the environment if safe to do so. Wear complete and proper personal protective equipment following the recommendation of Section 8 at a minimum. Dike with suitable absorbent material like granulated clay. Gather and store in a sealed container pending a waste disposal evaluation.

7. HANDLING AND STORAGE

Handling Technical Measures and Precautions:	Toxic or severely irritating material. Avoid contacting and avoid breathing the material. Use only in a well ventilated area. Use spark-proof tools and explosion-proof equipment
Storage Technical Measures and Conditions:	Store in a cool dry ventilated location. Isolate from incompatible materials and conditions. Keep container(s) closed. Keep away from sources of ignition

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

United States:

Chemical Name	CAS No.	IDLH	ACGIH STEL	ACGIH TLV-TWA	OSHA Exposure Limit
methanol	67-56-1	6000 ppm IDLH	250 ppm STEL	200 ppm TWA	200 ppm TWA; 260 mg/m3 TWA
dieldrin	60-57-1	ND		0.1 mg/m3 TWA (inhalable fraction and vapor)	0.25 mg/m3 TWA

Personal Protection:

Engineering Measures:	Local exhaust ventilation is recommended when generating excessive levels of vapors from handling or thermal processing.
Respiratory Protection:	Respiratory protection may be required to avoid overexposure when handling this product. General or local exhaust ventilation is the preferred means of protection. Use a respirator if general room ventilation is not available or sufficient to eliminate symptoms.If an exposure limit is exceeded or if an operator is experiencing symptoms of inhalation overexposure as explained in Section 3, provide respiratory protection.
Eye Protection:	Wear chemically resistant safety glasses with side shields when handling this product. Do not wear contact lenses.
Skin Protection:	Wear protective gloves. Inspect gloves for chemical break-through and replace at regular intervals. Clean protective equipment regularly. Wash hands and other exposed areas with mild soap and water before eating, drinking, and when leaving work

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance, color:	No data available.
Odor:	Mild
Physical State:	No data available.
pH:	No data available.
Vapor Pressure:	No data available.
Vapor Density:	1.1 (air = 1)
Boiling Point:	No data available.
Melting Point:	-98 °C
Flash Point:	52
Flammability:	Highly Flammable
Upper Flammable/Explosive Limit, % in air:	36
Lower Flammable/Explosive Limit, % in air:	6
Autoignition Temperature:	464 deg C
Decomposition Temperature:	No data available.
Specific Gravity:	0.791 - 0.792 g/cm3 at 20 °C
Evaporation Rate:	No data available.
Odor Threshold:	No data available.
Solubility:	Moderate; 50-99%
Partition Coefficient: n-octanol in water:	No data available.
VOC % by weight:	99.9
Molecular Weight:	32.04

10. STABILITY AND REACTIVITY

Stability:	Stable under normal conditions.
Conditions to Avoid:	No data available.
Materials to Avoid / Chemical Incompatiability:	Strong oxidizing agents
Hazardous Decomposition Products:	Carbon dioxide Carbon monoxide

11. TOXICOLOGICAL INFORMATION

Routes of Entry:	Inhalation, Skin Contact, Eye Contact, Ingestion

Target Organs Potentially Affected By Exposure: Eyes, Central nervous system stimulation, Skin, GI Tract, Respiratory Tract

Chemical Interactions That Change Toxicity: None Known

Immediate (Acute) Health Effects by Route of Exposure:

Inhalation Irritation: Can cause moderate respiratory irritation, dizziness, weakness, fatigue, nausea and headache.

Inhalation Toxicity: Harmful! Can cause systemic damage (see "Target Organs)Methanol can cause central nervous system depression and overexposure can cause damage to the optic nerve resulting in visual impairment or blindness.

Skin Contact: Can cause moderate skin irritation, defatting, and dermatitis. Not likely to cause permanent damage.

Eye Contact: Can cause moderate irritation, tearing and reddening, but not likely to permanently injure eye tissue.

Ingestion Irritation: Irritating to mouth, throat, and stomach. Can cause abdominal discomfort, nausea, vomiting and diarrhea.Highly toxic and may be fatal if swallowed.

Ingestion Toxicity: Toxic if swallowed. May cause target organ failure and/or death.May be fatal if swallowed.

Long-Term (Chronic) Health Effects:

Carcinogenicity: Contains a probable or known human carcinogen.

Reproductive and Developmental Toxicity: Contains a known human reproductive and/or developmental hazard.

Inhalation: Upon prolonged and/or repeated exposure, can cause moderate respiratory irritation, dizziness, weakness, fatigue, nausea and headache.Harmful! Can cause systemic damage upon prolonged and/or repeated exposure (see "Target Organs)

Skin Contact: Upon prolonged or repeated contact, can cause moderate skin irritation, defatting, and dermatitis. Not likely to cause permanent damage.

Ingestion: Toxic if swallowed. May cause target organ failure and/or death.

Component Toxicological Data:

NIOSH:

Chemical Name	CAS No.	LD50/LC50
Methanol	67-56-1	Inhalation LC50 Rat 22500 ppm 8 h

Component Carcinogenic Data:

OSHA:

Chemical Name	CAS No.
No data available.	

ACGIH:

Chemical Name	CAS No.
No data available.	

NIOSH:

Chemical Name	CAS No.
No data available.	

NTP:

Chemical Name	CAS No.
No data available.	

IARC:

Chemical Name	CAS No.	Group No.
No data.		Group 1
No data.		Group 2A
No data.		Group 2B

12. ECOLOGICAL INFORMATION

Overview: Moderate ecological hazard. This product may be dangerous to plants and/or wildlife.

Mobility: No data

Persistence: No data

Bioaccumulation: No data
Degradability: Biodegrades slowly.
Ecological Toxicity Data: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Description of Spent Product: Spent or discarded material is a hazardous waste.
Disposal Methods: Dispose of by incineration following Federal, State, Local, or Provincial regulations.
Waste Disposal of Packaging: Comply with all Local, State, Federal, and Provincial Environmental Regulations.

14. TRANSPORTATION INFORMATION

United States:
DOT Proper Shipping Name: Methanol
UN Number: UN1230
Hazard Class: 3
Packing Group: II

International:
IATA Proper Shipping Name: Methanol
UN Number: UN1230
Hazard Class: 3(6.1)
Packing Group: II

Marine Pollutant: No

Chemical Name	CAS#	Marine Pollutant	Severe Marine Pollutant
No data available.			

15. REGULATORY INFORMATION

United States:

Chemical Name	CAS#	CERCLA	SARA 313	SARA EHS 313	TSCA
methanol	67-56-1	X	X	-	X
dieldrin	60-57-1	X	-	-	-

The following chemicals are listed on CA Prop 65:

Chemical Name	CAS #	Regulation
Dieldrin	60-57-1	Prop 65 Cancer
Methanol	67-56-1	Prop 65 Devolop Tox

State Right To Know Listing:

Chemical Name	CAS#	New Jersey	Massachusetts	Pennsylvania	California
methanol	67-56-1	X	X	X	X
dieldrin	60-57-1	X	X	X	X

16. OTHER INFORMATION

Prior Version Date: 04/28/14
Other Information: Any changes to the SDS compared to previous versions are marked by a vertical line in front of the concerned paragraph.
References: No data available.
Disclaimer: Restek Corporation provides the descriptions, data and information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. It is provided for your guidance only. Because many factors may affect processing or application/use, Restek Corporation recommends you perform an assessment to determine the suitability of a product for your particular purpose prior to use. No warranties of any kind, either expressed or implied, including fitness for a particular purpose, are made regarding prodcuts described, data or information set forth. In no case shall the descriptions, information, or data provided be considered a part of our terms and conditions of sale. Further, the descriptions, data and information furnished hereunder are given gratis. No obligation or liability for the description, data and information given are assumed. All such being given

and accepted at your risk.

Material Safety Data Sheet
Chromium

MSDS# 90875

Section 1 - Chemical Product and Company Identification

MSDS Name:	Chromium
Catalog Numbers:	C318-500
Synonyms:	Chrome
Company Identification:	Fisher Scientific One Reagent Lane Fair Lawn, NJ 07410
For information in the US, call:	201-796-7100
Emergency Number US:	201-796-7100
CHEMTREC Phone Number, US:	800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#:	7440-47-3
Chemical Name:	Chromium
%:	100.0
EINECS#:	231-157-5

Hazard Symbols: XN

Risk Phrases: 40

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Warning! May cause allergic skin reaction. May cause liver damage. May cause kidney damage. May cause lung damage. Causes eye and skin irritation. Causes severe respiratory tract irritation. Target Organs: Liver.

Potential Health Effects

Eye:	Causes eye irritation. May cause conjunctivitis.
Skin:	Causes skin irritation. Prolonged and/or repeated contact may cause irritation and/or dermatitis. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.
Ingestion:	May cause irritation of the digestive tract. May cause liver damage.
Inhalation:	Causes respiratory tract irritation. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count. May cause asthma and shortness of breath. May cause headache, coughing, fever, weight loss, and pneumoconiosis.
Chronic:	Prolonged inhalation may cause respiratory tract inflammation and lung damage.

Section 4 - First Aid Measures

Eyes:	Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.
Skin:	Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.
Ingestion:	Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. Do NOT use mouth-to-mouth resuscitation.

Notes to Physician:

Section 5 - Fire Fighting Measures

General Information: Evacuate area and fight fire from a safe distance. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. May burn with invisible flame. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Dust can be an explosion hazard when exposed to heat or flame. Finely divided dusts may exhibit pyrophoric tendencies.

Extinguishing Media: Use dry sand or earth to smother fire. Use dry chemical to fight fire. Contact professional fire-fighters immediately.

Autoignition Temperature: 400 deg C (752.00 deg F)

Flash Point: Not applicable.

Explosion Limits: Lower: .0230oz/ft3

Explosion Limits: Upper: Not available

NFPA Rating: health: 2; flammability: 1; instability: 1;

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up or absorb material, then place into a suitable clean, dry, closed container for disposal. Avoid generating dusty conditions. Remove all sources of ignition. Isolate area and deny entry. Place under an inert atmosphere. Do not use combustible materials such as paper towels to clean up spill.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Minimize dust generation and accumulation. Use spark-proof tools and explosion proof equipment. Avoid contact with skin and eyes. Keep container tightly closed. Keep away from heat, sparks and flame. Avoid ingestion and inhalation. Handle under an inert atmosphere.

Storage: Keep away from heat, sparks, and flame. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from acids. Keep containers tightly closed. Do not expose to air. Store under an inert atmosphere.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Chromium	0.5 mg/m3	0.5 mg/m3 TWA 250 mg/m3 IDLH	1 mg/m3 TWA

OSHA Vacated PELs: Chromium: 1 mg/m3 TWA

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State:	Solid
Color:	silver-gray
Odor:	odorless
pH:	Not available
Vapor Pressure:	Not applicable.
Vapor Density:	Not available
Evaporation Rate:	Not applicable.
Viscosity:	Not applicable.
Boiling Point:	2640 deg C (4,784.00°F)
Freezing/Melting Point:	1857.2 deg C (3,374.96°F)
Decomposition Temperature:	Not available
Solubility in water:	Insoluble in water.
Specific Gravity/Density:	7.2 @28°C
Molecular Formula:	Cr
Molecular Weight:	51.996

Section 10 - Stability and Reactivity

Chemical Stability:	Stable under normal temperatures and pressures.
Conditions to Avoid:	Ignition sources, dust generation, exposure to air.
Incompatibilities with Other Materials	Not available
Hazardous Decomposition Products	Toxic chromium oxide fumes.
Hazardous Polymerization	Has not been reported.

Section 11 - Toxicological Information

RTECS#:	CAS# 7440-47-3: GB4200000
LD50/LC50:	RTECS: Not available.
Carcinogenicity:	Chromium - IARC: Group 3 (not classifiable)
Other:	See actual entry in RTECS for complete information.

Section 12 - Ecological Information

Not available

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

US DOT
Shipping Name: Not regulated as a hazardous material
Hazard Class:
UN Number:
Packing Group:
Canada TDG
Shipping Name: Not available
Hazard Class:
UN Number:
Packing Group:

USA RQ: CAS# 7440-47-3: 5000 lb final RQ (no reporting of releases of this hazardous substa

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XN

Risk Phrases:

R 40 Limited evidence of a carcinogenic effect.

Safety Phrases:

WGK (Water Danger/Protection)

CAS# 7440-47-3: Not available

Canada

CAS# 7440-47-3 is listed on Canada's DSL List

Canadian WHMIS Classifications: Not controlled.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 7440-47-3 is listed on Canada's Ingredient Disclosure List

US Federal

TSCA

CAS# 7440-47-3 is listed on the TSCA Inventory.

Section 16 - Other Information

MSDS Creation Date: 5/29/1998

Revision #12 Date 7/20/2009

Safety Data Sheet

Revision Date: 03/02/18
www.restek.com

2 Letter ISO country code/language code: US/EN

1. IDENTIFICATION

Catalog Number / Product Name:	**32207 / cis-Chlordane Standard**
Company:	Restek Corporation
Address:	110 Benner Circle Bellefonte, Pa. 16823
Phone#:	814-353-1300
Fax#:	814-353-1309
Emergency#:	800-424-9300 (CHEMTREC) 703-527-3887 (Outside the US)
Email:	www.restek.com
Revision Number:	8
Intended use:	For Laboratory use only

2. HAZARD(S)IDENTIFICATION

Emergency Overview:

GHS Hazard Symbols:

GHS Classification:	Specific Target Organ Systemic Toxicity (STOT) - Single Exposure Category 1 Flammable Liquid Category 2 Acute Toxicity - Dermal Category 3 Acute Toxicity - Oral Category 3
GHS Signal Word:	Danger
GHS Hazard:	Highly flammable liquid and vapour. Toxic if swallowed or in contact with skin. Causes damage to organs.
GHS Precautions:	
Safety Precautions:	Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilation and lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Do not breathe dust/fume/gas/mist/vapours/spray. Wash hands and skin thoroughly after handling. Do not eat, drink or smoke when using this product. Wear protective gloves/protective clothing/eye protection/face protection.
First Aid Measures:	IF SWALLOWED: Immediately call a POISON CENTER/doctor/.... IF ON SKIN: Wash with plenty of soap and water. IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. IF exposed: Call a POISON CENTER or doctor/physician. Call a POISON CENTER or doctor/physician if you feel unwell. Specific treatment see section 4. Rinse mouth. Take off immediately all contaminated clothing and wash it before reuse. In case of fire: Use extinguishing media in section 5 for extinction.
Storage:	Keep container tightly closed.

Store in a well-ventilated place. Keep cool.
Store locked up.

Disposal: Dispose of contents/container according to section 13 of the SDS.

Single Exposure Target Organs: Specific target organ toxicity - Single exposure - STOT SE 1: H370 Causes damage to organs. (C >= 10 %; No information to prove exclusion of certain routes of exposure); Specific target organ toxicity - Single exposure - STOT SE 2: H371 May cause damage to organs. (3 % <= C <10 %; Concentration limits for acute toxicity cannot be translated into GHS from the DSD especially when minimum classifications are given)

Repeated Exposure Target Organs: No data available

3. COMPOSITION / INFORMATION ON INGREDIENT

Chemical Name	CAS #	EINEC #	% Composition
methanol	67-56-1	200-659-6	99.9
cis-chlordane	5103-71-9	225-825-5	0.1

4. FIRST-AID MEASURES

Inhalation: Remove to fresh air. If breathing is difficult, have a trained individual administer oxygen. If not breathing, give artificial respiration and have a trained individual administer oxygen. Get medical attention immediately

Eyes: Flush eyes with plenty of water for at least 20 minutes retracting eyelids often. Tilt the head to prevent chemical from transferring to the uncontaminated eye. Get immediate medical attention.

Skin Contact: Wash with soap and water. Remove contaminated clothing and launder. Get medical attention if irritation develops or persists.

Ingestion: Do not induce vomiting and seek medical attention immediately. Drink two glasses of water or milk to dilute. Provide medical care provider with this SDS.

5. FIRE- FIGHTING MEASURES

Extinguishing Media: Use alcohol resistant foam, carbon dioxide, or dry chemical extinguishing agents. Water may be ineffective but water spray can be used extinguish a fire if swept across the base of the flames. Water can absorb heat and keep exposed material from being damaged by fire.

Fire and/or Explosion Hazards: Vapors may be ignited by sparks, flames or other sources of ignition if material is above the flash point giving rise to a fire (Class B). Vapors are heavier than air and may travel to a source of ignition and flash back.

Fire Fighting Methods and Protection: Do not enter fire area without proper protection including self-contained breathing apparatus and full protective equipment. Fight fire from a safe distance and a protected location due to the potential of hazardous vapors and decomposition products. Flammable component(s) of this material may be lighter than water and burn while floating on the surface.

Hazardous Combustion Products: Carbon dioxide, Carbon monoxide

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions and Equipment: Exposure to the spilled material may be severely irritating or toxic. Follow personal protective equipment recommendations found in Section 8 of this SDS. Personal protective equipment needs must be evaluated based on information provided on this sheet and the special circumstances created by the spill including; the material spilled, the quantity of the spill, the area in which the spill occurred, and the expertise of employees in the area responding to the spill. Never exceed any occupational exposure limits.

Methods for Clean-up: Prevent the spread of any spill to minimize harm to human health and the environment if safe to do so. Wear complete and proper personal protective equipment following the recommendation of Section 8 at a minimum. Dike with suitable absorbent material like granulated clay. Gather and store in a sealed container pending a waste disposal evaluation.

7. HANDLING AND STORAGE

Handling Technical Measures and Precautions: Toxic or severely irritating material. Avoid contacting and avoid

Storage Technical Measures and Conditions:	breathing the material. Use only in a well ventilated area. Use spark-proof tools and explosion-proof equipment Store in a cool dry ventilated location. Isolate from incompatible materials and conditions. Keep container(s) closed. Keep away from sources of ignition

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

United States:

Chemical Name	CAS No.	IDLH	ACGIH STEL	ACGIH TLV-TWA	OSHA Exposure Limit
methanol	67-56-1	6000 ppm IDLH	250 ppm STEL	200 ppm TWA	200 ppm TWA; 260 mg/m3 TWA

Personal Protection:

Engineering Measures:	Local exhaust ventilation is recommended when generating excessive levels of vapours from handling or thermal processing.
Respiratory Protection:	Respiratory protection may be required to avoid overexposure when handling this product. General or local exhaust ventilation is the preferred means of protection. Use a respirator if general room ventilation is not available or sufficient to eliminate symptoms.If an exposure limit is exceeded or if an operator is experiencing symptoms of inhalation overexposure as explained in Section 3, provide respiratory protection.
Eye Protection:	Wear chemically resistant safety glasses with side shields when handling this product. Do not wear contact lenses.
Skin Protection:	Wear protective gloves. Inspect gloves for chemical break-through and replace at regular intervals. Clean protective equipment regularly. Wash hands and other exposed areas with mild soap and water before eating, drinking, and when leaving work

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance, color:	No data available
Odor:	Mild
Physical State:	No data available
pH:	Not applicable
Vapor Pressure:	No data available
Vapor Density:	1.1 (air = 1)
Boiling Point (°C):	64.7 °C at 760 mmHg (HSDB)
Melting Point (°C):	-98 °C
Flash Point (°F):	52
Flammability:	Highly Flammable
Upper Flammable/Explosive Limit, % in air:	36
Lower Flammable/Explosive Limit, % in air:	6
Autoignition Temperature (°C):	464 deg C
Decomposition Temperature (°C):	No data available
Specific Gravity:	0.791 - 0.792 g/cm3 at 20 °C
Evaporation Rate:	No data available
Odor Threshold:	No data available
Solubility:	Moderate; 50-99%
Partition Coefficient: n-octanol in water:	No data available
VOC % by weight:	0
Molecular Weight:	32.04

10. STABILITY AND REACTIVITY

Stability:	Stable under normal conditions.
Conditions to Avoid:	None known.
Materials to Avoid / Chemical Incompatiability:	Strong oxidizing agents
Hazardous Decomposition Products:	Carbon dioxide Carbon monoxide

11. TOXICOLOGICAL INFORMATION

Routes of Entry:	Inhalation, Skin Contact, Eye Contact, Ingestion
Target Organs Potentially Affected By Exposure:	Eyes, Central nervous system stimulation, Skin, GI Tract, Respiratory Tract
Chemical Interactions That Change Toxicity:	None Known

Immediate (Acute) Health Effects by Route of Exposure:

Inhalation Irritation:	Can cause moderate respiratory irritation, dizziness, weakness, fatigue, nausea and headache.
Inhalation Toxicity:	Harmful! Can cause systemic damage (see "Target Organs)Methanol can cause central nervous system depression and overexposure can cause damage to the optic nerve resulting in visual impairment or blindness.
Skin Contact:	Can cause moderate skin irritation, defatting, and dermatitis. Not likely to cause permanent damage.
Eye Contact:	Can cause moderate irritation, tearing and reddening, but not likely to permanently injure eye tissue.
Ingestion Irritation:	Irritating to mouth, throat, and stomach. Can cause abdominal discomfort, nausea, vomiting and diarrhea.Highly toxic and may be fatal if swallowed.
Ingestion Toxicity:	Toxic if swallowed. May cause target organ failure and/or death.May be fatal if swallowed.

Long-Term (Chronic) Health Effects:

Carcinogenicity:	No data.
Reproductive and Developmental Toxicity:	No data available to indicate product or any components present at greater than 0.1% may cause birth defects.
Inhalation:	Upon prolonged and/or repeated exposure, can cause moderate respiratory irritation, dizziness, weakness, fatigue, nausea and headache.Harmful! Can cause systemic damage upon prolonged and/or repeated exposure (see "Target Organs)
Skin Contact:	Upon prolonged or repeated contact, can cause moderate skin irritation, defatting, and dermatitis. Not likely to cause permanent damage.
Ingestion:	Toxic if swallowed. May cause target organ failure and/or death.

Component Toxicological Data:
NIOSH:

Chemical Name	CAS No.	LD50/LC50
Methanol	67-56-1	Inhalation LC50 Rat 22500 ppm 8 h

Component Carcinogenic Data:
OSHA:

Chemical Name	CAS No.
No data available	

ACGIH:

Chemical Name	CAS No.
No data available	

NIOSH:

Chemical Name	CAS No.
No data available	

NTP:

Chemical Name	CAS No.
No data available	

IARC:

Chemical Name	CAS No.	Group No.
Monograph 79 [2001] (listed under Chlordane and Heptachlor); Monograph 53 [1991]; Supplement 7 [1987]	5103-71-9	Group 2B

12. ECOLOGICAL INFORMATION

Overview:	Moderate ecological hazard. This product may be dangerous to plants and/or wildlife.
Mobility:	No data
Persistence:	No data
Bioaccumulation:	No data
Degradability:	Biodegrades slowly.
Ecological Toxicity Data:	No data available

13. DISPOSAL CONSIDERATIONS

Waste Description of Spent Product: Spent or discarded material is a hazardous waste.Mixing spent or discarded material with other materials may render the mixture hazardous. Perform a hazardous waste determination on mixtures.

Disposal Methods: Dispose of by incineration following Federal, State, Local, or Provincial regulations.

Waste Disposal of Packaging: Comply with all Local, State, Federal, and Provincial Environmental Regulations.

14. TRANSPORTATION INFORMATION

United States:

DOT Proper Shipping Name: Methanol
UN Number: UN1230
Hazard Class: 3
Packing Group: II

International:

IATA Proper Shipping Name: Methanol
UN Number: UN1230
Hazard Class: 3(6.1)
Packing Group: II

Marine Pollutant: No

Chemical Name	CAS#	Marine Pollutant	Severe Marine Pollutant
No data available			

15. REGULATORY INFORMATION

United States:

Chemical Name	CAS#	CERCLA	SARA 313	SARA EHS 313	TSCA
methanol	67-56-1	X	X	-	X

The following chemicals are listed on CA Prop 65:

Chemical Name	CAS #	Regulation
Methanol	67-56-1	Prop 65 Devolop Tox

State Right To Know Listing:

Chemical Name	CAS#	New Jersey	Massachusetts	Pennsylvania	California
methanol	67-56-1	X	X	X	X
cis-chlordane	5103-71-9	-	-	-	-

16. OTHER INFORMATION

Prior Version Date: 12/06/16

Other Information: Any changes to the SDS compared to previous versions are marked by a vertical line in front of the concerned paragraph.

References: No data available

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APPENDIX H – COMMUNITY AIR MONITORING PLAN (CAMP)

Proactive by Design

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

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

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

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

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

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

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

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

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

VOC Monitoring, Response Levels, and Actions

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

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

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

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

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

Particulate Monitoring, Response Levels, and Actions

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

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

APPENDIX I - SVE SYSTEM O&M MANUAL

Known for excellence.
Built on trust.

OPERATIONS AND MAINTENANCE MANUAL

FORMER B.H. AIRCRAFT
441 Eastern Parkway
Farmingdale, New York
12.0076545.00

June 2019

PREPARED FOR:
441 Eastern Parkway, LLC.
Farmingdale, NY

GZA GeoEnvironmental, Inc.
55 Lane Road | Fairfield, NJ, 07004
973-744-3300

31 Offices Nationwide
www.gza.com

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

On behalf of 441 Eastern Parkway, LLC, Goldberg Zoino Associates of New York, P.C. d/b/a GZA GeoEnvironmental of New York (GZA) has prepared this Operations and Maintenance (O&M) Manual for the Soil Vapor Extraction (SVE) system, at the Former B.H. Aircraft property, located at 441 Eastern Parkway, Farmingdale, NY (Site).

The SVE 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. The SVE system has been designed and installed in accordance with the Remedial Investigation Report/Remedial Action Workplan (RIR-RAWP) dated December 2018, and the Final Remedial Design Report dated July 2019. The SVE system has been installed in the southwestern portion of the Site to prevent off-Site migration of VOC contamination identified during the Remedial Investigation (RI). The SVE system has been designed to target an area of approximately 14,000 square feet.

1.1 GENERAL PROCESS DESCRIPTION

The SVE remedial technology involves inducing airflow within the subsurface with an applied vacuum, enhancing the in-situ volatilization of contaminants and capture of soil vapors. The SVE process uses the volatility of the contaminants to allow mass transfer from adsorbed and dissolved phases in the soil and groundwater to the vapor phase, where it is removed under vacuum, and discharged to the atmosphere after treatment using granular activated carbon (GAC). Airflow is induced in the subsurface by a pressure gradient applied through soil vapor extraction (SVE) wells. The negative pressure inside the extraction wells will be generated by a vacuum blower, which causes soil vapor to migrate toward the wells. Any water recovered from the SVE wells is collected in a Vapor Liquid Separator (VLS) vessel, and disposed of in 55 gallon steel drums.

2.0 SITE CONTACTS

Name	Title	Organizational Affiliation	Responsibilities	Phone Number
Emergency Contacts				
BJ Parekh	Project Engineer	GZA	Manages Project Operations – coordinates field team and subcontractors.	O – (973) 774-3323 C – (862) 200-1790
Philip Bosco	Project Coordinator	GZA	On-Site Management of field team and subcontractors.	O – (973) 774-3315 C – (551) 486-6452
Ben Romagnoli	Field Engineer	GZA	Conducting on-Site operations and maintenance procedures	O – (973) 774-3341 C – (315) 382-6774

Paul Benya	Field Engineer	GZA	Conducting on-Site operations and maintenance procedures	O – (973) 774-3316 C – (862) 200-4640
Mike Cohen	Owner	Silver Star NY	Client	C – (516) 817-2709
Dom Del Monaco	Site Contractor	Red Rock Industries	Electrical Contractor	C – (631) 831-1691

3.0 SYSTEM COMPONENTS

In general, the SVE system includes the following components:

- Five SVE Wells (SVE-1 through SVE-5), installed to a total depth of approximately 18 ft bgs;
- Five Vapor monitoring points (VP-1 through VP-5), installed to a total depth of approximately 18 ft below ground surface (bgs);
- Three 3-inch, Schedule 40 PVC Header Lines: Headers 1 and 2 are connected to the SVE wells, Header 3 is not connected to any SVE wells, and will be used for dilution air, as needed;
- One 3-inch, Schedule 40 PVC Manifold line, which combines the flow from Header 1 through 3;
- A blower with a maximum capacity of 300 cfm at 50 inches of water (IW). The blower is equipped with a pressure relief valve and inline filters. Blower manufacturer specifications are presented in **Appendix A**;
- A vapor-liquid separator (VLS) tank with a minimum capacity of 50 gallons, equipped with a high-level alarm and drain port to drain any collected liquids;
- System Operation Instrumentation, including; magnehelic gauges ranging from 0 – 20 IW, pressure gauges ranging from 0 to 60 psi and a temperature gauge ranging from 0 to 500 degrees Fahrenheit;
- System Trailer housing all of the system components;
- VOC Treatment - Three (3)-200 lb GAC vessels; and
- A 10-ft tall exhaust stack, attached to the effluent of the final GAC vessel

The SVE system layout is provided in **Figure 1**. A piping and instrumentation diagram (P&ID) is provided in **Figure 2**.

3.1 SVE SYSTEM CONFIGURATION

During operation, the blower extracts air from two SVE header lines (Header 1 and Header 2). Header 1 is connected to three SVE wells (SVE-1 through SVE-3), and Header 2 is connected to two SVE wells (SVE-4 and SVE-5). The extracted air travels through the VLS, where any liquid from the air stream is removed before entering the SVE blower. There is a

dilution valve on the vacuum end of the blower, which provides the means to control air flow from the extraction wells and the applied vacuum at the wells. The SVE system vacuum and flow are controlled by valves on the header lines and at each vapor extraction well. Header 3 of the SVE system is not connected to any vapor extraction wells, and can be used to supplement the dilution air flow as needed.

The optimal flow rate and vacuum were estimated based on the pilot test results, and are governed by the Site subsurface conditions and the air permeability of the soil. The commissioning vacuum values for each vertical SVE well were measured to be approximately 2.5 (SVE-4 and SVE-5) and 5 (SVE-1 through SVE-3) IW. The commissioning flow values for each vertical SVE well were measured to be approximately 45 cfm (SVE-1 through SVE-5), respectively. The applied vacuum is measured at the SVE point and does not account for friction losses in pipelines. The total combined flow rate at the manifold was measured to be approximately 220 cfm during commissioning.

3.2 SYSTEM TRAILER

The SVE system trailer includes, vacuum blower, VLS tank, three (3) header lines and manifolds, valves, vacuum/pressure gauges, alarms, control panel, transformer, power panel and sample ports.

The extracted airflow from individual header lines combine into one stream at the manifold, located within the system trailer. VOC concentration (part per million, ppm), air flow (cubic feet per minute, CFM), and vacuum pressure (inches of water, IW) measurements from individual header lines and manifold are collected inside the system trailer. The air stream passes through the VLS and the condensate is separated from the air stream, then vapors are passed through three GAC drums before discharging into the atmosphere.

3.3 VOC TREATMENT AND DISCHARGE

Photoionization Detector (PID) readings will be recorded before and after treatment at each GAC vessel. The combined air stream passes through the VLS, where any liquid in the air stream is removed. The air stream passes through the SVE blower to three GAC vessels, connected in series. The treated vapor stream is then discharged through a 10-foot high ventilation stack to the atmosphere. The contamination reduction rate from the influent stream by the three 200 lbs GAC units is anticipated to be 99.9%.

3.4 WATER MANAGEMENT

The condensate and moisture from the air stream will be separated and captured in the VLS before the air stream reaches the SVE blower. Recovered water will be drained from the VLS vessel by gravity into 55-gallon drum. The water removed from the tank will be treated with liquid granular activated carbon prior to discharging on-site. The system can be temporarily shut down during O&M to facilitate draining of the VLS tank.

4.0 **STANDARD OPERATING PROCEDURES AND MONITORING PLAN**

This System Operating Procedures Monitoring Plan should be followed in all normal operating circumstances. If circumstances arise while operating the system which are not covered in this O&M Manual, the Project Engineer and Project Coordinator should be notified. This section discusses step-by-step procedures for operating and monitoring the system in a safe manner.

GZA proposes to operate the system on a continuous basis during the initial startup and shake down for approximately 3 days. Following the startup, GZA will shift the system to continuous operation and visit the Site three weeks after starting the system for the first month of operation. After the first month of operation, GZA will visit the Site on a quarterly basis to confirm system operations and to collect vapor phase concentration readings. The following tasks will be conducted during routine site visits:

- Collect system flow rates and operating vacuums;
- Collect influent, effluent and mid-treatment vapor concentration readings (using a hand held PID) to assess vapor control efficiency;
- Monitor vapor probes to assess induced vacuum readings;
- Inspect SVE wells and adjust the applied vacuum and flows using valves;
- Conduct a general inspection of the system to ensure proper housekeeping; and
- Assess the volume of liquids in the VLS.
- Air samples will be collected periodically from influent and effluent sample ports and will be sent to a New York certified laboratory for VOC analysis.

The following sections discuss the procedures for starting and shutting down the system, emergency situations, and routine monitoring.

4.1 START-UP AND SHUT-DOWN PROCEDURES

Before starting the system for the first time, complete the SVE System Startup Checklist and Commissioning Plan provided in **Table 1**. The following procedures should be followed when starting up the system:

1. Open the SVE header lines.
2. Set the SVE blower HOA switch to AUTO and allow the flow to stabilize for 15 minutes. NOTE: The SVE blower switch should be set on HAND only while troubleshooting and when an operator is present. The system running in HAND mode will not shut down in alarm conditions.

If water is suspected to be in header lines, it can be removed by closing off flow to the other header legs using the gate valves on the header legs inside the system enclosure. Increasing vacuum to the leg containing water will pull the water through the header leg into the system to be collected by the VLS. Remove water from one header leg at a time, and return valves to their normal position when complete.

To shut down the system, the following procedures should be followed:

1. Record a round of system readings (**Table 2**).
2. Set the SVE blower HOA switch to OFF.

In the event of an emergency, the following procedures should be followed:

1. Pull the main disconnect on the breaker panel inside the system, evacuate the area (if necessary due to safety concerns) and call Project Engineer and/or then the Project Coordinator. Contact information is provided in Section 2.0.

4.2 SYSTEM READINGS

Collect system readings quarterly (including flow, vacuum, pressure, PID readings, etc.) inside the system trailer. Record readings on the SVE System Data Sheet, provided in **Table 2**.

1. Calibrate a handheld PID (MiniRae) rented from Pine Environmental before its use. Record calibration data in the field book.
2. Locations for system readings are labeled by point number inside trailer and on readings sheet (**Table 2**). Point numbers are shown in parenthesis after reading title.
3. Record the blower counter hours and note the time of reading.
4. Record the previous blower counter hours from the last visit, and calculate the hours elapsed.
5. Record vacuum readings from the vacuum gauges installed on Headers 1 and 2.
6. Record Differential Pressure readings for Headers 1 and 2 from flow sensors located on their respective Header lines.
7. Using the recorded vacuum and differential pressure, calculate and record the flows from Headers 1 and 2.
8. Record PID readings for Headers 1, 2 and 3 from the sample ports on their respective header legs.
9. Record vacuum and differential pressure at the manifold and VLS tank and calculate the flows.
10. Record the vacuum at the dilution filter.
11. Record temperature at the blower.
12. Record the PID reading and pressure reading at the sample port located BEFORE the primary, secondary, tertiary GAC vessel.
13. Record the PID reading and pressure reading at the sample port located at the stack (AFTER the tertiary GAC vessel).

4.3 FIELD READINGS

Record applied and induced vacuum readings from the field at each SVE well and vapor monitoring points (VP). Record readings on the Applied/Induced Vacuum Readings Sheet, provided in **Table 3**.

1. For SVE wells
    a. Open well lid using crowbar and prybar. Move well lid to the side and set up safety cones around open vault.
    b. Record PID readings from the sample port on the 2-inch SVE line coming from the well. Connect handheld PID directly to the sample port using 1/4-inch tubing.
    c. Record vacuum from the sample port on the 2-inch SVE line coming from the SVE well. Using 1/4-inch to 1/8-inch tubing, connect the low pressure port of a Magnehelic gauge to the sample port. Record vacuum readings with high pressure port open to the atmosphere.
        i. Magnehelic gauge should be zeroed before use using the set screw on the face of the gauge. The needle should sit on zero before connecting either port. If the needle is moving, relocate to an area blocked from the wind before performing the zero, as wind can affect the reading.
    d. When readings are complete, close well lids as soon as possible.
2. For VPs
    a. Open well lid using ratchet with either a 9/16” or 1/2” socket.
    b. Make sure to open valve on sample port before connecting PID. The PID pump will stop if it tries to pull against a closed valve. If this happens the PID can be shut down and turned back on to restart the pump.
    c. Record PID readings from the sample port on the 1-inch VP points. Connect handheld PID directly to the sample port using 1/4-inch tubing.

d. Record the vacuum from the sample port on the 1-inch VP point. Using 1/4-inch to 1/8-inch tubing, connect the low pressure port of a Magnehelic gauge to the sample port. Record vacuum readings with high pressure port open to the atmosphere.
    i. Magnehelic gauge should be zeroed before use using the set screw on the face of the gauge. The needle should sit on zero before connecting either port. If the needle is moving, relocate to an area blocked from the wind before performing the zero, as wind can affect the reading.

4.4 PERFORMANCE MONITORING AND CALCULATIONS

The treatment system operation and maintenance will be conducted as described above, it is intended to ensure the system is operating correctly, in accordance with the proposed full-scale design. A performance monitoring program will also be implemented to assess the effectiveness of the treatment system at achieving the remedial goals. The performance monitoring program will assess whether modifications to the system operation could enhance contaminant recovery.

System performance will be based on PID readings from individual extraction wells, influent VOC concentrations and cumulative VOC mass removal. All three criteria will be compared to pre-remediation conditions. Performance monitoring calculations are presented in **Tables 4, 5, and 6**.

4.5 SAMPLING PLAN

4.5.1 Air Sampling

Air samples will be collected from the influent stream and effluent sample ports during each monitoring event. The influent sample port is located immediately prior to the first GAC vessel. The effluent sample port is located at the exhaust stack, immediately following the third GAC vessel. Air samples will be collected with 6-L SUMMA canisters, using a 30-minute flow controller, and analyzed for VOCs using TO+15 method. The air samples will be used to assess contaminant removal rates. The air samples will be sent to a New York certified laboratory for analysis.

4.5.2 Groundwater Sampling

Groundwater samples will be collected in accordance with the December 2018 RIR-RAWP on an annual basis after an initial baseline sampling event. Groundwater will be sampled for VOCs and Monitored Natural Attenuation (MNA) parameters.

Refer to the August 2018 RIR-RAWP and the July 2019 Site Management Plan for further instructions on groundwater sampling procedures/requirements.

4.6 SURVEY

All SVE, VP and permanent groundwater monitoring wells were surveyed by DPK Consulting Land Surveyors on June 7, 2019. All wells were marked with a black marker, and any water level measurements will be taken from this surveyed location. The well coordinates are presented in **Table 7**. Surveyed SVE, VP and permanent groundwater monitoring well locations are presented as **Figure 3**.

5.0 EQUIPMENT MAINTENANCE REQUIREMENTS

The SVE system includes the following components, which will require routine maintenance:

- SVE Blower
- VOC Treatment (GAC Units)

5.1 SVE BLOWER

Blower specific O&M, such as blower lubrications or flow meter replacement will be conducted per the manufacturer's requirements. SVE blowers create excessive noise when in operation. When either blower is operating, all personnel must wear hearing protection at all times when inside system trailer.

5.2 GAC VESSELS

GAC vessels will be operated in a lead/lag configuration. Carbon in the lead vessel will be changed out when sampling indicates breakthrough in the second GAC vessel or saturation of the lead GAC unit (outlet PID reading within 20% of inlet reading). When the primary vessel is spent, the GAC will be replaced, and the secondary vessel plumbed to the primary treatment location. GAC will be either re-generated or disposed of off-Site by the vendor. Periodic samples may be collected from the GAC vessels to ensure proper classification and disposal.

6.0 HEALTH AND SAFETY PLAN

All field activities must be performed safely in accordance with the GZA site-wide Health and Safety Plan (HASP). The HASP is kept on-site in the system enclosure unit.

The following Job Hazard Analyses (JHAs) will apply to O&M activities for the SVE System. Copies of these JHAs are provided in **Appendix C**.

- Groundwater Sampling
- Soil-Gas Sampling
- Remediation System O&M
- Field Sampling

Tables

TABLE 1

SVE SYSTEM STARTUP CHECKLIST AND COMISSIONING PLAN

Former B.H. Aircraft

441 Eastern Parkway, Farmingdale NY

Date: _____

Person Performing Inspection: _____

Check	Description	Notes
	Inspect connections to SVE-1 through SVE-5	
	Inspect valves are open to treatment wells	
	Inspect that other manifold legs are closed	
	Inspect that plumbing to GAC is in place	
	Check the condition of the flow meter, vacuum gauges and temperatiure probe	
	Check the condition of all of the valves, including dilution valve	
	Check the condition of the air filter	
	Check the condition of the GAC vessel for any rusting	
	Check the condition of the trailer and note for any rusting or damage	
	Check for fire estinguisher	
	Secure the area with cones or barricades	
	Ensure that all sample ports are closed	
	Inspect that the stack is erected at correct height	
	Check depth to groundwater in the existing monitoring well	
	Ensure all vapor probes are capped (closed)	
	Ensure there is no water in the vapor/liquid separator	
	Record the counter readings on the timers	
After turning on the blower:		
	Bump blower and ensure rotation is correct	
	Run blower and ensure there are no leaks in the above ground line(s)	
	Ensure the exhaust fan inside the trailer is working	
	Calibrate magnehelic gauges	
	Conduct SVE System Shake down as indicated in the Field Workplan	
	Conduct SVE pilot test as indicated in the field workplan	

TABLE 2

SVE SYSTEM DATA SHEET

SVE System O M

Former B.H. Aircraft

441 Eastern Parkway, Farmgindale NY

Date: _____

Weather: _____

Personnel: _____

SVE Blower Time (Previous) _____

SVE Blower Time (Current) _____

Time _____

Difference (hours) _____

Notes: _____

Time	Header #1 Vac **(13)**	Header #1 DP **(16)**	Header #1 Flow **(*)**	Header #1 PID **(1)**	Header #2 Vac **(14)**	Header #2 DP **(17)**	Header #2 Flow **(*)**	Header #2 PID **(2)**	Manifold Vac **(3)**	Manifold DP **(19)**	Manifold Flow **(*)**	VLS Vac **(5)**	Discharge Vac **(6)**	Dicharge DP **(20)**	Discharge Flow **(*)**	Header 3 Dilution Air Vac **(15)**	Header 3 Dilution DP **(18)**	Header 3 Dilution Flow **(*)**	Dilution Filter Vac **(21)**	Effluent Temp **(22)**	Drum 1 GAC PID **(23)**	Drum 1 GAC Pressure **(23)**	Drum 2 GAC PID **(24)**	Drum 2 GAC Pressure **(24)**	Drum 3 GAC PID **(25)**	Drum 3 GAC Pressure **(25)**	Stack PID **(12)**	Stack Pressure **(12)**
hr:min	in-H20	in-H20	CFM	ppm	in-H20	in-H20	CFM	ppm	in-H20	in-H20	CFM	in-H20	in-H20	in-H20	CFM	in-H20	in-H20	CFM	in-H20	°F	ppm	in-H20	ppm	in-H20	ppm	in-H20	ppm	in-H20

Notes/Abbreviations:

Vac: Vacuum

hr:min: hours/minutes

in-H20: Inches of Water

°F: Degree Farenheit

CFM Cubic Feet per Minute

(#) Number labeled in the trailer

(*) Value calculated using excel spreadsheet

TABLE 3

12.0076545.00

APPLIED/INDUCED VACUUM DATA SHEET
SVE SYSTEM O M
Former B.H. Aircraft
441 Eastern Parkway, Farmingdale, NY

Date: _____

Weather: _____

Personnel: _____

Notes: _____

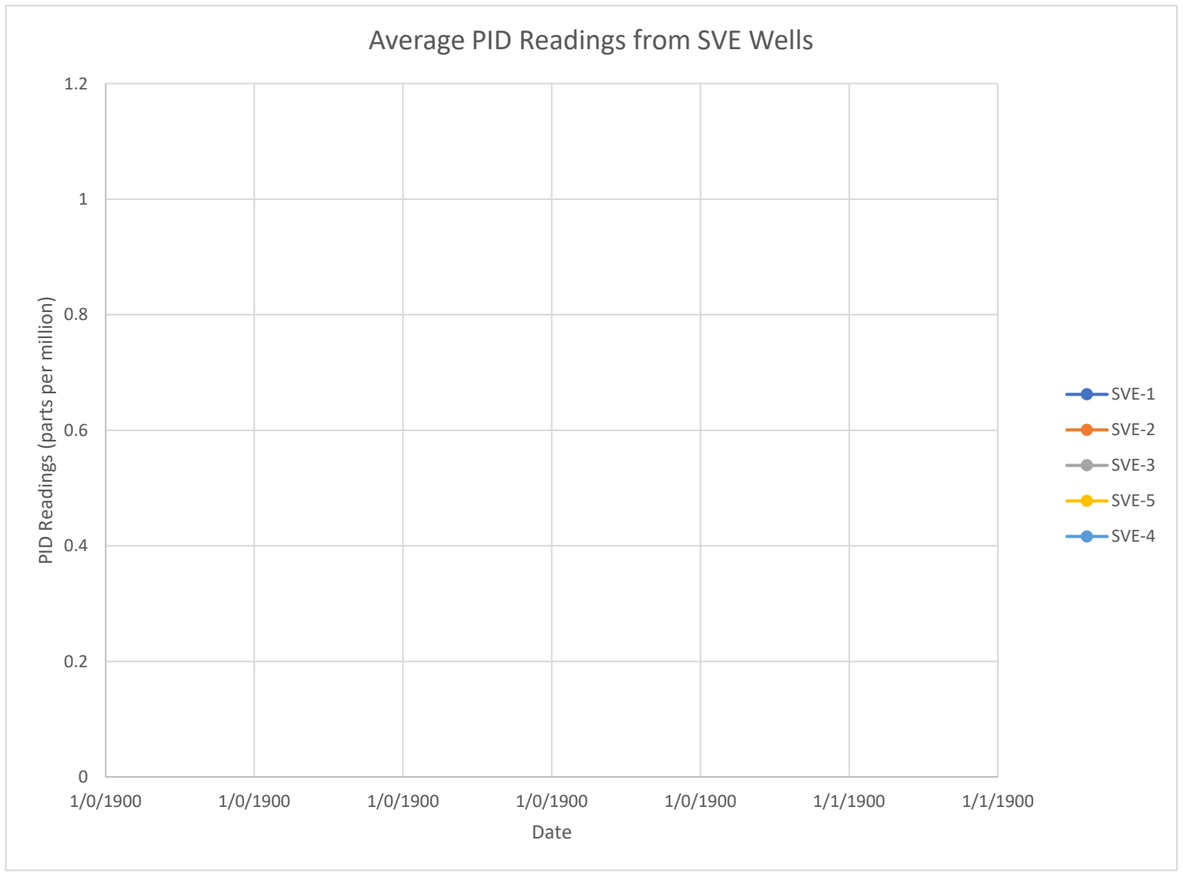
Time of Readings	Observation Points									
	SVE-1		SVE-2		SVE-3		SVE-4		SVE-5	
	VAC	PID	VAC	PID	VAC	PID	VAC	PID	VAC	PID
hr:min	in-H20	ppm	in-H20	ppm	in-H20	ppm	in-H20	ppm	in-H20	ppm
	VP-1		VP-2		VP-3		VP-4		VP-5	
	VAC	PID	VAC	PID	VAC	PID	VAC	PID	VAC	PID
	in-H20	ppm	in-H20	ppm	in-H20	ppm	in-H20	ppm	in-H20	ppm

Notes/Abbreviations:

Vac: Vacuum
hr:min: hours/minutes
in-H20: Inches of Water
ppm: Parts Per Million

TABLE 4
PID READINGS FROM EXTRACTION WELLS
Former B.H. Aircraft
441 Eastern Parkway, Farmingdale NY

Date														
Well Number	PID Readings (parts per million)													
SVE-1														
SVE-2														
SVE-3														
SVE-4														
SVE-5														
Influent														
Effluent														



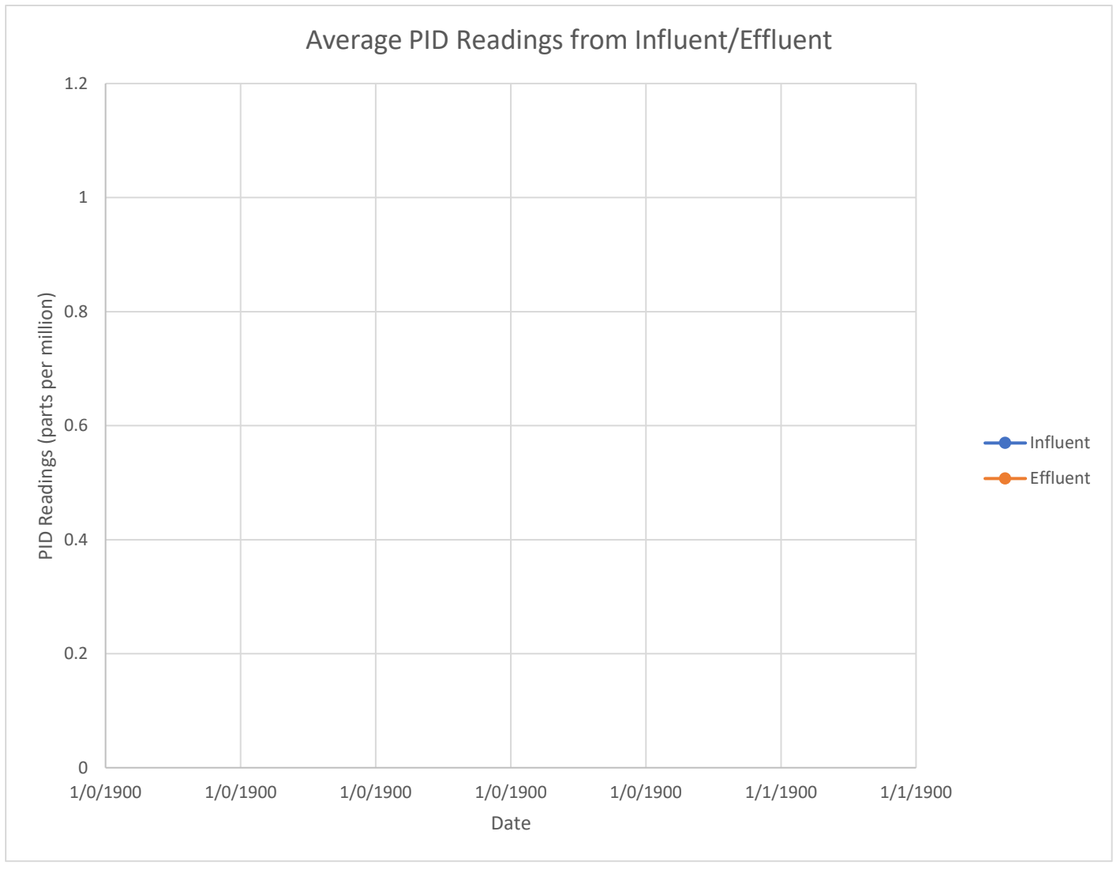


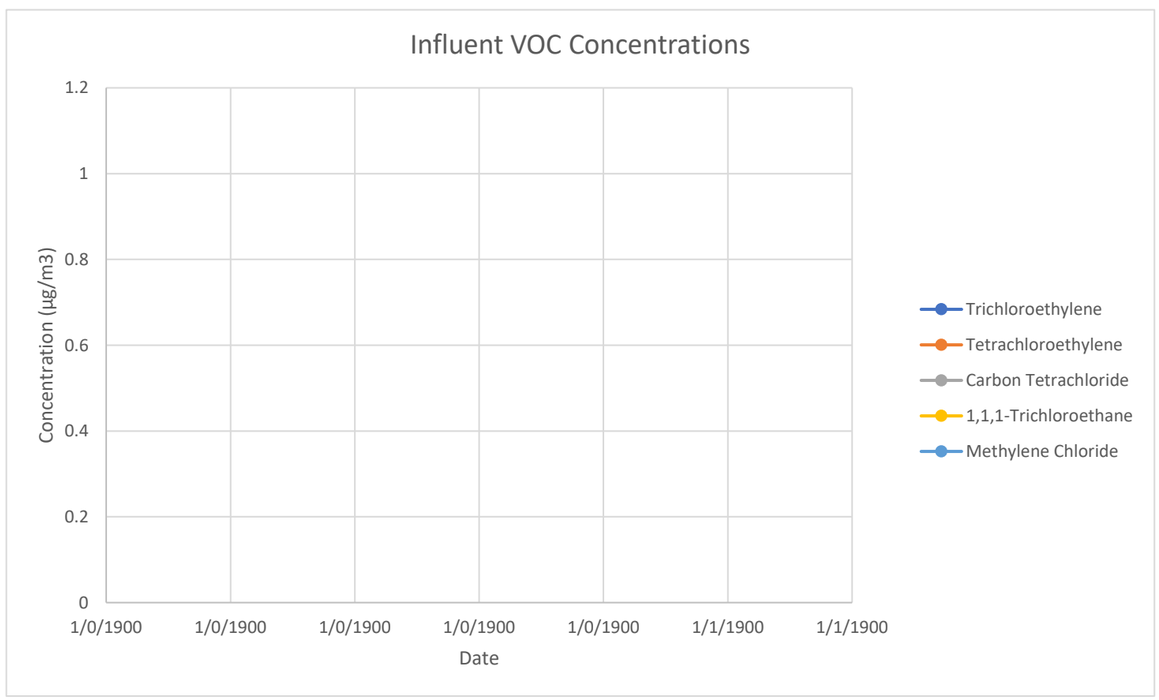
TABLE 5
INFLUENT AND EFFLUENT VOC CONCENTRATIONS
Former B.H. Aircraft
441 Eastern Parkway, Farmingdale, NY

Influent:													
Date													
Compound	Influent Concentration (µg/m3)												
Trichloroethylene													
Tetrachloroethylene													
Carbon Tetrachloride													
1,1,1 - Trichloroethane													
Effluent:													
Date													
Compound	Effluent Concentration (µg/m3)												
Trichloroethylene													
Tetrachloroethylene													
Carbon Tetrachloride													
1,1,1 - Trichloroethane													
Notes:													

1 For all compounds with non-detect (ND), the rerporting limit was listed

"E" designation samples report 2 concentrations. The higher value shall be used for this table

E



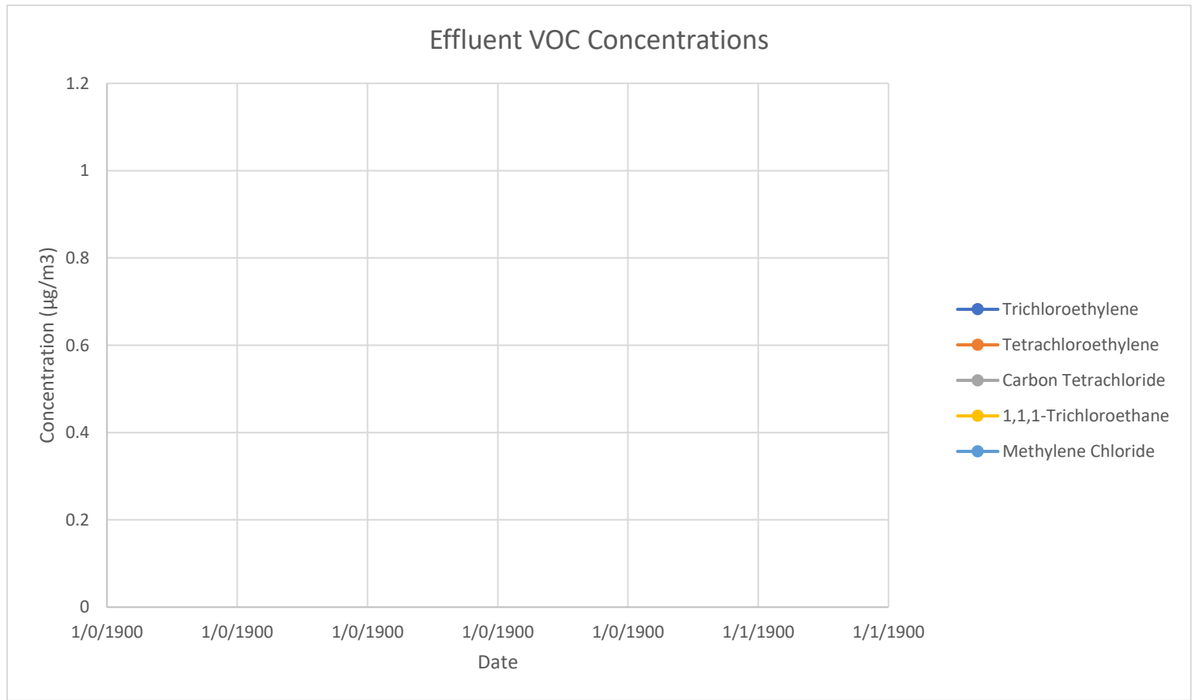


TABLE 6
CUMULATIVE VOC MASS REMOVAL CALCULATIONS
Former B.H. Aircraft
441 Eastern Parkay, Farmingdale, NY

			Trichloroethylene		Tetrachloroethylene		Carbon Tetrachloride		1,1,1 - Trichloroethane	
Mass Existing in Soil Vapors (lbs)[1]			**1.12**		**0.08**		**0.01**		**0.45**	
Date	Flow (CFM)	Elapsed Time (Minutes)	Influent Conc.(µg/m3)	Mass Removed (lbs)	Influent Conc.(µg/m3)	Mass Removed (lbs)	Influent Conc.(µg/m3)	Mass Removed (lbs)	Influent Conc.(µg/m3)	Mass Removed (lbs)
				0.00		0.00		0.000		0.000
Cumulative mass removed (lbs)				**0.00**		**0.00**		**0.000**		**0.000**

Notes:
[1] Mass estimated using maximum value detected in the soil gas (2017 Remedial Investigation)over the treatment volume (14,000 sq. ft., 20 ft depth)

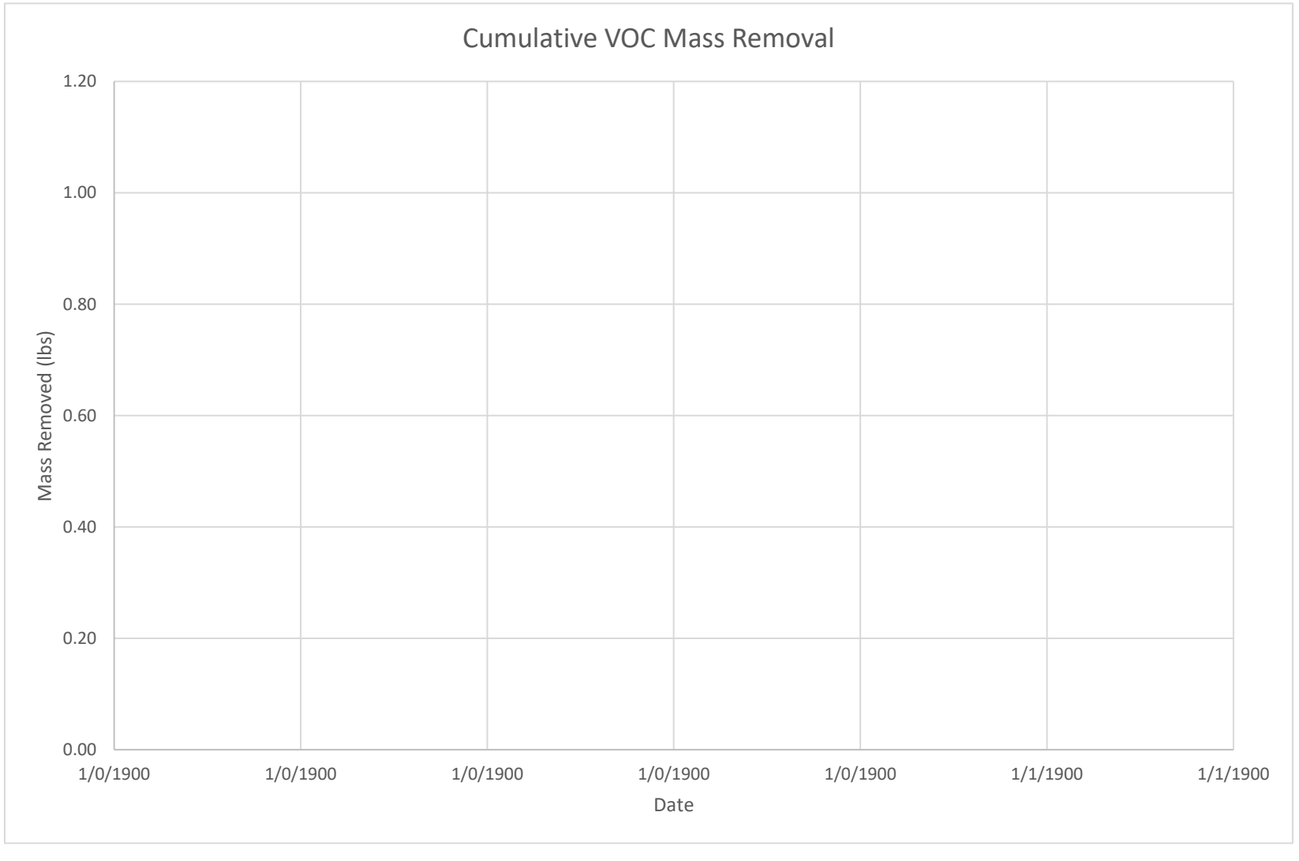


Table 4

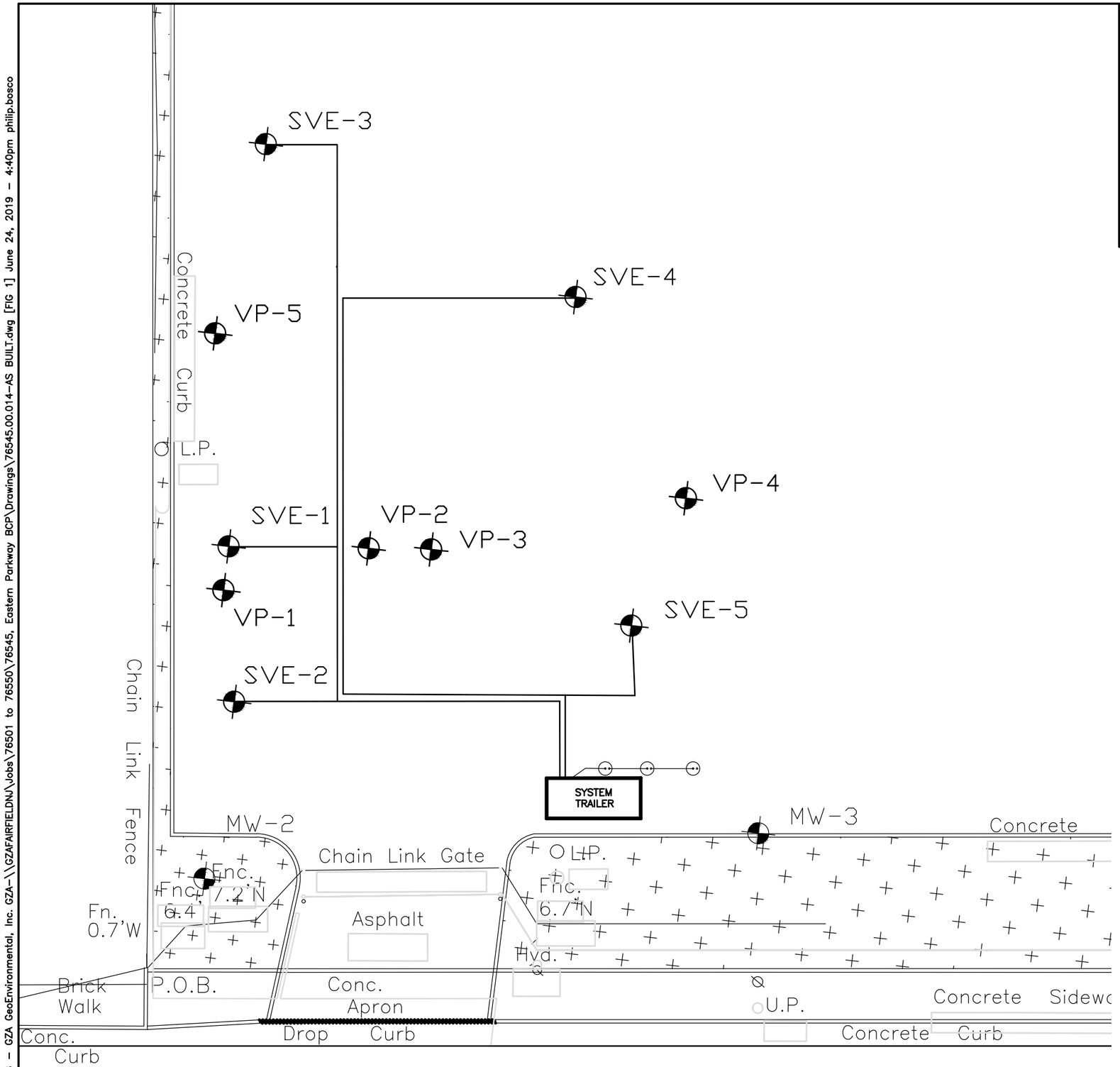
DPK Consuling, LLC
220 Old New Brunswick Road Suite-201 Piscataway, New Jersey 08854
Telephone: 732.764.0100 Fax: 732.764.0990 Email: JStuhl@dpkconsulting.net

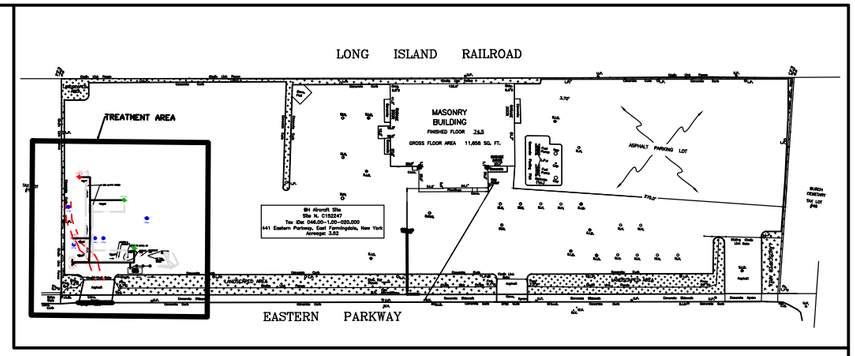
For: GZA GEOENVIRONMENTAL
Site: 441 EASTERN PARKWAY, FARMINGDALE, NY

Date of Survey: June 6, 2019
Project #19-8452 **June 7, 2019**
Horizontal Datum: NEW YORK LONG ISLAND STATE PLANE COORDINATE NAD 83
Vertical Datum: NAVD 88
BENCHMARK: NYCI CENTRAL ISLIP CORS ARP ELEV=56.49
Additional Comments:

	ELEVATIONS			COORDINATES			
MONITORING WELLS	GROUND	RIM	PVC	NORTHING	EASTING	LATITUDE (N)	LONGITUDE (W)
MW-1	76.26	76.26	75.85	208349.08	1140829.10	40°44'13.78"	73°26'05.95"
MW-2	76.02	76.06	75.83	208171.54	1140871.17	40°44'12.02"	73°26'05.42"
MW-3	75.70	75.74	75.31	208197.97	1140949.41	40°44'12.28"	73°26'04.40"
MW-4	74.71	74.84	74.33	208250.01	1141134.07	40°44'12.78"	73°26'02.00"
MW-5	72.74	72.76	72.42	208324.07	1141376.46	40°44'13.50"	73°25'58.84"
MW-6	75.71 PAVE	75.67	75.14	208506.28	1141311.67	40°44'15.30"	73°25'59.67"
SVE-1	75.68 PAVE	75.63	74.35	208215.47	1140861.46	40°44'12.46"	73°26'05.54"
SVE-2	75.45 PAVE	75.46	73.83	208193.55	1140869.10	40°44'12.24"	73°26'05.44"
SVE-3	75.93 PAVE	75.91	74.44	208274.40	1140849.03	40°44'13.04"	73°26'05.70"
SVE-4	75.37 PAVE	75.34	73.64	208266.20	1140899.82	40°44'12.95"	73°26'05.04"
SVE-5	74.78 PAVE	74.79	73.42	208221.84	1140922.24	40°44'12.52"	73°26'04.75"
VP-1	75.57 PAVE	75.57	75.03	208209.04	1140862.64	40°44'12.39"	73°26'05.53"
VP-2	75.51 PAVE	75.50	75.18	208221.39	1140881.44	40°44'12.51"	73°26'05.28"
VP-3	75.19 PAVE	75.20	74.68	208223.96	1140890.39	40°44'12.54"	73°26'05.16"
VP-4	75.02 PAVE	75.02	74.75	208242.46	1140924.36	40°44'12.72"	73°26'04.72"
VP-5	75.80 PAVE	75.80	75.40	208245.27	1140850.14	40°44'12.75"	73°26'05.69"

Figures





KEY MAP:
1" = 150'

LEGEND:

- EXISTING 2" VAPOR EXTRACTION WELL
- PROPOSED 2" VAPOR EXTRACTION WELL
- EXISTING 1" VAPOR MONITORING POINT
- PROPOSED 1" VAPOR MONITORING POINT
- BLOWER AND COMPRESSOR LOCATION
- MARKED ELECTRIC LINE
- ABOVE GROUND PIPING
- SUBSURFACE PIPING
- SLOPE DIRECTION

N W E S

0 8' 16' 32'

SCALE IN FEET 1" = 16'

NO.	ISSUE/DESCRIPTION	BY	DATE

441 EASTERN PARKWAY
FARMINGDALE, NEW YORK

APPROVED:

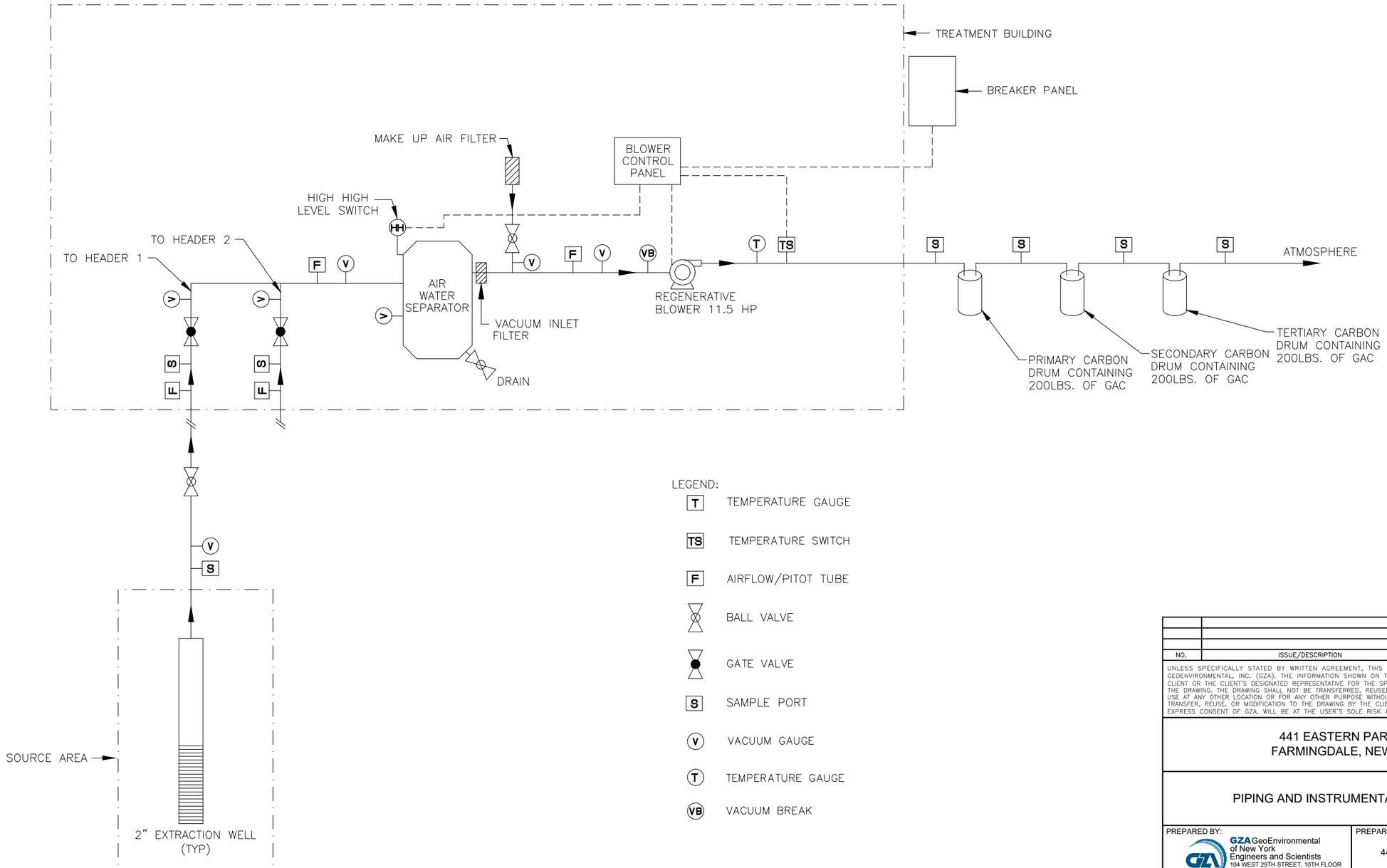
ERNEST R. HANNA
NY P.E. 065440

FULL SCALE SOIL VAPOR EXTRACTION SITE PLAN

PREPARED BY:
GZA GeoEnvironmental of New York
Engineers and Scientists
104 WEST 29TH STREET, 10TH FLOOR
NEW YORK, NEW YORK 10001

PREPARED FOR:
441 EASTERN PARKWAY, LLC

PROJ MGR: DW	REVIEWED BY: SK	CHECKED BY: DW	FIGURE 1
DESIGNED BY: BJ	DRAWN BY: PB	SCALE: 1" = 16'	
DATE: APRIL 2019	PROJECT NO. 12.0076545.00	REVISION NO.	SHEET NO. 1 OF 4



LEGEND:

- T — TEMPERATURE GAUGE
- TS — TEMPERATURE SWITCH
- F — AIRFLOW/PITOT TUBE
- BALL VALVE
- GATE VALVE
- S — SAMPLE PORT
- V — VACUUM GAUGE
- T — TEMPERATURE GAUGE
- VB — VACUUM BREAK

NO.	ISSUE/DESCRIPTION	BY	DATE

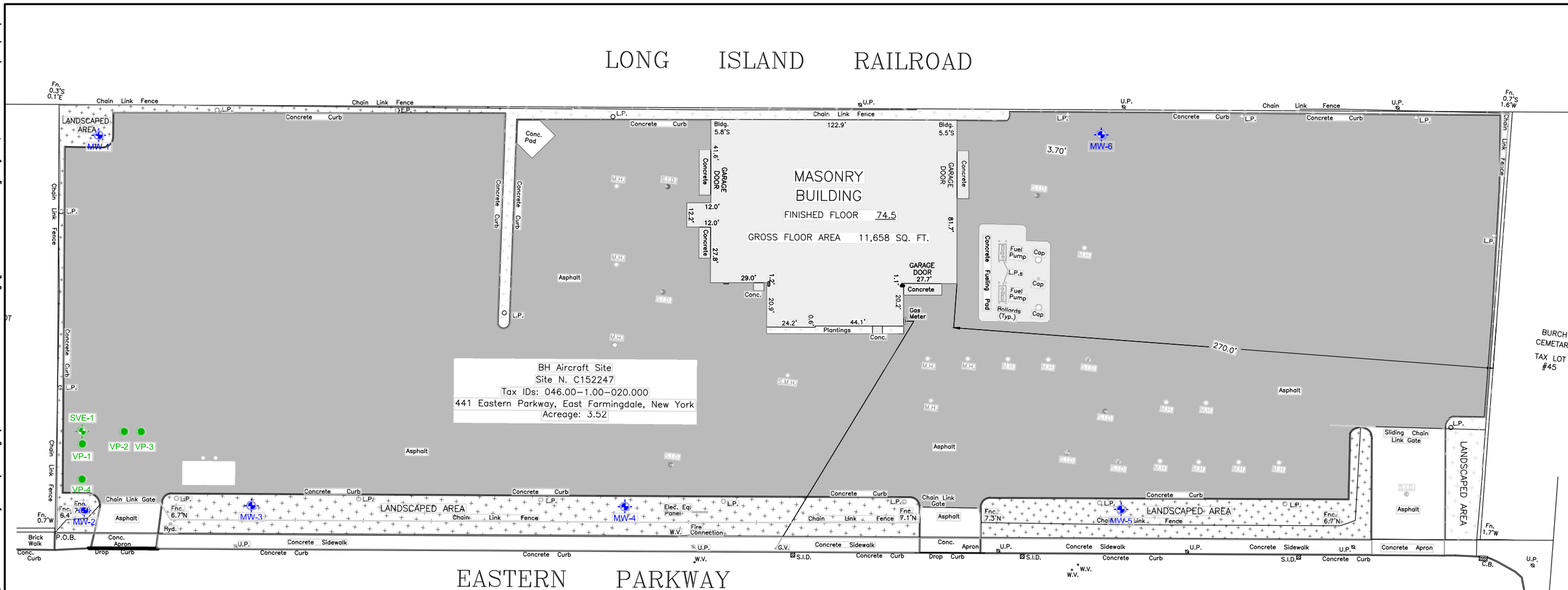
441 EASTERN PARKWAY
FARMINGDALE, NEW YORK

PIPING AND INSTRUMENTATION DESIGN

PREPARED BY:
GZA GeoEnvironmental of New York
Engineers and Scientists
104 WEST 29TH STREET, 10TH FLOOR
NEW YORK, NEW YORK 10001

PREPARED FOR:
441 EASTERN PARKWAY, LLC

PROJ MGR: DW	REVIEWED BY: BP	CHECKED BY: DW	FIGURE 2
DESIGNED BY: BR	DRAWN BY: MT	SCALE: NOT TO SCALE	
DATE: DECEMBER 2018	PROJECT NO. 12.0076545.00	REVISION NO.	SHEET NO.



NO.	ISSUE/DESCRIPTION	BY	DATE

441 EASTERN PARKWAY
FARMINGDALE, NEW YORK

SURVEYED WELL LOCATIONS

APPROVED:

ERNEST R. HANNA
NY P.E. 065440

PREPARED BY:
GZA GeoEnvironmental of New York
Engineers and Scientists
104 WEST 29TH STREET, 10TH FLOOR
NEW YORK, NEW YORK 10001

PREPARED FOR:
441 EASTERN PARKWAY, LLC

PROJ MGR: DW	REVIEWED BY: SK	CHECKED BY: DW	FIGURE 3
DESIGNED BY: BJ	DRAWN BY: PB	SCALE: 1" = 16'	
DATE: APRIL 2019	PROJECT NO. 12.0076545.00	REVISION NO.	SHEET NO. 2 OF 6

Appendix A

Blower Specifications

AIRTECH® VACUUM

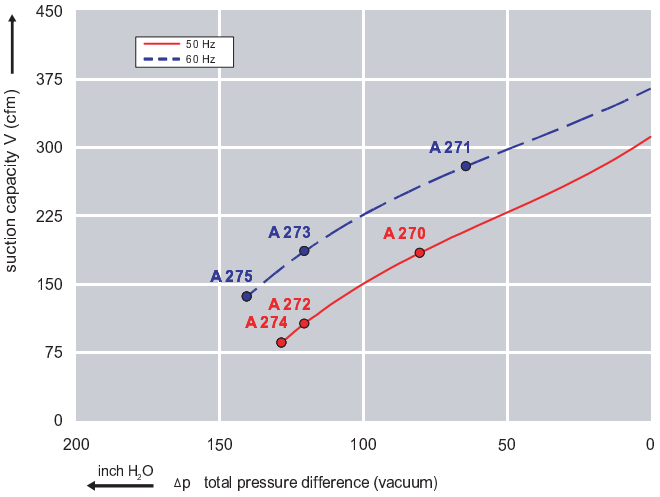
3BA1800

Vacuum/Pressure Regenerative Blower

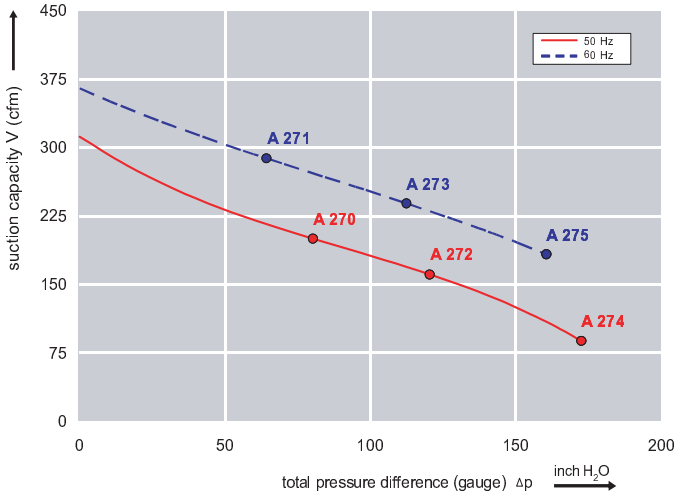
Features:

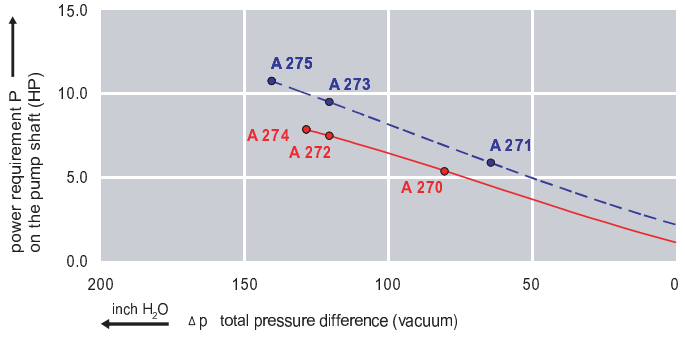
- Cooler running, outboard bearing provides maintenance-free operation
- Environmentally friendly oil-free technology
- Extremely quiet operation
- All motors are standard TEFC with Class F insulation, UL recognized, CE Compliant
  Explosion-Proof motors available
- Custom construction blowers are available
- Rugged die cast aluminum construction

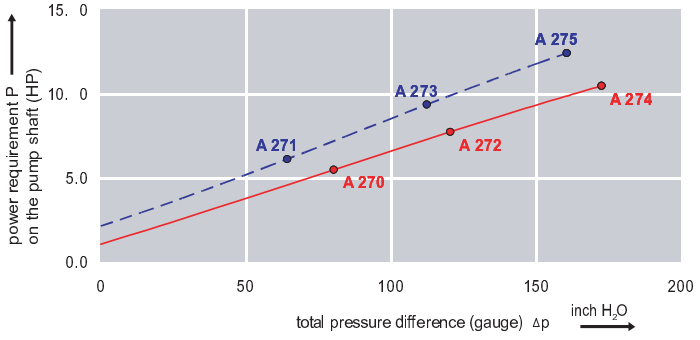
Performance curve for Vacuum pump

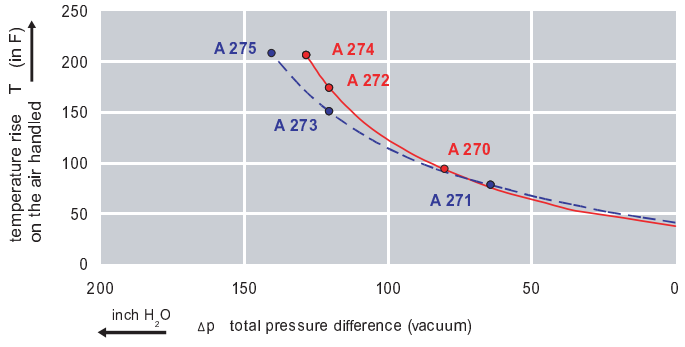


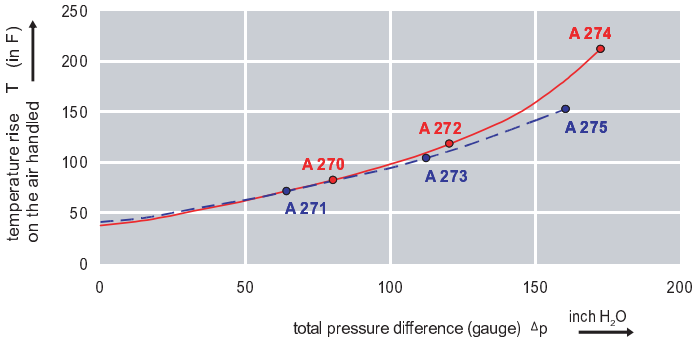
Performance curve for Compressor







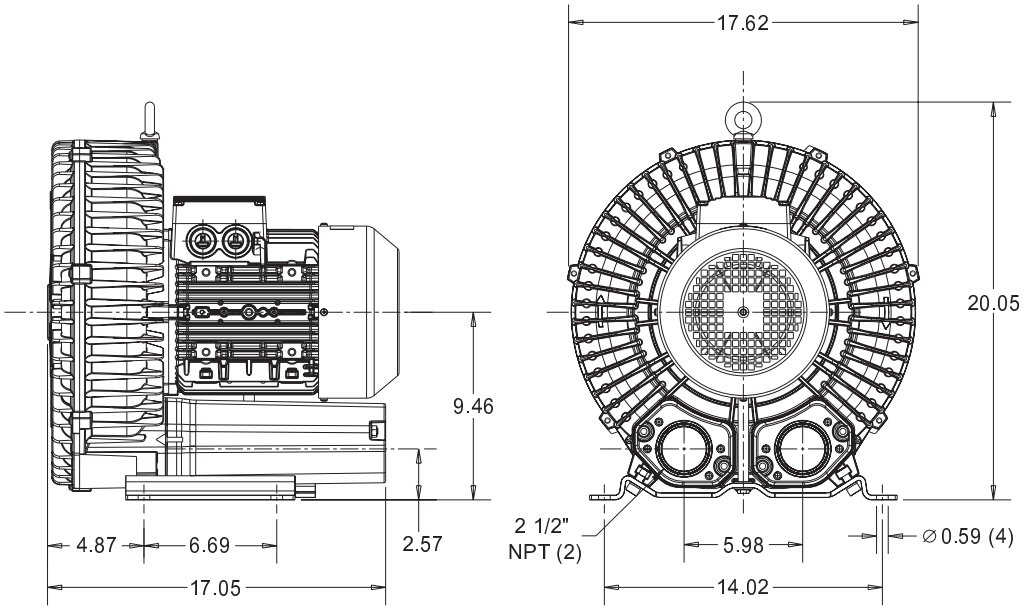




3BA1800

Vacuum/Pressure Regenerative Blower

Dimensions: (inches)



Recommended Accessories:

Relief valve:

VC81Z (Vacuum)

PC81Z (Pressure)

Filter:

ATF-250-15124/1 (Vacuum)

AFS-230-250-10 (Pressure)

Specifications subject to change without notice. Please contact factory for specification updates.

Selection & Ordering Data - Type 3BA1800

Curve No.	Order No.	Frequency Hz	Rated power HP	Input Voltage V		Input Current A		Permissible total differential pressure Vacuum inch H2O	Permissible total differential pressure Compressor inch H2O	Sound pressure level	lbs
3~ 50/60 Hz IP55 insulation material class F											
A 270	3BA1800-7AT06	50	5.36	200D ... 240D	345Y ... 415Y	15.6D	9.0Y	-80	80	70	128
A 271	3BA1800-7AT06	60	6.16	220D ... 250D	415Y ... 460Y	15.2D	8.5Y	-64	64	74	128
A 272	3BA1800-7AT16	50	7.37	200D ... 240D	345Y ... 415Y	23.0D	13.3Y	-120	120	70	143
A 273	3BA1800-7AT16	60	8.44	220D ... 250D	415Y ... 460Y	23.0D	13.3Y	-120	112	74	143
A 274	3BA1800-7AT26	50	10.05	200D ... 240D	345Y ... 415Y	29.0D	16.7Y	-128	173	70	150
A 275	3BA1800-7AT26	60	11.52	220D ... 250D	415Y ... 460Y	27.5D	15.0Y	-141	161	74	150

Suitable for 208 Volt Operation

All curves are rated at 14.7 psia and 68° F ambient conditions and are reported in SCFM referenced to 68° F and 14.696 psia sea level conditions. Curve values are nominal, actual performance may vary by up to 10% of the values indicated. For inlet temperatures above approximately 80 °F or for handling gases other than air, please contact your Airtech sales representative for assistance.

Appendix B

Job Hazard Analysis

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Groundwater Sampling		
Analysis By: Andrew Whitsitt	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: October 2, 2011 **Revised: June 15, 2012**	**Date: June 15, 2012**	**Date: June 26, 2012**

Task 4.2
GROUNDWATER SAMPLING

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
Review Related THA's – 21.1 – General Outdoor Field Work		
Deploying Traffic Protection Equipment	Personal injury due to vehicle traffic; Collisions, injuries	GZA drivers shall be properly licensed and abide by driving safety procedures. Inspect vehicle to determine if it is in safe operating condition.
		Park in designated parking locations, or select off-road areas that are firm and without hazards. Directly observe parking location on foot if necessary.
		Use emergency flashers or other appropriate vehicle warning system as appropriate to local conditions.
		Utilize police detail (when necessary) to direct traffic while entering traffic safety zone, if applicable.
Handling Flammable Liquids	Fire Hazards	Use only approved fuel containers for fuel, heavy duty metal cans with stable base and self closing nozzle is recommended.
		Store flammable liquids in an appropriate area when not in use.
		Provide working fire extinguisher with current inspection certificate with the sampling equipment.
		Observe GZA's "no smoking" policy at all work sites.
Mobilizing Equipment	Collision; struck by	Perform a pre-operation check of the vehicle, ensuring service brakes, parking brake, steering, lights, tires, horn, wipers mirrors, and glass are in good condition. Do not drive a vehicle that is not roadworthy.
		All vehicle occupants shall wear seat belts.
		Secure loose materials in the cab or bed of the vehicle.
		Keep the windows and lights clean.
		Do not operate the vehicle if it is in an unsafe condition.
		Abide by driving safety procedures and laws.
Positioning vehicle at monitoring well	Unstable, uneven terrain and ground obstacles	Locate the vehicle on stable ground.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Groundwater Sampling		
Analysis By: Andrew Whitsitt	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: October 2, 2011 **Revised: June 15, 2012**	**Date: June 15, 2012**	**Date: June 26, 2012**

Task 4.2
GROUNDWATER SAMPLING

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
	Backing Collisions	Avoid wet areas/mud when possible.
		Assess the need for blocking/chocking wheels..
		If possible, avoid backing by taking a route that allows you to pull straight through.
		If you must back, do a complete walk around the vehicle to look for objects that could be struck or run over by the vehicle.
		Use a spotter when available to help guide the backing safely.
		Look over shoulders and glance back to make sure fenders are clearing objects. Back out slowly.
Well Sampling	Hazardous material contact	Identify wells with hazardous concentrations of contaminants.
		Sample wells in order from least to most impacted.
		Wear proper gloves specified in the project HASP when handling jars, preservatives could leak during shipment from the laboratory.
	Cuts and bruises from Sample jar	Do not over-tighten glass jars (especially VOAs); they can break, causing a laceration.
	Exposure to Hazardous Substances	Become familiar with the hazards associated with hazardous commercial products used while groundwater sampling (laboratory preservatives, decontamination solutions, etc.). Review Safety Data Sheets (SDS) for such products.
		Wear proper personal protective equipment (PPE) as specified in the Health and Safety Plan (HASP) to avoid direct contact with Site contaminants, calibration solutions, decontamination supplies, and laboratory preservatives.
		Respiratory protection as specified by the HASP must be available and used when necessary.
		Decontamination procedures as specified in the HASP must be followed.
Sampling Equipment Operation	Splashes, electrical shocks, fires, caught by	Perform an equipment observation before use; pumps, flow meters, and water quality meters must be calibrated and in good working condition.
		Use GFCI with all electrical cords.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Groundwater Sampling		
Analysis By: Andrew Whitsitt	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: October 2, 2011 **Revised: June 15, 2012**	**Date: June 15, 2012**	**Date: June 26, 2012**

Task 4.2
GROUNDWATER SAMPLING

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		All equipment (especially generators) must be properly grounded.
		Completely shut down all equipment prior to conducting maintenance activities, fueling, servicing or repairs. Follow lock-out/tag-out procedures as needed.
	Manual lifting, equipment handling	Use proper lifting techniques when lifting equipment (generators, pumps, air compressors, tubing, etc.) Seek assistance with heavy loads.
		Use work gloves where appropriate to prevent hand injuries.
		Wear steel toed boots.
		When containerizing water, do not try to carry more than you can safely carry. It is better to make multiple trips.
	Noise	Wear appropriate hearing protection during activities that produce noise (running generators, pumps, air compressors, etc.)
	Slips, trips and falls	Maintain a clean and sanitary work area free of tripping/slipping hazards.
		Store hand tools in their proper storage location when not in use.
		Provide adequate space for each employee to work safely with sound footing.
		Provide adequate lighting.
	Tool-related hazards	Do not use electrical tools with damaged cords or other electrical components.
		Observe proper electrical safety practices.
		Properly maintain tools; do not use damaged tools.
		Wear eye protection.
		Store and carry tools correctly.
		Use the correct tool for the job.
		Protect from gouges, hammer blows, cutting tools, etc. Position your hands to prevent injury in case the tool slips while in use.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Soil-Gas Sampling		
Analysis By: Joseph DiAntonio	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: September 30, 2011 **Revised: June 22, 2012**	**Date: June 22, 2012**	**Date: June 26, 2012**

Task 4.5
Soil-Gas Sampling

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
Review Related THA's – 21.1 – General Outdoor Field Work		
Collection of Soil-Gas for Sampling	Exposure to Hazardous Substances	Become familiar with hazards through review of Task Hazard Analysis and participate in daily safety tailgate meetings.
		Communicate Task Hazard Analysis and Lessons Learned information to GZA field crew prior to initiating work and throughout the project as needed.
		Be alert for hazardous site contaminants (as indicated by odor, visual characteristics, location, and site history).
		Wear appropriate safety equipment as required by the Site Specific Health and Safety Plan (HASP) work area (hard hat, steel toe boots, work clothes, high visibility vest, eye and hearing protection, etc.). Implement work practices identified in the HASP.
		Be familiar with hazards associated with products used where samples will be collected and potential compounds of concern during the remedial investigation.
		Review and have Safety Data Sheets (SDSs) available on site for chemicals being used on site.
	Slips, Trips, and Falls	Become familiar with physical site specifics to reduce or eliminate slips, trips and falls due to uneven surfaces, onsite equipment, discarded materials, or working at height.
	Underground Utilities	Proper utility locations/clearance must be performed and the area checked for evidence of underground features prior to breaking ground. Review and comply with GZA Policy 04-0301 *Responsibility for Utility Clearance of Exploration Locations* .
	Electrical Conductor Hazards	Identify location of electrical conductors and maintain minimum approach distance of 25 feet.
	Poor visibility	Provide additional portable lighting if natural lighting is not adequate for performing the work safely.
	Manual Lifting, Equipment Handling	Use proper lifting techniques when lifting/moving objects or equipment to gain access into survey areas. Seek assistance with heavy loads.
		Use work gloves where appropriate to prevent hand injuries.
		Wear steel-toed work shoes.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Soil-Gas Sampling		
Analysis By: Joseph DiAntonio	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: September 30, 2011 **Revised: June 22, 2012**	**Date: June 22, 2012**	**Date: June 26, 2012**

Task 4.5
Soil-Gas Sampling

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
	Personnel Decontamination	All personnel, clothing, and equipment leaving the contaminated area of the site must be decontaminated to remove any harmful chemicals or properly disposed.
Sampling Near or In Roadways:	Personal Injury Due to Vehicular Traffic	Wear high visibility safety vest when out of vehicle and in areas with vehicular traffic.
		Park vehicle in designated parking locations, or select off-road area that is firm, and without hazards. Directly inspect parking location on foot if necessary.
		If parking outside of a designated parking area, demarcate vehicle with traffic cones or equivalent.
		Use emergency flashers or other appropriate vehicle warning system as appropriate to local conditions when parking vehicle.
		Use police detail (if necessary) to direct traffic while
Manual Installation of Sample Points	Cuts, Bruises, Shocks, Lacerations, Sprains and Strains	Observe proper electrical safety practices. Do not use electrical tools with damaged cords or other electrical components.
		Tools must be properly maintained; do not use damaged tools.
		Wear proper Personal Protective Equipment.
		Store and carry tools correctly.
		Use the correct tool for the job.
		Unplug tools or remove batteries when servicing or changing bit, blades, abrasive wheels or other components.
		Protect your “off hand” from gouges, hammer blows, cutting tools, etc. Position your “off hand” to prevent injury in case of slip of the tool.
Generator Use	Fire / Burn Hazards from Generator Used to Power Drill,	All flammable/combustible liquids must be stored in proper containers.
		A fire extinguisher (10 # class B/C, minimum) must be present on site.
		Generator must be placed on level, stable ground. Keep exhaust port/pipe away from potential flammable materials (i.e., dry brush, oily rags, etc).
		Use care when working around hot exhaust port/pipe.
		If a fuel powered generator is being used take precautions to prevent carbon monoxide and other exhaust fume build up on the work area and other potential areas occupied by personnel.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Soil-Gas Sampling		
Analysis By: Joseph DiAntonio	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: September 30, 2011 **Revised: June 22, 2012**	**Date: June 22, 2012**	**Date: June 26, 2012**

Task 4.5
Soil-Gas Sampling

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Vent outside of the work area away from other personnel/occupants. Where necessary have CO detector available to warn of hazardous concentrations.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Remediation Systems O&M		
Analysis By: Michael McCoy, CIH	**Reviewed By: Benjamin Sallemi, Ph.D.**	**Approved By: Jayanti Chatterjee , CIH**
Date: September 26, 2011 **Revised: June 26, 2012**	**Date: June 26, 2012**	**Date: June 28, 2012**

Task 18.0
Remediation Systems O&M

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
Review related THAs: 21.1 - Outdoor Fieldworkd		
Operation and Maintenance of Remediation Systems	Hazardous Energy	Consult the O&M manual for the treatment system equipment components and know how to properly control hazardous energy before working on equipment.
		Utilize lockout/tagout procedures if project work is to occur on or around any energized equipment. See GZA policy on Control of Hazardous Energy - Lockout/Tagout and address hazards in the site-specific health and safety plan.
		Review GZA's Electrical Safe Work Practices Program 03-3003.
		Utilize only properly grounded electrical tools and equipment, and insure cords are free from wear.
		Do not run electrical cords through or around areas of water.
		When necessary and internal GZA expertise and training is not available hire a licensed electrician for appropriate electrical repairs and or maintenance.
		Review and abide by signage regarding electrical hazards at remediation sites.
	Mechanical Hazards	Evaluate equipment for possible pinch points, crush points and other potential mechanical hazards.
		Maintenance of remediation systems often requires use of hand tools. Select the correct tool and gloves as necessary for each project per the site-specific health and safety plan.
	Chemical Hazards	Evaluate and address controls for chemical hazards of each project in the site-specific health and safety plan. Chemicals may be utilized in the maintenance or cleaning of the system.
		Store water treatment chemicals and other chemicals to be used on site in their proper containers and in proper storage areas. Review and maintain Safety Data Sheets (SDSs) for chemicals being used on site. Use proper PPE when handling chemicals.
		When necessary provide for proper eyewash and safety showers for washing off caustic chemicals.
	Slips, Trips and Falls	Work around remediation systems, especially equipment utilized for treating groundwater and product may present slip hazards. Wear slip resistant boots on projects where water could be present on the floor.

Job: Remediation Systems O&M		
Analysis By: Michael McCoy, CIH	**Reviewed By: Benjamin Sallemi, Ph.D.**	**Approved By: Jayanti Chatterjee , CIH**
Date: September 26, 2011 **Revised: June 26, 2012**	**Date: June 26, 2012**	**Date: June 28, 2012**

Task 18.0
Remediation Systems O&M

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		If ladders are to be utilized, assess if they are the appropriate type, in good repair and can hold the appropriate load.
	Working Alone	Review GZA's Working Alone Policy if project involves solo work at a remediation system project site.
		Sign out or call into the office to leave site specific information where you are working, the anticipated duration/hours of work on site. Do this for each site if multiple in one day.
		Call office or the person identified as the emergency contact in the HASP when off site.
	Site Specific Hazards	Remediation systems may be in abandoned or unoccupied facilities in a variety of environments from rural to urban. Address site specific hazards in the health and safety plan.
		A variety of environmental conditions may exist including high or low temperatures, wind and other weather conditions. Address these hazards in the site-specific health and safety plan.
		Remediation systems treat a variety of water pollutants, using various chemicals. Address chemical hazards of water pollutants and treatment chemicals in the site specific health and safety plan. Wear proper PPE.
		Insects, rodents and other vermin. Consider using appropriate repellant, and avoid contact with vermin and nest areas. Utilize wasp or bee insecticide during insect season, as appropriate.
		Confined spaces such as tanks and pits may present as part of remediation treatment systems that may need occasional cleaning and/or maintenance. Only trained personnel are allowed to work in confined spaces. All confined space work shall be in accordance with GZA's Confined Space Program.
	Fire Hazards	Refer to chemical SDS for proper handling, storage and use of chemicals.
		Store flammable combustible chemicals in proper containers and in areas away from sparks and heat generating equipment.
		Provide the appropriate fire extinguishers in the remediation treatment area and know their locations and how to use them.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Field Sampling

Analysis By: Christie Wagner	**Reviewed By: Jayanti Chatterjee, CIH**	**Approved By: Jayanti Chatterjee, CIH**
Date: November 4, 2011 **Revised: July 12, 2012**	**Date: July 12, 2012**	**Date: July 12, 2012**

Task 20.11
Field Sampling

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
Review Related THA's – 21.1 General Outdoor Field Work		
Pre work task for site visit	Adverse Weather Conditions	Assess weather conditions prior to on-site work and examine forecast for anticipated period of work.
		Dress appropriately for weather conditions (e.g., precipitation, temperature ranges over anticipated duration of field work).
		Use protective ointments such as sunscreen and chap stick, as appropriate to the field conditions.
		Be aware of the anticipated weather conditions prior to mobilization to the site. Unacceptable field work conditions are not precise, but may include site specific conditions, general location, extreme weather conditions (e.g., icing, lightening, excessive cold or wind), travel conditions, and other factors. Professional judgment is required, and personal assessment of safety must always be individually assessed.
Conduct visual inspection of site	Dangerous Terrain	Be aware of the site terrain, watch for holes and rocks that can be tripping hazards
		Learn to identify and watch for plants such as thorn bushes and poision ivy that can either scratch you or give you a rash.
Collecting sample	Muscle strain from lifting heavy objects	Use proper lifting techniques. Use appropriate mechanical assistance and tools when possible. Wear work gloves and steel toed boots.
	Exposure to unknown sample	Be sure to treat effluent samples as unknowns and wear the proper PPE.
		If there are any unusual odors/fumes coming from a sample, especially those that cause reactions in the eyes or nose, leave the area and inform a supervisor immediately.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
Pre-work preparation	Overlooking of potential hazards	Become familiar with project area and job site by reviewing available on-line mapping (USGS Topographic, NWI Wetland, NRCS Soil, etc.; and aerial photographs before visiting site. Understand related hazards through review of this and other Task Hazard Analyses and participate in daily safety tailgate meetings (where applicable).
		Communicate Task Hazard Analysis and Lessons Learned information to operator(s) prior to initiating work and throughout the project as needed.
Driving to site	Vehicle accidents/collisions/injuries	Perform pre-operation check of vehicle, verifying service brakes, parking brake, steering, lights, tires, horn, wipers mirrors and glass are in good condition. verify that the rig is roadworthy.
		Wear seat belts always when driving even on site.
		Secure loose materials in cab or bed of vehicle.
		Keep windshields, windows and lights cleans.
		Abide by safe driving procedures.
	Backing collisions	If possible avoid backing by using a route that allows you to pull through.
		If backing up from a parked area do a quality 360 walker.
Working within transportation corridors or active construction sites	Collisions injuries	Wear high visibility safety vest on site when out of personal or GZA vehicle.
		Park vehicle in designated parking locations, or select off-road area that is firm, and without hazards. Directly inspect parking location on foot if necessary.
		Use emergency flashers or other appropriate vehicle warning system as appropriate to local conditions when parking vehicle.
		Use emergency flashers or other appropriate vehicle warning system when parking outside of standard parking spaces, or to stop in right-of-
		Be alert at all times; never step outside traffic cones.
		Stand clear of moving heavy equipment and away from any overhead utility lines until equipment is safely in position and parked properly and securely by the contractor.

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Do not wear headphones or earbuds, or listen to music or talk on the phone, which may distract from work hazards.
	Crossing Automobile traffic lanes	Wear high visibility safety vests at all times when out of vehicle and working within or adjacent to the roadway.
	Crossing Airport Movement Areas (e.g., Runways, taxiways, approaches)	Learn, know, and conform to project site Airport's, Airfield's, or Airbase's protocol for crossing movement areas (whether on foot or in vehicle).
		Work within airport movement areas or safety zones must be coordinated with the Air Traffic Control Tower.
		Vehicles to have blinking or flashing lights or beacons; pedestrians to wear high visibility safety vests.
		Using protocol, maintain communication with airport security and air traffic controllers.
	Crossing Railways	Work within active railroad ROWs requires railroad safety training. No work can be done within the railroad traffic envelope without the permission of a railroad flagman.
		No equipment or vehicles can cross without the permission of a railroad flagman.
		Expect any train on any track coming from either direction at any time.
Working in Natural or Remote Areas	Slips, trips, fall	Be aware of loose ground materials such as talus, unconsolidated rock, soil, sediment, ice and other media that could cause slips, trips or falls.
		Be careful when walking in heavily vegetated areas. Mind tangles of vines, thorny branches, and slippery logs and rock surfaces. Dense vegetation and especially entangled vines present trip hazards, or can mask voids, sharp objects, or other hazards beneath.
		Be vigilant for signs of cracking, shifting, fracturing, and evidence of past movement.
		Use wood mats or other stabilizing materials for equipment if soft ground conditions are present.
		Use walking stick, auger, or ski poles to steady yourself when traversing loose material or slopes.

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Wear proper footwear for conditions.
		Store tools in their proper storage location when not in use.
		Provide adequate lighting when necessary.
	Falls into excavations/ voids	Stand away from edges of excavations and voids. Do not attempt access without proper equipment / training. Remember that some excavations or voids may constitute a confined space and may present structural stability issues.
	Cave-ins and engulfment	DO NOT enter caves, sinkholes, excavations, and other voids or concavities that are not sloped or shored properly and have not been evaluated by a competent person to be safe.
		Stand away from edges of excavations, cliffs, dug wells, and other voids.
		Watch for cracks/fissures in the ground surface in the immediate vicinity of a pit or void, which indicate imminent sidewall failure/cave-in.
		Assess if confined space entry procedures need to be implemented.
		Before entering void (if required to do so and with proper training) be aware of any hazards at the surface (boulders, equipment) which may fall into the void.
Working among hazardous biota	Plant toxins Incidental contact	Know the appearance of poison ivy and poison sumac in all seasons, and if sensitive to these toxins, carry and use special cleaning soaps/solutions when thought to be exposed. Stock first aid kit with poison ivy/sumac cleaning soaps/solutions.
	Ticks	Ticks carry risk of Lyme's and other Diseases. Tick season is basically any field day above 40 degrees F.
		Tuck pants into long socks.
		The application of DEET (or permethrin pre-treatment) to clothing in season to control exposure to ticks is recommended.
		Check clothing for ticks frequently.
		Check whole body immediately upon returning from field and shower.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
	Mosquitoes	Be aware of intermittent seasonal reports of mosquito borne diseases, such as West Nile disease and Eastern Equine Encephalitis (EEE), and their locations relative to your field site. Use of DEET or other mosquito repellant is recommended.
	Stinging bees and wasps	Be aware of potential cavity, suspended or ground nesting bee/wasp/hornet nests. Avoid undue disturbance or approach with appropriate safety clothing, protection and netting.
		Take appropriate precautions if allergic to bees. Carry at least two epi-pens in first aid kit as well as anti-histamines (oral and inhalers).
		Avoid areas of heavy bee activity if allergic. Avoid perfumed soaps, shampoos, deodorants, colognes, etc. that may attract bees.
	Poisonous Snakes	Be aware of terrain likelihood of harboring poisonous snakes in your work zone. Avoid reaching or stepping into hidden areas (such as into wood pile, rock pile, debris pile, stone wall, etc.) without pre-inspection.
		Coordinate with local hospitals to verify they have proper anti-venom in stock.
		Learn first aid procedures in case of poisonous snake bite.
		Devise an action plan and include in the site-specific HASP.
	Wild Animals	Do NOT handle wildlife unless properly trained to do so.
		Beware of any wild animal that shows no sign of wariness of humans.
		Do NOT attempt to feed wild animals or to help apparently injured wild animals.
		Be aware of domestic animals that may also pose a threat such as dogs off leash, bulls out to pasture, etc.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
Working in Adverse Weather Conditions	Heat / cold stress and other weather related hazards	Assess weather conditions prior to on-site work and examine forecast for anticipated period of work.
		Dress appropriately for weather conditions (e.g., precipitation, temperature ranges over anticipated duration of field work). Include clothing and the presence / absence of shade when calculating a heat index.
		Schedule work day to avoid working during hottest or coldest parts of the day, to the extent practicable.
		Keep exposed skin covered in extremely cold weather.
		Recognize signs of frostbite; use warming packs and layer clothing to maintain warmth.
		Use a wicking layer of clothing against your body to keep moisture away from skin.
		Wool clothing will continue to keep you warm after it becomes wet; cotton will not.
		Use protective ointments such as sunscreen and chap stick, as appropriate to the field conditions.
		Stay hydrated in hot weather; drink fluids regularly throughout the day, even if not thirsty.
		Recognize signs of heat stress; take frequent breaks in shade when working in direct sunlight for prolonged periods.
		Be familiar with Heat index chart - add 20 degrees to chart if fully clothed and if working in direct sunlight.
		NOTE: Unacceptable field work conditions are not precise, but may include site specific conditions, general location, extreme weather conditions (e.g., icing, lightning, excessive cold or wind), travel conditions, and other factors. Professional judgment is required, and personal assessment of safety must always be individually assessed.
	Working on Ice	Assess relative load bearing capacity of ice on lakes, ponds and other waterways. If unsure do not venture onto the ice.
		Wear proper footwear modified for traction on ice.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
	Electrical storms	If lightning is observed during drilling activities, work shall be suspended immediately and employees shall find suitable shelter (building or vehicle at minimum). Work will commence no sooner than 30 minutes after the last indications of lightning have been observed
		Seek shelter inside a walled building or your vehicle.
		Open picnic pavilions and under trees are not adequate shelters.
		Assess vulnerability to lightning strikes as soon as thunder is heard on the horizon. Open areas and higher elevations are more susceptible to strikes.
		Tall objects such as metal towers and flag poles may attract lightning.
		Consult internet weather radar tracking devices to learn of impending storm patterns proximal to your work area.
	High Winds	Avoid working at high elevations, elevated platforms, and other exposed areas during high wind conditions.
		Assess work area for equipment that may be blown down, over, or carried aloft by high winds.
Working in areas without sanitary facilities	Hygiene related hazards	Provide hand washing kits (e.g., baby wipes, hand sanitizers, paper towels, bottled water, etc.) to be used prior to eating and drinking.
		Have garbage bags handy to collect trash.
Working in remote areas	Emergency Conditions	Be familiar with onsite emergency procedures and route to nearest hospital.
		Have a first aid kit available; know its contents and how to use them.
		Carry a cell phone during all field work for emergency purposes, and confirm the nearest location of cell phone signal on site prior to start of worksite.
	Disorientation	Plan your route and anticipated progress prior to field work.
		Have multiple navigation aids (e.g., USGS Map, compass, GPS, etc.) and know how to use them before entering field. Remember to have charged batteries and battery back-ups for electronic devices.
		Share your progress plan with office staff prior to entering the field.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Check in with office personnel periodically to update progress.
		Review and comply with GZA's Working Alone Policy 03-1009 in advance of working alone on a project site.
	Hunting	Be familiar with the various game hunting seasons. Follow rules and guidelines for remaining visible to hunters.
		Try to plan work around active hunting seasons or daily peak hunting hours as warranted.

APPENDIX J – FIELD SAMPLING AND QUALITY ASSURANCE PROJECT PLAN

Proactive by Design

FIELD SAMPLING PROCEDURES/ QUALITY ASSURANCE PROJECT PLAN

FORMER B.H. AIRCRAFT
441 EASTERN PARKWAY
FARMINGDALE, NEW YORK

NYSDEC Site No. C152247

July 18, 2019
12.0076545.00

PREPARED FOR:
441 Eastern Parkway, LLC
37-14 36th Street
Long Island City, NY 10111

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1.0 INTRODUCTION

GZA GeoEnvironmental of New York (GZA) has developed this Quality Assurance Project Plan (QAPP) to establish the procedures for sample collection, analysis and quality assurance for groundwater and soil vapor extraction (SVE) system monitoring to be performed at 441 Eastern Parkway, Farmingdale, New York (the Site). Sampling and analytical activities will be conducted in accordance with this QAPP, and the applicable requirements of the New York State Department of Environmental Conservation (NYSDEC).

1.1 PROJECT SCOPE

This QAPP describes field, analytical and reporting standard operating procedures (SOPs) that will be utilized during monitoring. The information and data collected will be utilized to assess the environmental conditions at the Site. These procedures generally apply to the following activities:

- Groundwater monitoring well installation
- Monitoring well sampling
- Sampling procedures for emerging contaminants per- and poly-fluoroalkyl substances (PFAS)
- Monitoring well gauging
- SVE system influent/effluent sampling
- Waste characterization sampling
- Laboratory analysis
- Report preparation

1.2 PROJECT OBJECTIVES

This QAPP was prepared to ensure that field sampling procedures, selected analytical methods, and chemical analytical data are of sufficient quality to meet the intended usage. As specific conditions and additional information warrant, this QAPP may be amended or revised to include Site-specific quality assurance/quality control (QA/QC) procedures. The information/data collected during monitoring will be used to evaluate the effectiveness of monitored natural recovery of groundwater conditions, to evaluate groundwater flow direction, and to evaluate soil vapor concentrations in the southwestern corner of the Site.

1.3 SAMPLE DESIGN AND RATIONALE

The monitoring sampling program has been designed to evaluate soil vapor concentrations in the southwestern corner of the Site and groundwater conditions both upgradient and downgradient of the Site following capping and renovation activities.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

A description of specific roles and responsibilities is provided below.

The Project Manager will be responsible for:

- Initiating project activities;
- Identifying project staff, equipment, and other resource requirements;
- Interfacing with client concerning technical matters and project progress;
- Monitoring task activities, and adjusting efforts or resources, as required to help ensure that established quality objectives are maintained;
- Internal project administration; and
- Oversight of report preparation.

The Field Team Leader/Site Supervisor will be responsible for:

- Supervising the technical performance of the project staff and field subcontractors;
  Ensuring compliance with the work plan;
- Coordinating data validation and quality assurance;
- Report preparation; and
- Working with the Project Manager in coordinating overall project quality assurance including preparation of work plans and review of data.

The field team will be comprised of various members of GZA staff based on their availability.

The Health and Safety Coordinator will be responsible for working with the Project Manager and Field Team Leader/Site Supervisor in formulation of a Site-specific Health and Safety Plan.

Quality Assurance will be accomplished through the GZA Consultant Reviewer project review process.

3.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

3.1 DATA QUALITY PROTOCOLS

New York State Department of Health Environmental Laboratory Accreditation Program (ELAP)-certified laboratories will provide analytical services for the Monitoring program. Groundwater samples will be analyzed for one or more compound classes using the following analytical methods:

- Volatile Organic Compounds (VOC) by EPA Method 8260B

- Per- and Poly-fluoroalkyl substances (PFAS) by Modified EPA Method 537

SVE system influent/effluent samples will be analyzed for VOCs using the following analytical method:

- Volatile Organic Compounds in Air by EPA Method TO-15

Soil samples (for waste characterization) will be analyzed for VOCs, semi-volatile organic compounds (SVOCs), inorganics, poly-chlorinated biphenyls (PCBs) and pesticides using the following methods:

- VOCs by EPA Method 8260B
- SVOCs by EPA Method 8270D
- Inorganics; including metals, total cyanide and hexavalent chromium by EPA Method 6010C, 9010C/9012B and 7196A, respectively
- PCBs by EPA Method 8082A
- Pesticides by 8081B

Potential parameters to be analyzed, including their respective quantitation limits (QLs), and data quality levels (DQLs), are provided in **Table 1**. The proposed samples, sampling and analytical parameters, analytical methods, sample preservation requirements and containers are presented in **Table 2**.

3.2 ACCURACY

Accuracy is defined as the degree of agreement of a measurement or average of measurements with an accepted reference or true value. Accuracy will be evaluated by use of calibration and calibration verification procedures, laboratory control samples, and surrogate, matrix, and analytical spikes at the frequencies specified in Section 4.60. Not all accuracy checks are incorporated into each analytical method.

3.3 PRECISION

Precision is defined as a measure of mutual agreement among individual measurements of the sample property. Precision will be evaluated by the analysis of laboratory and matrix spike duplicate samples at the rate specified in Section 4.60. We will also collect 5% duplicate samples in the field for comparison purposes.

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

3.4 DATA REPRESENTATIVES

Samples will be collected in a standardized manner designed to produce representative samples. This QAPP is designed so that the samples collected will present an accurate representation of actual Site conditions.

3.5 DATA COMPARABILITY

Data comparability will be ensured by control of sample collection methodology, analytical methodology, and data reporting and by the usage of USEPA-approved methodologies. The QAPP and sampling methodologies are designed so that comparability questions are minimized. Standardized sampling techniques and analytical

methods will be used to attain stated project objectives. The required level of laboratory deliverables will maximize comparability of analytical results.

3.6 DATA COMPLETENESS

The number of samples to be collected is based on the need for data completeness. Data gaps will be addressed when/if they occur by systematic re-sampling and/or increasing the number of sampling points.

4.0 SAMPLING PROCEDURES

Environmental sampling will include groundwater sampling and SVE system influent/effluent vapor sampling. Groundwater samples will be collected using bladder pumps, submersible pumps or bailers. Grab or composite sampling using appropriate hand-held sampling equipment will be the preferred method for waste characterization sampling. SVE system influent/effluent air samples will be collected using laboratory supplied SUMMA™ canisters.

4.1 GROUNDWATER SAMPLING (PERMANENT WELL)

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

4.1.1 Well Installation/Construction

Groundwater monitoring wells will be constructed of threaded two-inch diameter PVC well casing and 10-slot well screen. Clean silica sand (No. 1 sand) will be placed in the annular space around the well to a minimum of one foot above the top of the well screen, two feet being optimal. Solid PVC riser, attached to the well screen, will extend to grade or above if the well is a stick-up. For a two-inch diameter well, the annular space for the filter pack should be between 6 to 8 inches thick. (The 4 ¼ inside diameter hollow stem augers will be retracted as the filter pack is installed to yield the required annular space.) A minimum two-foot thick bentonite seal will be placed above the sand pack and moistened with potable water for a minimum of 15 minutes before backfilling the remaining space with a cement-bentonite grout. If warranted by depth, filling will be completed using a tremie pipe placed below the surface of the grout. A stick-up or flush-mount protective casing with a locking well cap will be installed and a measuring point marked on each PVC well riser. Boring logs/well construction diagrams will be prepared for each well.

4.1.2 Well Development

Following installation, the groundwater monitoring wells will be developed using a two-inch diameter submersible pump(s) (or equivalent) until the water is reasonably free of turbidity. Fifty nephelometric turbidity units (NTUs) or less will be the turbidity goal but not an absolute value. The wells will be developed aggressively to remove fines from the formation and sand pack. The wells will be allowed to equilibrate for at least 14 days prior to sampling. The volume of water removed, the well development time, and field instrument readings will be recorded in the field logbook.

4.1.3 Low-Flow Well Sampling

Upon opening each monitoring well, the headspace will be measured using a photo ionization detector (PID) and water level measurements will be recorded using an electronic water level meter or oil-water interface probe, as appropriate. The depth to product (if present), depth to water, and the total depth will be measured from the top of the marked PVC casings to an accuracy of 0.01 feet. Before sampling, the wells will be purged utilizing a low-flow submersible stainless-steel pump with dedicated Teflon® or Teflon®-lined polyethylene tubing connected to a transparent flow cell. Very low purging rates are proposed, on the order of 100 ml/minute to 500 ml/minute, to minimize suspension of particulate matter in the well.

Groundwater from each well will be purged until turbidity, pH, temperature, dissolved oxygen and specific conductivity have stabilized. As practical, all field measurements will be taken from the flow cell and will be recorded in the field logbook during and after purging, and before sampling.

Purging will be performed with the pump intake placed at the midpoint of the well screen or the midpoint of the water column (to be determined based on the depth and length of the screen interval) to insure that all stagnant water in the well is removed, while not stirring up sediment that may have accumulated on the bottom of the well. Equipment will be lowered into the well very carefully to prevent suspension of bottom sediment and subsequent entrainment onto sampling equipment. Surging will be avoided. Dedicated tubing will be used for each well. Pumps will be carefully cleaned between wells according to the procedures specified in Section 4.60. Ideally, pumping rates will be at a rate so that no drawdown of the groundwater level occurs (i.e., pumping rate is less than recharge rate). During purging, the sampler will actively monitor and track the volume of water purged and the field parameter readings. Data will be recorded in the field logbook or well purge data sheet. Sampling personnel will wear phthalate-free gloves such as nitrile (no latex will be used) and will avoid contact of the gloves with the sample. Only clean instruments will be allowed to touch the sample.

4.1.4 Water Samples

Per- and poly-fluoroalkyl substances (PFAS), if analyzed, are to be sampled first. PFAS are very stable manmade chemicals that have properties that allow them to repel both water and oil. The water repelling properties of these substances allow them to be applied to almost any material to make it water, oil, and stain repellant. These properties were first used commercially in the 1950s, and they are used in a wide variety of consumer products, including carpets, clothing, non-stick pans, paints, polishes, waxes, cleaning products, and food packaging. Firefighters and the military use them in fire-suppressing foam. Based upon its usage it is important to prevent cross-contamination while collecting groundwater samples for PFAS analysis. A detailed sampling procedure is discussed in GZA's standard operating procedure manual (**Attachment A**). For PFAS sampling, low-flow sampling should be conducted through dedicated PFAS free low-density polyethylene (LDPE) tubing in accordance with EPA Ground Water Issue Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, dated April 1996. The NYSDEC PFAS 21 compound analyte list is presented in **Table 4-1**.

Volatile organic compounds (VOCs) analysis: Pour water slowly into the 40-ml vial, filling to top and ensuring no bubbles are visible. Fill until a meniscus forms and tightly seal the vial. Invert the vial and check for bubbles. If bubbles are present, add water and repeat. It may be necessary to discard the vial and use another if bubbles continue to appear.

The samples will be collected in laboratory prepared sample bottles (pre-preserved, if appropriate), placed in iced coolers and removed from light immediately after collection. The PFAS samples should be kept in a separate and dedicated cooler and should not be placed with the other sample containers. Place sample in a cooler with ice to maintain temperature at 4 degrees Celsius (°C) +/- 2°C. Samples will be maintained at this temperature throughout the sampling and transportation period. n addition, all sample bottles must be filled to the top so that no aeration of the samples occurs during transport. All bottles will be filled to avoid cascading and aeration of the samples, the goal being to minimize any precipitation of colloidal matter.

4.2 SVE SYSTEM INFLUENT/EFFLUENT AIR SAMPLING

The SVE system influent/effluent air samples will be collected using sample ports installed just after the blower and at the discharge stack of the SVE system.

4.2.1 Influent/Effluent Air Sampling

Each probe will be connected via Teflon tubing from the permanent sampling point to a laboratory-supplied SUMMA canister. Using a 0.10 L/min flow regulator and individually certified clean two-liter capacity SUMMA canister, the sample collection time will be thirty (30) minutes. Personnel will ensure that SUMMA canister regulators are turned off before the end pressure reaches zero.

4.3 WASTE CHARACTERIZATION SAMPLING

Waste characterization of a liquid or a solid can involve grab or composite sampling depending upon the homogeneity and the volume of the waste. Grab sampling consists of collecting a discrete sample or samples of a material, and submitting each sample for separate analysis. Composite sampling consists of taking discrete grab samples of a material and combining them into a smaller number of samples for analysis. The sampling will be conducted in accordance with the disposal facility's protocol, NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, and 6 NYCRR Part 375 requirements.

Waste Characterization sampling will be performed for the following objectives:

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

4.4 FIELD DATA COLLECTION

Groundwater data to be collected in the field may include:

- Groundwater level and/or free product level measurements via electronic water level indicator, oil/water interface probe and/or pressure-based water level data loggers;
- Pumping rates (calculated based on gallons pumped in a measured time);

- Water quality parameters including temperature, pH, oxidation-reduction potential, dissolved oxygen, specific conductivity, turbidity, etc. via water quality field meter, and
- Well headspace via PID.

Soil vapor data to be collected in the field may include:

- PID readings from the influent and effluent sample port locations prior to sampling using SUMMA canisters for VOC analysis; and
- SUMMA canister initial/final vacuum and sampling start/stop time.

4.5 QC SAMPLE COLLECTION

QC samples for groundwater samples may include equipment rinsate/field blanks, trip blanks, sample duplicates and matrix spike/matrix spike duplicates (MS/MSDs).

Equipment Rinsate/Field Blanks will be used to check for potential contamination from ambient air and/or field sampling equipment. Equipment rinsate/field blanks will be collected in the field by pouring laboratory-supplied deionized water over/through decontaminated sampling equipment prior to sample collection. Equipment rinsate/field blanks will be submitted to the laboratory at a frequency of one per 10 soil samples. For groundwater samples, an equipment/rinsate blank will be collected for each sampling day when more than one groundwater sample is collected. Equipment rinsate/field blank analytical parameters will match sample analytical parameters. Equipment rinsate/field blanks will not be collected for samples associated with waste disposal. For PFAS analysis, GZA will collect one field blank sample per sampler per day, one equipment blank sample per day, and one blind duplicate sample per 20 samples, per sampling matrix.

Trip Blanks will be used to assess the potential for volatile organic compound contamination of groundwater samples due to contaminant migration during sample shipment and storage. Trip blanks will consist of laboratory-supplied deionized water. Trip blanks are never opened and travel to and from the Site with the empty and full sample bottles. Trip blanks are stored with the investigative samples and kept closed until analyzed by the laboratory. Trip blanks will be submitted to the laboratory at a frequency of one per cooler that contains groundwater samples for VOC analysis only.

Sample Duplicates are an additional aliquot of the same sample submitted for the same parameters as the original sample. Sample duplicates will be used to assess sampling and analytical reproducibility. Duplicate samples consist of an actual sample taken in the field that has been split into two identical aliquots and put into two separate sampling containers. Each duplicate of a soil sample (except for the VOC fraction) will be homogenized in a dedicated stainless steel pan prior to alternately filling the sample containers. The volatile fraction for soils will be collected directly from the sampling device without homogenization. Sample duplicates will be analyzed as two separate samples and submitted at a frequency of one per 20 samples for all matrices and all parameters with the exception of parameters collected for waste characterization purposes.

MSs and MSDs are two additional aliquots of the same sample submitted for the same parameters as the original sample. However, the additional aliquots are spiked with the compounds of concern. Matrix spikes

provide information about the effect of the sample matrix on the measurement methodology. MS/MSDs samples will selected by the laboratory at a frequency of one per 20 investigative samples per matrix for organic parameters. MSs will be submitted at a frequency of one per 20 investigative samples per matrix for inorganic parameters.

4.6 SAMPLE PRESERVATION AND CONTAINERIZATION

The analytical laboratory will supply the sample containers for the applicable samples. These containers will be cleaned by the laboratory/manufacturer to meet or exceed all analyte specifications established in the latest U.S. EPA's Specifications and Guidance for Contaminant-Free Sample Containers. The containers will be pre-preserved, as required by the analytical method.

4.7 EQUIPMENT DECONTAMINATION

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

- Non-dedicated PFAS sampling equipment should be decontaminated and rinsed with laboratory-certified PFAS-free deionized water between each monitoring well.
- Wash/scrub with a biodegradable degreaser ("Simple Green") if there is oily residue on equipment surface
- Tap water rinse
- Wash and scrub with Alconox and water mixture
- Tap water rinse
- 10 percent HNO_3 rinse for non-dedicated, stainless steel groundwater sampling equipment for metals analysis only (excludes submersible pump and flow cell) and 1 percent HNO3 rinse for non-dedicated, non-stainless steel equipment.
- Hexane rinse (optional, only if required to remove heavy petroleum coating)
- Distilled/deionized water rinse
- Air dry

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

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

Bladder pumps will utilize dedicated bladders, o-rings and grab plates. Bladder pumps will be cleaned by taking apart the pump and washing and scrubbing with an Alconox/water mixture, rinsing with tap water and irrigating with distilled/deionized water. Once the pump is clean, new dedicated parts (bladder, o-rings and grab plate) will be installed.

Disposable, dedicated equipment (e.g. bailers, tubing, etc.) will be used to the extent feasible.

5.0 DOCUMENTATION AND CHAIN-OF-CUSTODY

5.1 SAMPLE COLLECTION DOCUMENTATION

5.1.1 Field Data Documentation/Field logs

A system of logging pertinent data collected during sampling operations will be maintained using bound field logbooks. Each page will be numbered, dated, and initialed or signed by the person making the entry. Entries will be made in ink. Errors will be crossed out with a single line, initialed, and dated. At the completion of the day, if a page is not complete, a diagonal line will be drawn through the remainder of the page with the signature at the bottom.

Sample locations will be recorded and referenced to the Site map so that each location is permanently established. Samples will be tagged or labeled with pertinent Site information at the time of sampling. Section 5.1.3 describes sample identification. Pertinent Site information to be supplied in the field log for each task is listed below:

- Initials or Signature of note taker
- Name and location of investigation
- Date and time of arrival and departure
- Names of all personnel on-Site and their affiliation
- Purpose of the visit
- Field instruments used, date and time of calibration and calibration checks, method of calibration, standards used
- Field measurement results
- Date, time, and location of all sampling points
- Method of sample collection
- Factors that could affect sample integrity
- Name of sampler(s)
- Sample identification and sample description
- Documentation of conversations with the client, regulatory personnel, field decisions, and approval

- Sample locations intervals
- Weather conditions
- Inventory of drum contents and storage location for each drum of waste material generated.

Field notebooks should contain only factual information entered as real-time notes, which will enable the user to recreate events on-Site. Drilling/boring logs and monitoring well construction details will be recorded in the field notebook and/or on a separate boring log/well construction form for each boring/monitoring well. Soil descriptions will be based on a modified Burmeister soil classification system, where minor components and relative soil density will not be specified. Strata not sampled will be so indicated. Groundwater sampling field data will be recorded in the field notebook and/or on separate purge data sheet for each monitoring well sampled.

5.1.2 Chain-of-Custody Records

Sample custody is discussed in detail in **Sections 5.1.4 through 5.1.6** of this Plan. Chain-of-custody records are initiated by the samplers in the field. The field portion of the custody documentation should include: (1) the project name; (2) signature(s) of sampler(s); (3) the sample number, date and time of collection, and whether the sample is grab or composite; and (4) if applicable, air bill or other shipping number. Sample receipt and log-in procedures at the laboratory are described in **Section 5.1.6** of this Plan.

Samples will be transferred to the custody of the respective laboratories via third-party commercial carriers or via laboratory courier service within timeframes required by NYDEC field sampling procedures.

5.1.3 Sample Labeling

Immediately upon collection, each sample will be labeled with an adhesive label, which includes the date and time of collection, sampler's initials, tests to be performed, preservative (if applicable), and a unique identifier. The following identification scheme will be used:

A. The sample ID number will include the soil, soil gas, sediment, wastewater, or monitoring well location, along with the sample depth, sample interval, and the depth interval at which it was collected.

Example: Sample P-9(5-5.5') indicates the sample was taken at boring location P-9, from the 6-inch interval in the spoon beginning at 5.0 feet below grade and ending at 5.5 feet below grade.

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

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

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

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

Example: SVOC

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

Example: 03-22-12

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

Example: 14:30

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

F. Other information relevant to the sample.

Example: Equipment Blank

A sample label will contain the following information:

Job No.

Client:

Sample Number

Date Sample Time

Sample Matrix

Grab or Composite (explain)

Preservatives

Analyses

Sampler Signature

An example sample label is presented below:

Job No: XXXXXXXXX

Client: Name

Sample No: OU1-B22(5-5.5')

Matrix:Soil

Date Taken: 3/22/12

Time Taken: 14:30

Sampler: B. Smith

Analysis: SVOC

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

5.1.4 Sample Custody

A sample is considered to be under a person's custody if:

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

5.1.5 Field Custody Procedures

Samples will be collected following the sampling procedures documented in **Section 4.00** of this Plan. Documentation of sample collection is described in **Section 5.1.1** of this Plan. Sample chain-of-custody and packaging procedures are summarized below. These procedures are intended to ensure that the samples will arrive at the laboratory with the chain-of-custody intact.

- The field sampler is personally responsible for the care and custody of the samples until they are transferred or dispatched properly. Field procedures have been designed such that as few people as possible will handle the samples.
- All bottles will be identified by the use of sample labels with sample numbers, sampling locations, date/time of collection, and type of analysis. The sample labeling system is presented in **Section 5.1.3** of this Plan.
- Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample label because the pen would not function in wet weather.
- Samples will be accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents the transfer of custody of samples from the sampler to another person, to the analytical laboratory courier, or to/from a secure storage location.

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

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

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

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

5.1.6 Laboratory Custody Procedures

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

- Examine the shipping containers to verify that the custody tape is intact, if applicable,

- Examine all sample containers for damage,

- Determine if the temperature required for the requested testing program has been maintained during shipment and document the temperature on the chain-of-custody records,

- Compare samples received against those listed on the chain-of-custody,

- Verify that sample holding times have not been exceeded,

- Examine all shipping records for accuracy and completeness,

- Determine sample pH (if applicable) and record on chain-of-custody forms

- Sign and date the chain-of-custody immediately (if shipment is accepted) and attach the air bill,

- Note any problems associated with the coolers and/or samples on the cooler receipt form and notify the Laboratory Project Manager, who will be responsible for contacting GZA,

- Attach laboratory sample container labels with unique laboratory identification and test, and

- Place the samples in the proper laboratory storage.

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

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

5.2 SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

No field analyses are anticipated for this program. If site conditions were to warrant field analysis, the responsible contractor will prepare an addendum establishing the field analytical procedures. Analyses of all soil, groundwater, and waste classification samples will be performed by a New York ELAP Certified laboratory, certified for the specific analyses to be performed (e.g. Alpha Analytical or equivalent laboratory). The laboratory shall confirm that their method detection limits (MDLs) meet the requirements of 6 NYCRR Part 375.

5.3 SAMPLE PRESERVATION AND CONTAINERS

The proposed samples, sampling and analytical parameters, analytical methods, sample preservation requirements and containers are presented in **Table 2**.The analytical laboratory will supply the sample containers for the chemical samples. These containers will be cleaned by the manufacturer/laboratory to meet the specifications established in the latest U.S. EPA's Specifications and Guidance for Contaminant-Free Sample Containers. Certificates of analysis are provided with each bottle lot and maintained on file to document conformance to EPA specifications. The containers will be pre-preserved, where appropriate, see **Table 2** and **Table 6**.

5.4 INVESTIGATION-DERIVED WASTE

Drill cuttings and purged well water will be containerized in DOT-approved or equivalent 55-gallon drums and stored on-Site pending analysis and proper off-Site disposal.

Purged well water will be containerized in DOT-approved 55-gallon drums and stored on-Site pending receipt of analytical results. If groundwater samples indicate that all contaminant concentrations are below New York State Ambient Water Quality Standards (AWQS), purged well water will be treated on-Site with granular activated carbon (GAC) and subsequently discharged into an on-Site storm sewer.

Decontamination fluids will be collected and treated onsite via a granular activated carbon (GAC) vessel. Once treated, the fluid will be discharged to the ground surface unless visible sheen or odor is detected either on the equipment or the fluids, at which point the decontamination water will be contained in a 55-gallon drum, staged and properly disposed of. Decontamination fluids collected during PFAS sampling will be containerized in 55-

gallon drums for off-site disposal. If the analytical results do not indicate presence of PFAS then the water will be treated like other decontamination fluids and will be treated using GAC.

6.0 CALIBRATION/ANALYTICAL PROCEDURES

6.1 LABORATORY CALIBRATION

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

6.2 LABORATORY PREVENTATIVE MAINTENANCE

Preventative maintenance and periodic maintenance will be performed as needed and documented in laboratory notebooks, instrument maintenance logbooks, or work orders as appropriate in accordance with method-specific requirements.

6.3 FIELD CALIBRATION

Field calibration and measurement results will be maintained in bound logbooks assigned to the specific instrument and/or field logbooks. Qualified personnel shall perform initial calibrations of field instruments prior to mobilization of equipment to the Site.

Electronic water level indicators will be calibrated when new, damaged, or repaired. The electronic water level indicator will be calibrated against a calibrated steel surveyor's tape to within 0.01 (one hundredth) of a foot per 10 feet of length.

Water quality meters used, including pH, dissolved oxygen, and conductivity probes, will be calibrated in accordance with the manufacturer's specifications in the field at the start of each days sampling activities and throughout the day as required by NYSDEC sampling requirements.

PID screening instruments will be calibrated daily prior to field activities according to the instrument manufacturer's specifications using certified calibration gases. Sampling personnel shall perform battery checks daily. The recorded calibration information includes date of calibration, standards used, and calibration results.

The following table provides a summary of items that are likely to contain PFAS (i.e., prohibited items) and that are not to be used by the sampling team at the site, along with acceptable alternatives. This list may change as new information becomes available.

Category	**Prohibited Items**	**Allowable Items**
Field Equipment Including: • Pumps • Tubing • Bailers	Teflon and other fluoropolymer-containing materials (e.g., Teflon tubing, bailers, tape; Teflon-containing plumbing paste, or other Teflon materials) **Note**: The Grundfos Redi-Flow Submersible Pump is a submersible pump which, as of this revision, has a Teflon impeller and is not recommended for collecting PFAS samples.	High-density polyethylene (HDPE) - *preferred,* or silicone tubing HDPE or stainless steel bailers Peristaltic pumps Stainless steel submersible pumps (e.g., ProActive stainless steel pumps with PVC [polyvinyl chloride]) leads and Geotech Stainless Steel Geosub pumps) Bladder pumps with polyethylene bladders and tubing need to be evaluated on a case by case basis because the gaskets and O-rings may contain PFAS. Equipment with Viton components needs to be evaluated on a case by case basis. Viton contains PTFE but may be acceptable if used in gaskets or O-rings that are sealed away and will not come into contact with sample or sampling equipment.) Gasoila NT Non-PTFE Thread Sealant™ has been confirmed by the manufacturer to be PFAS-free and is acceptable for use.
Health & Safety Equipment	Leather Gloves (may be treated)	Cut resistant gloves: MaxiFlex Cut cut-resistant gloves
Decontamination	Decon 90	Alconox®, Liquinox®[1], or Citranox®, potable water followed by triple rinse with “PFAS-free” deionized water.

Category	Prohibited Items	Allowable Items
Sample Storage and Preservation	LDPE or glass bottles, PTFE-or Teflon-lined caps, chemical ice packs	Laboratory-provided sample container - *preferred*; or, HDPE or polypropylene bottles with an unlined plastic screw cap, as specified by the laboratory doing the analysis, regular ice double-bagged in Ziploc® brand bags. Bubble wrap may be used for shipping provided it does not come into contact with the inside of the bottle or cap before, during, or after sampling.
Field Documentation	Waterproof/treated paper or field books, recycled paper, plastic clipboards, binders, Sharpie® and other markers, electrical tape, Post-It® and other adhesive paper products.	Plain Paper, metal clipboard, ballpoint pens Duct Tape is acceptable provided it doesn't contact the media that is being sampled.
Clothing/Laundering	Clothing or boots made of or with Gore-Tex™ or other synthetic water proof/ resistant and/or stain resistant materials, coated Tyvek® material that may contain PFAS, fabric protectors (including UV protection), insect-resistant chemicals, stain-resistant chemicals; Fabric softener	Synthetic or cotton material, previously laundered clothing <u>washed greater than six times without the use of fabric softeners</u>. Polyurethane and wax coated materials. Boots made with polyurethane and PVC, untreated leather boots Tyvek material that is PFAS free (e.g., uncoated)

Category	**Prohibited Items**	**Allowable Items**
Personal Care Products (for day of sample collection)	Cosmetics, moisturizers, hand cream, antiperspirant/deodorant, scented body wash/shampoo/conditioner and other related products. Hand sanitizer gel. Dental floss and plaque removers.	**Personal Care Items:** Unscented soaps (7th Generation unscented, Tom's of Maine Unscented, or similar. No "naturally scented" items) **Sunscreens:** Alba Organics Natural Yes to Cucumbers Aubrey Organics Jason Natural Sun Block Kiss My Face Baby-safe sunscreens ('free' or 'natural') **Insect Repellents**: Jason Natural Quit Bugging Me Repel Lemon Eucalyptus Herbal Armor California Baby Natural Bug Spray BabyGanics Deep Woods OFF Sawyer Permethrin **Sunscreen and Insect Repellents:** Avon Skin So Soft Bug Guard-SPF 30

Category	Prohibited Items	Allowable Items
Food and Beverage	Pre-packaged food, fast food wrappers or containers. Non-stick cookware & containers, aluminum foil. Fast food shall not be consumed within 48 hours of sampling.	Food that is brought and consumed only outside the exclusion zone and does not include prohibited items listed in this table. Hands and faces must be thoroughly washed with soap and water after consuming food and before entering the exclusion zone. Bottled water or hydration drinks (i.e., Gatorade® and Powerade®)

[1.] While Liquinox soap is acceptable for use for PFAS decontamination, it may contain 1,4-dioxane.

6.4 FIELD PREVENTATIVE MAINTENANCE

Field instruments will be checked prior to use in the field according to the procedures and frequencies specified by the manufacturer. The environmental company will utilize a commercial instrument rental company (e.g. Pine Environmental) to provide field instrumentation. Records of factory calibrations and instrument maintenance will be maintained by the instrument rental company. Field maintenance will be performed as needed and recorded in the field logbook.

7.0 DATA REPORTING AND VALIDATION

Laboratory deliverables will include, at a minimum:

1. A cover page, including facility name and address, laboratory name and address, laboratory certification number, date of analytical report preparation, and signature of laboratory director.
2. A content page
3. A non-conformance summary
4. A listing of all field sample identification numbers and corresponding laboratory sample identification numbers
5. A listing of the analytical methods used
6. Detection limits for each analyte
7. Tabulated sample results, including date of analysis
8. Method blank results
9. Chain-of-custody documents
10. Temperature of sample at receipt

Errors in reporting identified during the data review process must be corrected by the reporting laboratory.

Tables

Table 1
Media Criteria Table
441 Eastern Parkway
Field Sampling Procedures/Quality Assurance Project Plan

Contaminant	Industrial Soil Cleanup Objectives[1], mg/kg	Aqueous Water Quality Standards[2], ug/L	Soil Gas Criteria[3], ppbv
Metals			
Antimony	---	3	---
Arsenic	19	---	---
Arsenic	---	25	---
Barium	10,000	1,000	---
Beryllium	2,700	3	---
Cadmium	60	5	---
Chromium, hexavalent	800	---	---
Chromium, trivalent	6,800	50	---
Copper	10,000	200	---
Cyanide	10,000	---	---
Iron	---	300	---
Lead	3,900	25	---
Magnesium	---	35,000	---
Manganese	10,000	300	---
Mercury	5.7	0.7	---
Nickel	10,000	100	---
Selenium	6,800	10	---
Silver	6,800	50	---
Sodium	---	20,000	---
Thallium	---	0.5	---
Zinc	10,000	2000	---
PCBs/Pesticides			
alpha-BHC	6.8	0.01	---
2,4,5-TP Acid (Silvex)	1,000	---	---
4,4'-DDD	180	0.3	---
4,4'-DDE	120	0.2	---
4,4'-DDT	94	0.2	---
Aldrin	1.4	---	---
beta-BHC	14	0.04	---
Chlordane (alpha)	47	---	---
Dibenzofuran	1,000	---	---
Dieldrin	2.8	0.004	---
Endosulfan I	920	0.12	---
Endosulfan II	920	0.12	---
Endosulfan sulfate	920	0.12	---
Endrin	410	---	---
Endrin aldehyde	---	5	---
Endrin ketone	---	5	---
gamma-BHC (Lindane)	---	0.05	---

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441 Eastern Parkway
Field Sampling Procedures/Quality Assurance Project Plan

Contaminant	Industrial Soil Cleanup Objectives[1], mg/kg	Aqueous Water Quality Standards[2], ug/L	Soil Gas Criteria[3], ppbv
PCBs/Pesticides, Con't.			
gamma-Chlordane	---	0.12	---
Heptachlor	29	0.04	---
Heptachlor epoxide	---	0.03	---
Lindane	23	---	---
Methoxychlor	---	35	---
Polychlorinated biphenyls	25	---	---
Toxaphene		0.06	---
Semivolatiles			
1,1'-Biphenyl	---	5	---
2,2'-oxybis(1-Chloropropane)	---	5	---
2,4,5-Trichlorophenol	---	1	---
2,4-Dichlorophenol	---	1	---
2,4-Dimethylphenol	---	50	---
2,4-Dinitrophenol	---	10	---
2,4-Dinitrotoluene	---	5	---
2,6-Dinitrotoluene	---	5	---
2-Chloronaphthalene	---	10	---
2-Chlorophenol	---	1	---
2-Methylnaphthalene	---	502	---
2-Methylphenol	---	1	---
2-Nitroaniline	---	5	---
2-Nitrophenol	---	1	---
3,3'-Dichlorobenzidine	---	5	---
3-Nitroaniline	---	5	---
4-Chloro-3-methylphenol	---	1	---
4-Chloroaniline	---	5	---
4-Methylphenol	---	1	---
4-Nitroaniline	---	5	---
4-Nitrophenol	---	1	---
Acenaphthene	1,000	20	---
Acenapthylene	1,000	202	---
Anthracene	1,000	50	---
Atrazine	---	7.5	---
Benz(a)anthracene	11	0.002	---
Benzo(a)pyrene	1.1	---	---
Benzo(b)fluoranthene	11	0.002	---
Benzo(g,h,i)perylene	1,000	52	---
Benzo(k)fluoranthene	110	0.002	---
bis(2-Chloroethoxy)methane	---	5	---

Table 1
Media Criteria Table
441 Eastern Parkway
Field Sampling Procedures/Quality Assurance Project Plan

Contaminant	Industrial Soil Cleanup Objectives[1], mg/kg	Aqueous Water Quality Standards[2], ug/L	Soil Gas Criteria[3], ppbv
Semivolatiles, Con't.			
Bis(2-Chloroethyl)ether	---	1	---
bis(2-Ethylhexyl)phthalate	---	5	---
Butylbenzylphthalate	---	50	---
Chrysene	110	0.002	---
Dibenz(a,h)anthracene	1.1	502	---
Dibenzofuran	---	52	---
Diethylphthalate	---	50	---
Dimethylphthalate	---	50	---
Di-n-butylphthalate	---	50	---
Di-n-octylphthalate	---	50	---
Fluoranthene	1,000	50	---
Fluorene	1,000	50	---
Hexachlorobenzene	---	0.04	---
Hexachlorobutadiene	---	0.5	---
Hexachlorocyclopentadiene	---	5	---
Hexachloroethane	---	5	---
Indeno(1,2,3-cd)pyrene	11	0.002	---
Isophorone	---	50	---
m-Cresol	1,000	---	---
Naphthalene	1,000	10	---
Nitrobenzene	---	0.4	---
N-Nitrosodiphenylamine	---	50	---
o-Cresol	1,000	---	---
p-Cresol	1,000	---	---
Pentachlorophenol	55	1	---
Phenanthrene	1,000	50	---
Phenol	1,000	1	---
Pyrene	1,000	50	---
Volatiles			
1,1,1-Trichloroethane	1,000	5	200,000
1,1,2,2-Tetrachloroethane	---	5	3.1
1,1,2-Trichloro-1,2,2-trifluoroethane	---	5	---
1,1,2-Trichloroethane	---	1	14
1,1-Dichloroethane	480	5	62,000
1,1-Dichloroethene	1,000	5	---
1,1-Dichloroethylene	---	---	25,000
1,2,4-Trichlorobenzene	---	---	13,000

Table 1
Media Criteria Table
441 Eastern Parkway
Field Sampling Procedures/Quality Assurance Project Plan

Contaminant	Industrial Soil Cleanup Objectives[1], mg/kg	Aqueous Water Quality Standards[2], ug/L	Soil Gas Criteria[3], ppbv
Volatiles, Con't.			
1,2,4-Trimethylbenzene	380	5	610
1,2-Dibromo-3-chloropropane	---	0.04	62,000
1,2-Dibromoethane	---	0.0006	1
1,2-Dichlorobenzene	1,000	3	25,000
1,2-Dichloroethane	60	0.6	12
1,2-Dichloropropane	---	1	430
1,3,5- Trimethylbenzene	380	---	610
1,3-Butadiene	---	---	2
1,3-Dichlorobenzene	---	3	12
1,3-Dichlorobenzene	560	---	430
1,4-Dichlorobenzene	---	3	610
1,4-Dichlorobenzene	250	---	2
1,4-Dioxane	250	---	---
2-Butanone	---	50	---
2-Hexanone	---	50	---
4-Methyl-2-pentanone	---	502	---
Acetone	1,000	50	74,000
Benzene	89	1	49
Bromodichloromethane	---	50	10
Bromoform	---	50	110
Bromomethane	---	5	640
Butylbenzene	1,000	---	---
Carbon Disulfide	---	60	110,000
Carbon tetrachloride	44	5	13
Chlorobenzene	1,000	5	6,500
Chloroethane	---	5	1,900,000
Chloroform	700	7	11
Chloromethane	---	5	590
Cis- 1,3-Dichloropropene	---	0.4	67
cis-1,2-Dichloroethene	1,000	5	1,900,000
cis-1,2-Dichloroethylene	---	---	4,400
Cyclohexane	---	---	---
Dibromochloromethane	---	50	6
Dichlorodifluoromethane	---	5	20,000
Ethyl Acetate	---	---	440,000
Ethylbenzene	780	5	250
Freon 113	---	---	2,000,000
Hexachlorobenzene	12	---	---

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441 Eastern Parkway
Field Sampling Procedures/Quality Assurance Project Plan

Contaminant	Industrial Soil Cleanup Objectives[1], mg/kg	Aqueous Water Quality Standards[2], ug/L	Soil Gas Criteria[3], ppbv
Volatiles, Con't.			
Hexachlorobutadiene	---	---	5.2
Hexane	---	---	28,000
Isopropylbenzene	---	5	---
m,p-Xylene	---	---	810,000
m-Dichlorobenzene	---	---	8,700
Methyl Acetate	---	NS	---
Methyl ethyl ketone	1,000	---	170,000
Methyl Isobutyl Ketone	---	---	9,800
Methyl tert-butyl ether	1,000	10	420,000
Methylcyclohexane	---	---	---
Methylene chloride	1,000	5	750
n-Propylbenzene	1,000	---	---
o-Dichlorobenzene	---	---	17,000
o-Xylene	---	---	810,000
p-Dichlorobenzene	---	---	67,000
sec-Butylbenzene	1,000	---	---
Volatiles, Con't.			
Styrene	---	5	120,000
tert-Butylbenzene	1,000	---	---
Tertiary Butyl Alcohol	---	---	---
Tetrachloroethene	300	5	60
Toluene	1,000	5	53,000
trans-1,2-Dichloroethene	1,000	5	8,800
trans-l,3-Dichloropropene	---	0.4	67
Trichloroethene	400	5	2.1
Trichlorofluoromethane	---	5	62,000
Vinyl Acetate	---	---	28,000
Vinyl Chloride	27	2	54
Xylene (mixed)	1,000	5	810,000

Notes:

[1] - New York State Department of Environmental Conservation Department of Remediation specified Industrial Soil Cleanup Objectives, NYSCC 6 Part 375 Table-6.8(b).

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

[3] - EPA's Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance), Table 3c-SG:Question 5 Soil Gas Screening Levels for Scenario-Specific Vapor Attenuation Factors (α = 2x10-3), November 2002, bbbV

mg/kg - milligrams per kilogram
ug/L - micro gram per liter
ppbv - part per billion by volume.

Table 2

Analytical Parameters, Methods, Preservation, Holding Time and Container Requirements

441 Eastern Parkway

Field Sampling Procedures/Quality Assurance Project Plan

Sample Matrix	Analytical Parameter	Sample Type[1]	No. of Samples[2]	EPA Analytical Method	Sample Preservation	Holding Time[3]	Sample Container[4,5]
Soil/Sediment	VOCs (STARS or TCL)	Grab	TBD	SW-846 Method 8260B	Cool to 4^0 C; no headspace	14 days to analysis	(2) 2-oz. glass jars
Soil/Sediment	PCBs	Grab	TBD	SW-846 Method 8082A	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil/Sediment	Pesticides (TCL)	Grab	TBD	SW-846 Method 8081A	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil/Sediment	PAHs or SVOCs (STARS or TCL)	Grab	TBD	SW-846 Method 8270C	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Sediment	Grain Size	Grab	TBD	ASTM Method D422 (with hydrometer)	None	None	(1) 500 mL polyethylene jar or 16 oz. Ziploc bag
Soil/Sediment	Metals (TAL)	Grab	TBD	SW-846 Method 6010B/7000 Series	Cool to 4^0 C	28 days to analysis for Hg; 6 months to analysis for other metals	(1) 300 mL amber glass jar
Soil	Cyanide	Grab	TBD	SW-846 Method 9012A	Cool to 4^0 C	14 days to analysis	(1) 300 mL amber glass jar
Soil	Herbicides	Grab	TBD	SW-846 Method 8151A	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil	Organophosphorous Pesticides	Grab	TBD	SW-846 Method 8141A[6]	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar

Table 2

Analytical Parameters, Methods, Preservation, Holding Time and Container Requirements

441 Eastern Parkway

Field Sampling Procedures/Quality Assurance Project Plan

Sample Matrix	Analytical Parameter	Sample Type[1]	No. of Samples[2]	EPA Analytical Method	Sample Preservation	Holding Time[3]	Sample Container[4,5]
Soil/Sediment	VOCs (STARS or TCL)	Grab	TBD	SW-846 Method 8260B	Cool to 4^0 C; no headspace	14 days to analysis	(2) 2-oz. glass jars
Soil/Sediment	PCBs	Grab	TBD	SW-846 Method 8082A	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil/Sediment	Pesticides (TCL)	Grab	TBD	SW-846 Method 8081A	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil/Sediment	PAHs or SVOCs (STARS or TCL)	Grab	TBD	SW-846 Method 8270C	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Sediment	Grain Size	Grab	TBD	ASTM Method D422 (with hydrometer)	None	None	(1) 500 mL polyethylene jar or 16 oz. Ziploc bag
Soil/Sediment	Metals (TAL)	Grab	TBD	SW-846 Method 6010B/7000 Series	Cool to 4^0 C	28 days to analysis for Hg; 6 months to analysis for other metals	(1) 300 mL amber glass jar
Soil	Cyanide	Grab	TBD	SW-846 Method 9012A	Cool to 4^0 C	14 days to analysis	(1) 300 mL amber glass jar
Soil	Herbicides	Grab	TBD	SW-846 Method 8151A	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil	Organophosphorous Pesticides	Grab	TBD	SW-846 Method 8141A[6]	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar

Table 2

Analytical Parameters, Methods, Preservation, Holding Time and Container Requirements

441 Eastern Parkway

Field Sampling Procedures/Quality Assurance Project Plan

Sample Matrix	Analytical Parameter	Sample Type[1]	No. of Samples[2]	EPA Analytical Method	Sample Preservation	Holding Time[3]	Sample Container[4,5]
Sediment	Total Organic Carbon	Grab	TBD	Lloyd Kahn Method, EPA Region 2	Cool to 4^0 C	14 days to analysis	(1) 300 mL amber glass jar
Soil/Solid Waste/Liquid Waste	TCLP VOC (RCRA)	Grab	TBD	SW 846 Methods 1311/8260B	Cool to 4^0 C; no headspace	14 days to TCLP extraction; 14 days from TCLP extraction to analysis	(1) 60 ml VOC vial
Soil/Solid Waste	TCLP SVOC (RCRA)	Grab	TBD	SW 846 Methods 1311/ 8270C	Cool to 4^0 C	14 days to TCLP extraction; 7 days from TCLP extraction to SVOC extraction; 40 days from SVOC extraction to analysis	(1) 950 mL amber glass jar
Liquid Waste	TCLP SVOC (RCRA)	Grab	TBD	SW 846 Methods 1311/ 8270C	Cool to 4^0 C	7 days to TCLP extraction; 7 days from TCLP extraction to SVOC extraction; 40 days from SVOC extraction to analysis	(1) 950 mL amber glass jar
Solid Waste	TCLP Pesticides (RCRA)	Grab	TBD	SW-846 Methods 1311/8081A	Cool to 4ºC	14 days to TCLP extraction; 7 days from TCLP extraction to pesticide extraction; 40 days from pesticide extraction to analysis	(1) 950 mL amber glass jar
Liquid Waste	TCLP Pesticides (RCRA)	Grab	TBD	SW-846 Methods 1311/8081A	Cool to 4ºC	7 days to TCLP extraction; 7 days from TCLP extraction to pesticide extraction; 40 days from pesticide extraction to analysis	(1) 950 mL amber glass jar
Solid Waste	TCLP Herbicides (RCRA)	Grab	TBD	SW-846 Methods 1311/8151A	Cool to 4ºC	14 days to TCLP extraction; 7 days from TCLP extraction to herbicide extraction; 40 days from herbicide extraction to analysis	(1) 950 mL amber glass jar

Table 2

Analytical Parameters, Methods, Preservation, Holding Time and Container Requirements

441 Eastern Parkway

Field Sampling Procedures/Quality Assurance Project Plan

Sample Matrix	Analytical Parameter	Sample Type[1]	No. of Samples[2]	EPA Analytical Method	Sample Preservation	Holding Time[3]	Sample Container[4,5]
Liquid Waste	TCLP Herbicides	Grab	TBD	SW-846 Methods 1311/8151A	Cool to 4ºC	7 days to TCLP extraction; 7 days from TCLP extraction to herbicide extraction; 40 days from herbicide extraction to analysis	(1) 950 mL amber glass jar
	(RCRA)						
Solid Waste/Liquid Waste	TCLP Metals	Grab	TBD	SW 846 Methods 1311/ 6010B/7000 Series	Cool to 4^0 C	Hg: 28 days to TCLP extraction; 28 days from TCLP extraction to analysis	(1) 500 mL amber glass jar
	(RCRA)					Other Metals: 6 months to TCLP extraction; 6 months from TCLP extraction to analysis	
Solid Waste/Liquid Waste	Ignitability	Grab	TBD	SW-846 Method 1010/1030	Cool to 4^0 C	None specified	(1) 500 mL amber glass jar
Solid Waste/Liquid Waste	Corrosivity	Grab	TBD	SW-846 Method 9045C	Cool to 4^0 C	As soon as possible	(1) 500 mL amber glass jar
						(within 3 days of collection)	
Solid Waste/Liquid Waste	Reactive cyanide	Grab	TBD	SW-846 Chapter 7, Section 7.3.3	Cool to 4^0 C; no headspace	As soon as possible	(1) 500 mL amber glass jar
						(within 3 days of collection)	
Solid Waste/Sediment	TPH-DRO	Grab	TBD	SW-846 Method 8015B	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Solid Waste	Total Organic Halides	Grab	TBD	SW-846 Method 9023	Cool to 4^0 C; no headspace	28 days to analysis	(1) 2-oz. glass jar
Solid Waste/Liquid Waste	Reactive sulfide	Grab	TBD	SW-846 Chapter 7, Section 7.3.4	Cool to 4^0 C; no headspace	As soon as possible	(1) 500 mL amber glass jar
						(within 3 days of collection)	

Table 2

Analytical Parameters, Methods, Preservation, Holding Time and Container Requirements

441 Eastern Parkway

Field Sampling Procedures/Quality Assurance Project Plan

Sample Matrix	Analytical Parameter	Sample Type[1]	No. of Samples[2]	EPA Analytical Method	Sample Preservation	Holding Time[3]	Sample Container[4,5]
Groundwater	VOCs (STARS or TCL)	Grab	TBD	SW-846 Method 8260B	pH<2 with HCl; Cool to 4^0 C; no headspace	14 days to analysis	(2) 40 mL VOA vials
Groundwater	SVOCs (STARS or TCL)	Grab	TBD	SW-846 Method 8270C	Cool to 4^0 C	7 days to extraction; 40 days from extraction to analysis	(2) 950 mL amber glass jar
Groundwater/Wastewater	Metals- total (TAL)	Grab	TBD	SW-846 Method 6010B/7000 Series	pH<2 with HNO_3; Cool to 4^0 C	28 days to analysis for Hg; 6 months to analysis for other metals	(1) 1 L polyethylene container
Groundwater	Metals-dissolved (TAL)	Grab	TBD	SW-846 Method 6010B/7000 Series	Cool to 4^0 C	24 hours to filtering and preservation (pH<2 with HNO_3); 28 days to analysis for Hg; 6 months to analysis for other metals	(1) 1 L polyethylene container
Groundwater	Ammonia	Grab	TBD	EPA Method 350.1 (350.2 for distillation)	pH<2 with H_2SO_4; Cool to 4^0 C	28 days to analysis	(1) 250 mL polyethylene container
Groundwater	Nitrate	Grab	TBD	EPA Method 353.2/SM 4500-NO_2B (18^{th} edition)	pH<2 with H_2SO_4; Cool to 4^0 C	28 days to analysis	(1) 100 mL polyethylene container
Groundwater	Nitrite	Grab	TBD	SM 4500-NO_2B (18^{th} edition)	Cool to 4^0 C	48 hours to analysis	(1) 100 mL polyethylene container
Groundwater	Pesticides (TCL)	Grab	TBD	SW-846 Method 8081A	Cool to 4^0 C	7 days to extraction; 40 days from extraction to analysis	(2) 950 mL amber glass jar

Table 2
Analytical Parameters, Methods, Preservation, Holding Time and Container Requirements
441 Eastern Parkway
Field Sampling Procedures/Quality Assurance Project Plan

Sample Matrix	Analytical Parameter	Sample Type[1]	No. of Samples[2]	EPA Analytical Method	Sample Preservation	Holding Time[3]	Sample Container[4,5]
Groundwater	Sulfate	Grab	TBD	SW-846 9056	Cool to 4^0 C	As soon as possible (within 3 days of collection)	(1) 100 mL polyethylene container
Groundwater	Carbonate	Grab	TBD	SM 4500-CO_2D (18^{th} edition)	Cool to 4^0 C	14 days to analysis	(1) 250 mL polyethylene container
Groundwater	Bicarbonate	Grab	TBD	SM 4500-CO_2D (18^{th} edition)	Cool to 4^0 C	14 days to analysis	(1) 250 mL polyethylene container
Groundwater	Total Cyanide	Grab	TBD	EPA Method 335.4	pH>12 with NaOH; Cool to 4ºC	14 days to analysis	(1) 250 mL polyethylene container
Groundwater	Total Dissolved Solids	Grab	TBD	EPA Method 160.1	Cool to 4ºC	7 days to analysis	(1) 100 mL polyethylene container
Groundwater	Chloride	Grab	TBD	SM 2540C (18th edition)	Cool to 4ºC	28 days to analysis	(1) 100 mL polyethylene container
Groundwater	NYSDEC List of 21 PFAS Compounds	Grab	TBD	Modified EPA Method 537	Pre preserved with 1.25 g Trizma	Preparation holding time:48 hours Analytical Holding time: 14 days	(3) 250 milliliter HDPE or polypropylene containers
Wastewater	Total Petroleum Hydrocarbons	Grab	TBD	EPA Method 418.1	pH<2 with HCl; Cool to 4^0 C	28 days to analysis	(2) 950 mL amber glass jar
Wastewater	pH	Grab	TBD	EPA Method 150.1	Cool to 4ºC	As soon as possible (24 hours to analysis)	(1) 100 mL polyethylene container
Wastewater	Amenable cyanide	Grab	TBD	EPA Method 335.1	pH>12 with NaOH; Cool to 4ºC	14 days to analysis	(1) 300 mL polyethylene container

Table 2

Analytical Parameters, Methods, Preservation, Holding Time and Container Requirements

441 Eastern Parkway

Field Sampling Procedures/Quality Assurance Project Plan

Sample Matrix	Analytical Parameter	Sample Type[1]	No. of Samples[2]	EPA Analytical Method	Sample Preservation	Holding Time[3]	Sample Container[4,5]
Wastewater	Flashpoint	Grab	TBD	SW-846 Method 1010	Cool to 4ºC	None	(1) 100 mL polyethylene container

Table 2

Analytical Parameters, Methods, Preservation, Holding Time and Container Requirements

441 Eastern Parkway

Field Sampling Procedures/Quality Assurance Project Plan

Sample Matrix	Analytical Parameter	Sample Type[1]	No. of Samples[2]	EPA Analytical Method	Sample Preservation	Holding Time[3]	Sample Container[4,5]
Wastewater	Hexavalent chromium	Grab	TBD	SW-846 Method 7196A	Cool to 4ºC	24 hours to analysis	(1) 500 mL polyethylene container
Soil Gas	VOCs	Grab	TBD	EPA Method TO-15	None	14 days to analysis	(1) Evacuated 6-Liter SUMMA® canister

Notes:

[1] For soil samples, a six-inch sampling interval is the preferred sample size; however, sample volume recovery, analytical method requirements, and field conditions can affect the actual sample interval size. For these reasons, the actual sampling interval may change in order to obtain adequate volume.

[2] Actual number of samples may vary depending on field conditions, sample material availability, and field observations. See Remedial Work Plan for estimates.

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

[4] I-Chem Series 300 bottles

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

[6] Accutest utilizes SW-846 Method 8270C for organophosphorous pesticides and Lancaster utilizes SW-846 Method 8141A.

TBD = To Be Determined

Table 3
Typical Laboratory Data Quality Objectives
Soil, Sediment, and Solid Waste Samples
441 Eastern Parkway
Field Sampling Procedures/Quality Assurance Project Plan

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
VOCs	SW-846	Soil	Surrogates % Rec.	Surrogates:	Field Duplicates	Field Duplicates:
(TCL or STARS)	Method 8260B		1,2-Dichloroethane-d4 61-133 4-Bromofluorobenzene 65-142 Dibromofluoromethane 70-120 Toluene-d8 75-123	All samples, standards, QC samples	RPD <50	One per 20 per soils
			Matrix Spikes	Matrix Spikes:	MS/MSDs (RPD)	MS/MSDs:
			1,1-Dichloroethene 47-136 Trichloroethene 42-145 Benzene 49-134 Toluene 41-143 Chlorobenzene 42-142	One per 20 per matrix type	1,1-Dichloroethene 20 Trichloroethene 19 Benzene 17 Toluene 19 Chlorobenzene 20	One per 20 per matrix type
PCBs	SW-846	Soil	Surrogates % Rec.	Surrogates:	Field Duplicates	Field Duplicates:
			Decachlorobiphenyl 40-151 Tetrachloro-m-xylene 37-140	All samples, standards, QC samples	RPD <50	One per 20 per soils
			Matrix Spikes	Matrix Spikes:	MS/MSDs (RPD)	MS/MSDs:
			Aroclor 1016 43-161 Aroclor 1020 37-164	One per 20 per matrix type	Aroclor 1016 19 Aroclor 1020 24	One per 20 per matrix type
PAHs	SW-846	Soil	Surrogates % Rec.	Surrogates:	Field Duplicates	Field Duplicates:
(CP-51)	Method 8270C		Nitrobenzene-d5 26-113 2-Fluorobiphenyl 40-106 Terphenyl-d14 35-142	All samples, standards, QC samples	RPD <50	One per 20
			Matrix Spikes	Matrix Spikes:	MS/MSDs (RPD)	MS/MSDs:
			Naphthalene 24-115 2-Methylnaphthalene 25-120 Acenaphthylene 31-105 Acenaphthene 31-118 Fluorene 35-123 Fluoranthene 28-130 Pyrene 18-149 Phenanthrene 31-128 Anthracene 31-129 Benzo(a)anthracene 31-129 Chrysene 27-134 Benzo(b)fluoranthene 21-151 Benzo(k)fluoranthene 29-142 Benzo(a)pyrene 26-133 Indeno(1,2,3-cd)pyrene 12-134 Dibenzo(a,h)anthracene 18-125 Benzo(g,h,i)perylene 0-132	One per 20 per matrix type	Naphthalene 25 2-Methylnaphthalene 23 Acenaphthylene 22 Acenaphthene 25 Fluorene 25 Fluoranthene 39 Pyrene 42 Phenanthrene 39 Anthracene 32 Benzo(a)anthracene 33 Chrysene 32 Benzo(b)fluoranthene 33 Benzo(k)fluoranthene 37 Benzo(a)pyrene 33 Indeno(1,2,3-cd)pyrene 34 Dibenzo(a,h)anthracene 31 Benzo(g,h,i)perylene 35	One per 20 per matrix type
SVOCs	SW-846	Soil	Surrogates % Rec.	Surrogates:	Field Duplicates	Field Duplicates:
(TCLP or CP-51) and Organophosphorous Pesticides	Method 8270C		Phenol-d5 34-110 2-Fluorophenol 33-105 2,4,6-Tribromophenol 33-124 Nitrobenzene-d5 26-113 2-Fluorobiphenyl 40-106 Terphenyl-d14 35-142	All samples, standards, QC samples	RPD <50	One per 20 per soils
			Matrix Spikes	Matrix Spikes:	MS/MSDs (RPD)	MS/MSDs:
			Phenol 40-109 2-Chlorophenol 43-107 4-Chloro-3-methylphenol 42-104 Acenaphthene 31-118 4-Nitrophenol 14-138 Pentachlorophenol 22-125 Pyrene 18-149	One per 20 per matrix type	Phenol 18 2-Chlorophenol 16 4-Chloro-3-methylphenol 19 Acenaphthene 25 4-Nitrophenol 34 Pentachlorophenol 21 Pyrene 42	One per 20 per matrix type

Table 3
Typical Laboratory Data Quality Objectives
Soil, Sediment, and Solid Waste Samples
441 Eastern Parkway
Field Sampling Procedures/Quality Assurance Project Plan

Parameter	Method	Matrix	Accuracy Control Limits		Accuracy Frequency Requirements	Precision (RPD) Control Limits		Precision Frequency Requirements
Pesticides (TCL)	SW-846 Method 8081A	Soil	Surrogates	% Rec.	Surrogates:	Field Duplicates		Field Duplicates:
			Decachlorobiphenyl	28-148	All samples, standards, QC samples			One per 20 per soils
			Tetrachloro-m-xylene	31-136		RPD <50		
			Matrix Spikes		Matrix Spikes:	MS/MSDs	(RPD)	MS/MSDs:
			Gamma-BHC	35-148	One per 20 per matrix	Gamma-BHC	29	One per 20 per matrix type
			Heptachlor	51-136		Heptachlor	32	
			Aldrin	49-137		Aldrin	29	
			Dieldrin	51-151		Dieldrin	28	
			Endrin	27-168		Endrin	30	
			4,4'-DDT	20-193		4,4'-DDT	42	
Total Petroleum Hydrocarbons	SW-846 Method 8015B	Soil	Surrogates	% Rec.	Surrogates:	Field Duplicates		Field Duplicates:
			o-Terphenyl	27-153	All samples, standards, QC samples			One per 20 per soils
			Tetracosane-d50	28-148		RPD <50		
			5α-androstane	27-148				
			TPH-DRO	10-149	One per 20 per matrix type	TPH-DRO	44	One per 20 per matrix type
Herbicides	SW-846 Method 8151A	Soil	Surrogates	% Rec.	Surrogates:	Field Duplicates		Field Duplicates:
			2,4-DCAA	10-147	All samples, standards, QC samples			One per 20 per soils
						RPD V50		
			Matrix Spikes		Matrix Spikes:	MS/MSDs	(RPD)	MS/MSDs:
			2,4-D	10-130	One per 20 per matrix type	2,4-D	53	One per 20 per matrix type
			2,4,5-TP	19-108		2,4,5-TP	59	
			2,4,5-T	10-121		2,4,5-T	62	
Metals (TAL)	SW-846 Methods 6010B/7000 Series	Soil	Surrogates	% Rec.	Surrogates:	Field Duplicates		Field Duplicates:
								One per 20 per soils
						RPD <50		
			Matrix Spikes		Matrix Spikes:	MS/MSDs	(RPD)	MS/MSDs:
			75-125% recovery		One per 20 per matrix type			One per 20 per matrix type
						RPD <20		
Cyanide	SW-846 Method 9012A	Soil	Surrogates	% Rec.	Surrogates:	Field Duplicates		Field Duplicates:
								One per 20 per soils
						RPD <50		
			Matrix Spikes		Matrix Spikes:	MS/MSDs	(RPD)	MS/MSDs:
			85-120% recovery		One per 20 per matrix type			One per 20 per matrix type
						RPD <10		
Total Organic Halides	SW-846 Method 9023	Soil	Surrogates	% Rec.	Surrogates:	Field Duplicates		Field Duplicates:
								One per 20 per soils
						RPD <50		
			Matrix Spikes		Matrix Spikes:	MS/MSDs	(RPD)	MS/MSDs:
			69-132% recovery		One per 20 per matrix type			One per 20 per matrix type
						RPD <16		

Table 3
Typical Laboratory Data Quality Objectives
Soil, Sediment, and Solid Waste Samples
441 Eastern Parkway
Field Sampling Procedures/Quality Assurance Project Plan

Parameter	Method	Matrix	Accuracy Control Limits		Accuracy Frequency Requirements	Precision (RPD) Control Limits		Precision Frequency Requirements
Organophosphorous	SW-846 Method 8141A	Soil	Surrogates	% Rec.	Surrogates:	Field Duplicates		Field Duplicates:
Pesticides			2-Nitro-m-xylene	67-134	All samples, standards, QC samples	RPD <50		One per 20 per soils
			Matrix Spikes		Matrix Spikes:	MS/MSDs	(RPD)	MS/MSDs:
			Parathion	63-147	One per 20 per matrix type	RPD <35		One per 20 per matrix type
TCLP VOCs (RCRA)	SW-846 Methods 1311/8260B	Solid Waste/Liquid Waste	Surrogates	% Rec.	Surrogates:	Field Duplicates		Field Duplicates:
			1,2-Dichloroethane-d4	65-133	All samples, standards, QC samples			
			4-Bromofluorobenzene	79-124				
			Dibromofluoromethane	77-121				
			Toluene-d8	80-117				
			Matrix Spikes		Matrix Spikes:	MS/MSDs	(RPD)	MS/MSDs:
			1,1-Dichloroethene	63-135	One per 20 per matrix type	1,1-Dichloroethene	15	One per 20 per matrix type
			1,2-Dichloroethane	62-150		1,2-Dichloroethane	15	
			2-Butanone	45-146		2-Butanone	19	
			Chloroform	73-133		Chloroform	14	
			Carbon Tetrachloride	65-152		Carbon Tetrachloride	17	
			Benzene	50-141		Benzene	13	
			Trichloroethene	64-139		Trichloroethene	13	
			Tetrachloroethene	60-138		Tetrachloroethene	14	
			Chlorobenzene	73-124		Chlorobenzene	12	
			Vinyl chloride	56-146		Vinyl chloride	18	
			1,4-Dichlorobenzene	71-122		1,4-Dichlorobenzene	13	
TCLP SVOCs (RCRA)	SW-846 Methods 1311/8270C	Solid Waste/Liquid Waste	Surrogates	% Rec.	Surrogates:	Field Duplicates		Field Duplicates:
			Phenol-d5	10-59	All samples, standards, QC samples			
			2-Fluorophenol	12-76				
			2,4,6-Tribromophenol	42-128				
			Nitrobenzene-d5	30-122				
			2-Fluorobiphenyl	34-113				
			Terphenyl-d14	42-125				
			Matrix Spikes		Matrix Spikes:	MS/MSDs	(RPD)	MS/MSDs:
			Hexachloroethane	24-118	One per 20 per matrix type	Hexachloroethane	33	One per 20 per matrix type
			Nitrobenzene	37-117		Nitrobenzene	28	
			Hexachlorobutadiene	29-119		Hexachlorobutadiene	30	
			2,4,6-Trichlorophenol	46-122		2,4,6-Trichlorophenol	26	
			2,4,5-Trichlorophenol	50-120		2,4,5-Trichlorophenol	25	
			2,4-Dinitrotoluene	45-129		2,4-Dinitrotoluene	25	
			Hexachlorobenzene	52-119		Hexachlorobenzene	22	
			Pentachlorophenol	38-134		Pentachlorophenol	20	
			Pyridine	10-91		Pyridine	41	
			2-Methylphenol	29-108		2-Methylphenol	27	
			3&4-Methylphenol	25-105		3&4-Methylphenol	26	
TCLP Pesticides (RCRA)	SW-846 Methods 1311/8081A	Solid Waste/Liquid Waste	Surrogates	% Rec.	Surrogates:	Field Duplicates		Field Duplicates:
			Decachlorobiphenyl	19-153	All samples, standards, QC samples			
			Tetrachloro-m-xylene	35-138				
			Matrix Spikes		Matrix Spikes:	MS/MSDs	RPD	MS/MSDs:
			Gamma-BHC	51-145	One per 20 per matrix type	Gamma-BHC	39	One per 20 per matrix type
			Heptachlor	46-149		Heptachlor	38	
			Heptachlor epoxide	49-154		Heptachlor epoxide	41	
			Endrin	56-151		Endrin	35	
			Methoxychlor	44-160		Methoxychlor	38	
			Technical Chlordane	50-150		Technical Chlordane	20	
			Toxaphene	50-150		Toxaphene	20	

Table 3
Typical Laboratory Data Quality Objectives
Soil, Sediment, and Solid Waste Samples
441 Eastern Parkway
Field Sampling Procedures/Quality Assurance Project Plan

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
TCLP Herbicides	SW-846 Methods 1311/8151A	Solid Waste/Liquid Waste	Surrogates % Rec. 2,4-DCAA 54-141 Matrix Spikes 2,4-D 37-146 2,4,5-TP 21-144	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20 per matrix type	Field Duplicates MS/MSDs RPD 2,4-D 40 2,4,5-TP 39	Field Duplicates: MS/MSDs: One per 20 per matrix type
TCLP Metals	SW-846 Methods 1311/ 6010B/7000	Solid Waste/Liquid Waste	Matrix Spikes 75-125% recovery	Matrix Spikes: One per 20 per matrix type	Matrix Duplicates RPD <20	Matrix Duplicates: One per 20 per matrix type
Ignitability	SW-846 Method 1010	Solid Waste/Liquid Waste	Not Applicable	Not Applicable	Matrix Duplicates RPD <46	Matrix Duplicates: One per 20 per matrix type
Corrosivity	SW-846 Method 9045C	Solid Waste/Liquid Waste	Not Applicable	Not Applicable	Matrix Duplicates RPD <5	Matrix Duplicates: One per 20 per matrix type
Reactive cyanide	SW-846 Chapter 7, Section	Solid Waste/Liquid Waste	Matrix Spikes 0-5% recovery	Not Applicable	Matrix Duplicates RPD <10	Matrix Duplicates: One per 20 per matrix type
Reactive sulfide	SW-846 Chapter 7, Section	Solid Waste/Liquid Waste	Matrix Spikes 1-80% recovery	Not Applicable	Matrix Duplicates RPD £10	Matrix Duplicates: One per 20 per matrix type
TPH-DRO	SW846 Method 8015B	Solid Waste	Surrogates % Rec. o-terphenyl 45-129 Matrix Spikes 21-136% recovery	Matrix Spikes: One per 20 per matrix	Matrix Duplicates RPD <20	Matrix Duplicates: One per 20 per matrix type
Recovery criteria for laboratory control samples must be at least as stringent as MS/MSD criteria. Laboratory control limits are periodically updated. The latest control limits will be utilized at the time of sample analysis.						

Table 4
Typical Laboratory Data Quality Objectives: Precision and Accuracy:
Groundwater and Wastewater Samples
441 Eastern Parkway
Field Sampling Procedures/Quality Assurance Project Plan

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
PFAS Perfluorobutanoic Acid (PFBA) Perfluoropentanoic Acid (PFPeA) Perfluorobutanesulfonic Acid (PFBS) Perfluorohexanoic Acid (PFHxA) Perfluoroheptanoic Acid (PFHpA) Perfluorohexanesulfonic Acid (PFHxS) Perfluorooctanoic Acid (PFOA) 1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS) Perfluoroheptanesulfonic Acid (PFHpS) Perfluorononanoic Acid (PFNA) Perfluorooctanesulfonic Acid (PFOS) Perfluorodecanoic Acid (PFDA) 1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS) N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA) Perfluoroundecanoic Acid (PFUnA) Perfluorodecanesulfonic Acid (PFDS) Perfluorooctanesulfonamide (FOSA) N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA) Perfluorododecanoic Acid (PFDoA) Perfluorotridecanoic Acid (PFTrDA) Perfluorotetradecanoic Acid (PFTA) PFOA/PFOS, Total	Modified EPA Method 537	Groundwater	LCS/MS Criteria: 71-135 LCS/MS Criteria: 69-132 LCS/MS Criteria: 72-128 LCS/MS Criteria: 70-132 LCS/MS Criteria: 71-131 LCS/MS Criteria: 67-130 LCS/MS Criteria: 69-133 LCS/MS Criteria: 64-140 LCS/MS Criteria: 70-132 LCS/MS Criteria: 72-129 LCS/MS Criteria: 68-136 LCS/MS Criteria: 69-133 LCS/MS Criteria: 65-137 LCS/MS Criteria: 63-144 LCS/MS Criteria: 64-136 LCS/MS Criteria: 59-134 LCS/MS Criteria: 67-137 LCS/MS Criteria: 61-139 LCS/MS Criteria: 69-135 LCS/MS Criteria: 66-139 LCS/MS Criteria: 69-133	Surrogates: All samples, QC samples Matrix Spikes: 1 per 20	LCS/MS/Duplicate RPD: 30	Field Duplicates: 1 per 20 MS/MSDs: 1 per 20
VOCs (CP-51 or TCL)	SW-846 Method 8260B	Groundwater	Surrogates % Rec. 1,2-Dichloroethane-d4 65-133 4-Bromofluorobenzene 79-124 Dibromofluoromethane 77-121 Toluene-d8 80-117 Matrix Spikes 1,1-Dichloroethene 63-135 Trichloroethene 64-139 Benzene 51-138 Toluene 49-147 Chlorobenzene 76-120	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20	Field Duplicates RPD <30 MS/MSDs RPD 1,1-Dichloroethene 15 Trichloroethene 13 Benzene 13 Toluene 13 Chlorobenzene 12	Field Duplicates: One per 20 MS/MSDs: One per 20
SVOCs (CP-51 or TCL)	SW-846 Method 8270C	Groundwater	Surrogates % Rec. Phenol-d5 10-59 2-Fluorophenol 12-76 2,4,6-Tribromophenol 42-128 Nitrobenzene-d5 30-122 2-Fluorobiphenyl 34-113 Terphenyl-d14 42-125 Matrix Spikes Phenol 10-86 2-Chlorophenol 37-112 4-Chloro-3-methylphenol 43-128 Acenaphthene 43-109 4-Nitrophenol 10-109 Pentachlorophenol 38-134 Pyrene 48-121	Surrogates: All samples, standards, QC Matrix Spikes: One per 20	Field Duplicates RPD <30 MS/MSDs RPD Phenol 30 2-Chlorophenol 26 4-Chloro-3-methylphenol Acenaphthene 28 4-Nitrophenol 40 Pentachlorophenol 20 Pyrene 22	Field Duplicates: One per 20 MS/MSDs: One per 20
Metals (TAL)	SW-846 Methods 6010B/7000 Series	Groundwater/Waste water	Matrix Spikes 75-125% recovery	Matrix Spikes: One per 20	Field Duplicates RPD <30 Matrix Duplicates RPD <20	Field Duplicates: One per 20 Matrix Duplicates: One per 20

Table 4
Typical Laboratory Data Quality Objectives: Precision and Accuracy:
Groundwater and Wastewater Samples
441 Eastern Parkway
Field Sampling Procedures/Quality Assurance Project Plan

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
Ammonia	EPA Method 350.1 (350.2 for distillation)	Groundwater			Field Duplicates	Field Duplicates:
					RPD <30	One per 20
			Matrix Spikes	Matrix Spikes:	Matrix Duplicates	Matrix Duplicates:
			63-131% recovery	One per 20	RPD <24	One per 20
Nitrate	EPA Method 353.2/SM 4500-NO_2B (18th edition)	Groundwater			Field Duplicates	Field Duplicates:
					RPD <30	One per 20
			Matrix Spikes	Matrix Spikes:	Matrix Duplicates	Matrix Duplicates:
			80-120% recovery	One per 20	RPD <20	One per 20
Nitrite	SM 4500-NO_2B (18th edition)	Groundwater			Field Duplicates	Field Duplicates:
					RPD <30	One per 20
			Matrix Spikes	Matrix Spikes:	Matrix Duplicates	Matrix Duplicates:
			71-120% recovery	One per 20	RPD <10	One per 20
Pesticides (TCL)	SW-846 Method 8081A	Groundwater	Surrogates % Rec.	Surrogates:	Field Duplicates	Field Duplicates:
			Decachlorobiphenyl 15-142	All samples, standards, QC samples		One per 20
			Tetrachloro-m-xylene 36-126		RPD <30	
			Matrix Spikes	Matrix Spikes:	MS/MSDs RPD	MS/MSDs:
			Gamma-BHC 64-140	One per 20	Gamma-BHC 23	One per 20
			Heptachlor 52-145		Heptachlor 24	
			Aldrin 52-137		Aldrin 30	
			Dieldrin 65-153		Dieldrin 22	
			Endrin 61-156		Endrin 21	
			4,4'-DDT 55-162		4,4'-DDT 25	

Table 4
Typical Laboratory Data Quality Objectives: Precision and Accuracy:
Groundwater and Wastewater Samples
441 Eastern Parkway
Field Sampling Procedures/Quality Assurance Project Plan

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
Sulfate	SW-846 9056	Groundwater	Matrix Spikes 80-120% recovery	Matrix Spikes: One per 20	Field Duplicates RPD <30 Matrix Duplicates RPD <20	Field Duplicates: One per 20 Matrix Duplicates: One per 20
Carbonate	SM 4500-CO_2D (18^{th} edition)	Groundwater	Not Applicable	Not Applicable	Field Duplicates RPD <30 Matrix Duplicates RPD <10	Field Duplicates: One per 20 Matrix Duplicates: One per 20
Bicarbonate	SM 4500-CO_2D (18^{th} edition)	Groundwater	Not Applicable	Not Applicable	Field Duplicates RPD <30 Matrix Duplicates RPD <10	Field Duplicates: One per 20 Matrix Duplicates: One per 20
Cyanide	EPA Method 335.3	Groundwater	Matrix Spikes 75-125% recovery	Matrix Spikes: One per 20	Field Duplicates RPD <30 Matrix Duplicates RPD <23	Field Duplicates: One per 20 Matrix Duplicates: One per 20
Total Dissolved Solids	EPA Method 160.1	Groundwater	Not Applicable	Not Applicable	Field Duplicates RPD <30 Matrix Duplicates RPD <16	Field Duplicates: One per 20 Matrix Duplicates: One per 20
Chloride	EPA Method 300.0	Groundwater	Matrix Spikes 80-120% recovery	Matrix Spikes: One per 20	Field Duplicates RPD <30 Matrix Duplicates RPD <20	Field Duplicates: One per 20 Matrix Duplicates: One per 20
Total Petroleum Hydrocarbons	EPA Method 418.1	Wastewater	Matrix Spikes 55-132% recovery	Matrix Spikes: One per 20	Field Duplicates RPD <30 Matrix Duplicates RPD <24	Field Duplicates: One per 20 Matrix Duplicates: One per 20
pH	EPA Method 150.1	Wastewater	Not Applicable	Not Applicable	Field Duplicates RPD <30 Matrix Duplicates RPD <10	Field Duplicates: One per 20 Matrix Duplicates: One per 20
Amenable Cyanide	EPA Method 335.2	Wastewater	Not Applicable	Not Applicable	Field Duplicates RPD <30 Matrix Duplicates RPD <16	Field Duplicates: One per 20 Matrix Duplicates: One per 20
Hexavalent Chromium	SW-846 Method 7196A	Wastewater	Matrix Spikes 85-115% recovery	Matrix Spikes: One per 20	Field Duplicates RPD <30 Matrix Duplicates RPD <20	Field Duplicates: One per 20 Matrix Duplicates: One per 20

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

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

Table 4-1

PFAS Analyte List

441 Eastern Parkway

Field Sampling Procedures/Quality Assurance Project Plan

Group	Chemical Name	Abbreviation	CAS Number	MDL
Perfluoroalkyl sulfonates	Perfluorobutanesulfonic acid	PFBS	375-73-5	0.039
	Perfluorohexanesulfonic acid	PFHxS	355-46-4	0.0605
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8	0.1365
	Perfluorooctanesulfonic acid	PFOS	1763-23-1	0.13
	Perfluorodecanesulfonic acid	PFDS	335-77-3	0.153
Perfluoroalkyl carboxylates	Perfluorobutanoic acid	PFBA	375-22-4	0.0227
	Perfluoropentanoic acid	PFPeA	2706-90-3	0.046
	Perfluorohexanoic acid	PFHxA	307-24-4	0.0525
	Perfluoroheptanoic acid	PFHpA	375-85-9	0.0451
	Perfluorooctanoic acid	PFOA	335-67-1	0.0419
	Perfluorononanoic acid	PFNA	375-95-1	0.075
	Perfluorodecanoic acid	PFDA	335-76-2	0.067
	Perfluoroundecanoic acid	PFUA/PFUdA	2058-94-8	0.0468
	Perfluorododecanoic acid	PFDoA	307-55-1	0.07
	Perfluorotridecanoic acid	PFTriA/PFTrDA	72629-94-8	0.2045
	Perfluorotetradecanoic acid	PFTA/PFTeDA	376-06-7	0.054
Fluorinated Telomer Sulfonates	6:2 Fluorotelomer sulfonate	6:2 FTS	27619-97-2	0.1795
	8:2 Fluorotelomer sulfonate	8:2 FTS	39108-34-4	0.287
Perfluorooctanesulfonamides	Perfluroroctanesulfonamide	FOSA	754-91-6	0.098
Perfluorooctanesulfonamidoacetic acids	N-methyl perfluorooctanesulfonamidoacetic aci	N-MeFOSAA	2355-31-9	0.2015
	N-ethyl perfluorooctanesulfonamidoacetic acid	N-EtFOSAA	2991-50-6	0.0845

Table 5
Typical Laboratory Data Quality Objectives: Precision and Accuracy: Soil Gas Samples
441 Eastern Parkway
Field Sampling Procedures/Quality Assurance Project Plan

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

Table 6
QC Sample Preservation and Container Requirements
441 Eastern Parkway
Field Sampling Procedures/Quality Assurance Project Plan

Sample Matrix	Analytical Parameter	Sample Type	No. of Samples	EPA Analytical Method	Sample Preservation	Holding Time[1]	Sample Container[2]
Soil/Sediment	VOCs (CP-51 or TCL)	Field Duplicate	TBD	SW-846 Method 8260B	Cool to 4^0 C; no headspace	14 days to analysis	(2) 2-oz. glass jars
Soil/Sediment	PCBs	Field Duplicate	TBD	SW-846 Method 8082A	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil/Sediment	Pesticides (TCL)	Field Duplicate	TBD	SW-846 Method 8081A	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil	Herbicides	Field Duplicate	TBD	SW-846 Method 8151A	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil/Sediment	PAHs or SVOCs (CP-51 or TCL)	Field Duplicate	TBD	SW-846 Method 8270C	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil	Cyanide	Field Duplicate	TBD	SW-846 Method 9012A	Cool to 4^0 C	14 days to analysis	(1) 300 mL amber glass jar
Soil/Sediment	Metals (TAL)	Field Duplicate	TBD	SW-846 Method 6010B/7000 Series	Cool to 4^0 C	28 days to analysis for Hg; 6 months to analysis for other metals	(1) 300 mL amber glass jar
Groundwater	VOCs (CP-51S or TCL)	Field Duplicate	TBD	SW-846 Method 8260B	pH<2 with HCl; Cool to 4^0 C; no headspace	14 days to analysis	(2) 40 mL VOA vials
Soil	Organophosphorous Pesticides	Field Duplicate	TBD	SW-846 Method 8270C or 8141A	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Groundwater	SVOCs (CP-51 or TCL)	Field Duplicate	TBD	SW-846 Method 8270C	Cool to 4^0 C	7 days to extraction; 40 days from	(2) 950 mL amber glass jars
Groundwater	Pesticides (TCL)	Field Duplicate	TBD	SW-846 Method 8081A	Cool to 4^0 C	7 days to extraction; 40 days from extraction to analysis	(2) 950 mL amber glass jars

Table 6
QC Sample Preservation and Container Requirements
441 Eastern Parkway
Field Sampling Procedures/Quality Assurance Project Plan

Sample Matrix	Analytical Parameter	Sample Type	No. of Samples	EPA Analytical Method	Sample Preservation	Holding Time[1]	Sample Container[2]
Groundwater	Metals- total (TAL)	Field Duplicate	TBD	SW-846 Method 6010B/7000 Series	pH<2 with HNO_3; Cool to 4^0 C	28 days to analysis for Hg; 6 months to analysis for other metals	(1) 1 L polyethylene container
Groundwater	Metals- dissolved (TAL)	Field Duplicate	TBD	SW-846 Method 6010B/7000 Series	Cool to 4^0 C	24 hours to filtering and preservation (pH<2 with HNO_3); 28 days to analysis for Hg; 6 months to analysis for other metals	(1) 1 L polyethylene container
Groundwater	Ammonia	Field Duplicate	TBD	EPA Method 350.1 (350.2 for distillation)	pH<2 with H_2SO_4; Cool to 4^0 C	28 days to analysis	(1) 250 mL polyethylene container
Groundwater	Nitrate	Field Duplicate	TBD	EPA Method 353.2/SM 4500-NO_2B (18^{th} edition)	pH<2 with H_2SO_4; Cool to 4^0 C	28 days to analysis	(1) 100 mL polyethylene container
Groundwater	Nitrite	Field Duplicate	TBD	SM 4500-NO_2B (18^{th} edition)	Cool to 4^0 C	48 hours to analysis	(1) 100 mL polyethylene container
Groundwater	Sulfate	Field Duplicate	TBD	SW-846 9056	Cool to 4^0 C	As soon as possible (within 3 days of collection)	(1) 100 mL polyethylene container
Groundwater	Carbonate	Field Duplicate	TBD	SM 4500-CO_2D (18^{th} edition)	Cool to 4^0 C	14 days to analysis	(1) 250 mL polyethylene container
Groundwater	Bicarbonate	Field Duplicate	TBD	SM 4500-CO_2D (18^{th} edition)	Cool to 4^0 C	14 days to analysis	(1) 250 mL polyethylene container
Groundwater	Cyanide	Field Duplicate	TBD	EPA Method 335.3	pH>12 with NaOH; Cool to 4ºC	14 days to analysis	(1) 250 mL polyethylene container
Groundwater	Chloride	Field Duplicate	TBD	EPA Method 300.0	Cool to 4ºC	28 days to analysis	(1) 100 mL polyethylene container
Groundwater	Total Dissolved Solids	Field Duplicate	TBD	EPA Method 160.1	Cool to 4ºC	7 days to analysis	(1) 100 mL polyethylene container
Aqueous	Ammonia	Equipment Blank	TBD	EPA Method 350.1 (350.2 for distillation)	pH<2 with H_2SO_4; Cool to 4^0 C	28 days to analysis	(1) 250 mL polyethylene container

Table 6
QC Sample Preservation and Container Requirements
441 Eastern Parkway
Field Sampling Procedures/Quality Assurance Project Plan

Sample Matrix	Analytical Parameter	Sample Type	No. of Samples	EPA Analytical Method	Sample Preservation	Holding Time[1]	Sample Container[2]
Aqueous	Nitrate	Equipment Blank	TBD	EPA Method 353.2/SM 4500-NO_2B (18^{th} edition)	pH<2 with H_2SO_4; Cool to 4^0 C	28 days to analysis	(1) 100 mL polyethylene container
Aqueous	Nitrite	Equipment Blank	TBD	SM 4500-NO_2B (18^{th} edition)	Cool to 4^0 C	48 hours to analysis	(1) 100 mL polyethylene container
Aqueous	Sulfate	Equipment Blank	TBD	SW-846 9056	Cool to 4^0 C	As soon as possible (within 3 days of collection)	(1) 100 mL polyethylene container
Aqueous	Carbonate	Equipment Blank	TBD	SM 4500-CO_2D (18^{th} edition)	Cool to 4^0 C	14 days to analysis	(1) 250 mL polyethylene container
Aqueous	Bicarbonate	Equipment Blank	TBD	SM 4500-CO_2D (18^{th} edition)	Cool to 4^0 C	14 days to analysis	(1) 250 mL polyethylene container
Aqueous	Cyanide	Equipment Blank	TBD	SW-846 Method 9010B	pH>12 with NaOH; Cool to 4ºC	14 days to analysis	(1) 250 mL polyethylene container
Aqueous	Chloride	Equipment Blank	TBD	SW-846 Method 9250	Cool to 4ºC	28 days to analysis	(1) 100 mL polyethylene container
Aqueous	Total Dissolved Solids	Equipment Blank	TBD	EPA Method 160.1	Cool to 4ºC	7 days to analysis	(1) 100 mL polyethylene container
Aqueous	VOCs (CP-51 or TCL)	Equipment Blank	TBD	SW-846 Method 8260B	pH<2 with HCl Cool to 4^0 C; no headspace	14 days to analysis	(2) 40 mL VOA vials
Aqueous	Pesticides (TCL)	Equipment Blank	TBD	SW-846 Method 8081A	Cool to 4^0 C	7 days to extraction; 40	(2) 950 mL amber glass jars
Aqueous	PCBs	Equipment Blank	TBD	SW-846 Method 8082A	Cool to 4^0 C	7 days to extraction; 40 days from extraction to analysis	(2) 950 mL amber glass jars
Aqueous	SVOCs (CP-51 or TCL)	Equipment Blank	TBD	SW-846 Method 8270C	Cool to 4^0 C	7 days to extraction; 40 days from	(2) 950 mL amber glass jars
Aqueous	PAHs (CP-51)	Equipment Blank	TBD	SW-846 Method 8270C	Cool to 4^0 C	7 days to extraction; 40	(2) 950 mL amber glass jars
Groundwater	NYSDEC List of 21 PFAS Compounds	Grab	TBD	Modified EPA Method 537	Pre preserved with 1.25 g Trizma	14 days to extraction, 28 days following extraction	(3) 250 milliliter HDPE or polypropylene containers
Aqueous	Herbicides	Equipment Blank	TBD	SW-846 Method 8151A	Cool to 4^0 C	7 days to extraction; 40 days from extraction to analysis	(2) 950 mL amber glass jars

Table 6
QC Sample Preservation and Container Requirements
441 Eastern Parkway
Field Sampling Procedures/Quality Assurance Project Plan

Sample Matrix	Analytical Parameter	Sample Type	No. of Samples	EPA Analytical Method	Sample Preservation	Holding Time[1]	Sample Container[2]
Aqueous	Metals-total (TAL)	Equipment Blank	TBD	SW-846 Method 6010B/7000 Series	pH<2 with HNO_3; Cool to 4^0 C	28 days to analysis for Hg; 6 months to analysis for other metals	(1) 1 L polyethylene container
Aqueous	Metals-dissolved (TAL)	Equipment Blank	TBD	SW-846 Method 6010B/7000 Series	Cool to 4^0 C	24 hours to filtering and preservation (pH<2 with HNO_3); 28 days to analysis for Hg; 6 months to analysis for other metals	(1) 1 L polyethylene container
Aqueous	VOCs (CP-51 or TCL)	Trip Blank	TBD	SW-846 Method 8260B	pH<2 with HCl Cool to 4^0 C; no headspace	14 days to analysis	(2) 40 mL VOA vials

Notes:
[1] Holding times listed are method holding time calculated from time of collection and not NYSDEC ASP holding times.
[2] I-Chem Series 300 bottles
TBD = To Be Determined

Attachment 1

June 2019

Sampling for 1,4-Dioxane and Per- and Polyfluoroalkyl Substances (PFAS) Under DEC's Part 375 Remedial Programs

Objective

The Department of Environmental Conservation (DEC) is requiring sampling of all environmental media and subsequent analysis for the emerging contaminants 1,4-Dioxane and PFAS as part of all remedial programs implemented under 6 NYCRR Part 375, as further described in the guidance below.

Sample Planning

The number of samples required for emerging contaminant analyses is to be the same number of samples where "full TAL/TCL sampling" would typically be required in an investigation or remedial action compliance program.

Sampling of all media for ECs is required at all sites coming into or already in an investigative phase of any DER program. In other words, if the sampling outlined in the guidance hasn't already been done or isn't part of an existing work plan to be sampled for in the future, it will be necessary to go back out and perform the sampling prior to approving a SC report or issuing a decision document.

PFAS and 1,4-dioxane shall be incorporated into the investigation of potentially affected media, including soil, groundwater, surface water, and sediment as an addition to the standard "full TAL/TCL sampling." Biota sampling may be necessary based upon the potential for biota to be affected as determined pursuant to a Fish and Wildlife Impact analysis. Soil vapor sampling for PFAS and 1,4-dioxane is not required.

Upon an emerging contaminant being identified as a contaminant of concern (COC) for a site, those compounds must be assessed as part of the remedy selection process in accordance with Part 375 and DER-10 and included as part of the monitoring program upon entering the site management phase.

Special Testing Requirements for Import or Reuse of Soil: Soil imported to a site for use in a soil cap, soil cover, or as backfill must be tested for 1,4-dioxane and PFAS contamination in general conformance with DER-10, Section 5.4(e). Soil samples must be analyzed for 1,4-dioxane using EPA Method 8270, as well as the full list of PFAS compounds (currently 21) using EPA Method 537.1 (modified).

For 1,4-dioxane, soil exceeding 0.1 ppm must be rejected per DER 10: Appendix 5 - Allowable Constituent Levels for Imported Fill or Soil, Subdivision 5.4(e).

If PFOA or PFOS is detected in any sample at or above 1 ppb, then a soil sample must be tested by the Synthetic Precipitation Leaching Procedure (SPLP) and the leachate analyzed. If the SPLP results exceed 70 ppt combined PFOA/S, then the source of backfill must be rejected. Remedial parties have the option of analyzing samples concurrently for both PFAS in soil and in the SPLP leachate to minimize project delays.

The work plan should explicitly describe analysis and reporting requirements, including laboratory analytical procedures for modified methods discussed below.

Analysis and Reporting

Labs should provide a full category B deliverable, and a DUSR should be prepared by an independent 3rd party data validator. QA/QC samples should be collected as required in DER-10, Section 2.3(c). The electronic data submission should meet the requirements provided at: https://www.dec.ny.gov/chemical/62440.html.

PFAS analysis and reporting: DEC has developed a *PFAS Analyte List* (below) for remedial programs. It is expected that reported results for PFAS will include, at a minimum, all the compounds listed. If lab and/or matrix specific issues are encountered for any compounds, the DEC project manager, in consultation with the DEC remedial program chemist, will make case-by-case decisions as to whether certain analytes may be temporarily or permanently discontinued from analysis at each site.

Currently, ELAP does not offer certification for PFAS compounds in matrices other than finished drinking water. However, laboratories analyzing environmental samples (e.g., soil, sediments, and groundwater) are required by DER to hold ELAP certification for PFOA and PFOS in drinking water by EPA Method 537 or ISO 25101. Labs must also adhere to the requirements and criteria set forth in the Laboratory Guidance for Analysis of PFAS in Non-Potable Water and Solids.

Modified EPA Method 537 is the preferred method to use for environmental samples due to its ability to achieve very low detection limits. Reporting limits for PFAS in groundwater and soil are to be 2 ng/L (ppt) and 1 ug/kg (ppb), respectively. If contract labs or work plans submitted by responsible parties indicate that they are not able to achieve these reporting limits for the entire list of 21 PFAS, site-specific decisions will need to be made by the DEC project manager in consultation with the DEC remedial program chemist. Note: Reporting limits for PFOA and PFOS in groundwater should not exceed 2 ng/L.

Additional laboratory methods for analysis of PFAS may be warranted at a site. These methods include Synthetic Precipitation Leaching Procedure (SPLP) by EPA Method 1312 and Total Oxidizable Precursor Assay (TOP Assay).

SPLP is a technique for determining the potential for chemicals in soil to leach to groundwater and may be helpful in determining the need for addressing PFAS-containing soils or other solid material as part of the remedy. SPLP sampling need not be considered if there are no elevated PFAS levels in groundwater. If elevated levels of PFAS are detected in water, and PFAS are also seen in soil, then an SPLP test should be considered to better understand the relationship between the PFAS in the two media.

The TOP Assay can assist in determining the potential PFAS risk at a site. For example, some polyfluoroalkyl substances may transform to form perfluoroalkyl substances, resulting in an increase in perfluoroalkyl substance concentrations as contaminated groundwater moves away from the site. To conceptualize the amount and type of oxidizable perfluoroalkyl substances which could be liberated in the environment, a “TOP Assay” analysis can be performed, which approximates the maximum concentration of perfluoroalkyl substances that could be generated if all polyfluoroalkyl substances were oxidized.

PFAS-containing materials can be made up of per- and polyfluoroalkyl substances that are not analyzable by routine analytical methodology (LC-MS/MS). The TOP assay converts, through oxidation, polyfluoroalkyl substances (precursors) into perfluoroalkyl substances that can be detected by current

analytical methodology. Please note that analysis of highly contaminated samples, such as those from an AFFF site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances. Please consult with a DEC remedial program chemist for assistance interpreting the results.

1,4-Dioxane analysis and reporting: The reporting limit for 1,4-dioxane in groundwater should be no higher than 0.35 µg/L (ppb) and no higher than 0.1 mg/kg (ppm) in soil. Although ELAP offers certification for both EPA Method 8260 and EPA Method 8270 for 1,4-dioxane, DER is advising the use of Method 8270 SIM for water samples and EPA Method 8270 for soil samples. EPA Method 8270 SIM is not necessary for soils if the lab can achieve the required reporting limits without the use of SIM. Note: 1,4-dioxane is currently listed as a VOC in the Part 375 SCO tables but will be moved to the SVOC table with the next update to Part 375.

Refinement of sample analyses: As with other contaminants that are analyzed for at a site, the emerging contaminant analyte list may be refined for future sampling events based on investigative findings. Initially, however, sampling using this PFAS Analyte List and 1,4-dioxane is needed to understand the nature of contamination.

PFAS Analyte List

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

Attachment 2

PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide guidance for collecting samples for per- and poly-fluorinated alkyl substances (PFAS) analyses. *Please note that PFAS are emerging contaminants; therefore, this SOP will be modified as new information becomes available.*

Because of the potential presence of PFAS in common consumer products and in equipment typically used to collect groundwater samples, and the low detection limits associated with laboratory PFAS analyses, special handling and care must be taken when collecting samples for PFAS analyses.

This SOP outlines general practices for collecting PFAS samples and provides a summary of non-acceptable field and sampling materials (likely to contain PFAS) and acceptable alternatives.

BACKGROUND

Based on U.S. Environmental Protection Agency (USEPA) guidance[1], "per- and polyfluoroalkyl substances (PFAS)" is the preferred term to refer to this class of chemicals, although the general public and others may also refer to them as "perfluorinated chemicals (PFCs)" or "perfluorinated compounds (PFCs)."

PFAS are a family of man-made compounds that do not naturally occur in the environment. They have a large number of industrial uses and are found in many commercial products because of their properties to resist heat, oil, grease, and water. Once released to the environment, PFAS are persistent and do not readily biodegrade or break down. There are areas within the United States where widespread PFAS impacts to drinking water supplies have been identified.

The USEPA issued drinking water lifetime health advisories for two PFAS compounds, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) on May 19, 2016. The State of Michigan has adopted three groundwater standards (effective January 2018): 70 parts per trillion (ppt) for PFOA, 70 ppt for perfluorooctane sulfonic acid (PFOS), and 70 ppt for PFOA and PFOS combined, where the chemicals are found together.

RESOURCES

Frequently asked questions, fact sheets and additional information concerning PFAS can be found on the EPA website[2]. The Northeast Waste Management Officials' Association (NEWMOA) provided a five-part webinar training[3] series in 2016. The National Groundwater Association (NGWA) published a PFAS guidance document *Groundwater and PFAS: State of Knowledge and Practice* in 2017. Other training events and information are available online. The Interstate Technology & Regulatory Council (ITRC)[4] is also in the process of preparing educational materials, which will also be available online when completed.

GENERAL GUIDANCE

SITE CONTROL

Due to the ease by which cross-contamination may occur when collecting samples for PFAS analyses, strict site control must be maintained. During daily setup, the field team shall clearly demarcate an exclusion zone (area within approximately 30 feet of sampling location). The exclusion zone shall be marked with stakes, cones, flags, caution tape, or equivalent visual cues. Visitors to the sampling area (including other contractors, managers, regulators, residents, and the public) must stay outside of the exclusion zone while sampling and investigation activities are on-going. If an individual requests access to the exclusion zone, they must receive training on the components of this SOP that are pertinent to the activities occurring at the

[1] https://www.epa.gov/pfas/what-are-pfcs-and-how-do-they-relate-and-polyfluoroalkyl-substances-pfass

[2] https://www.epa.gov/pfas/what-are-pfcs-and-how-do-they-relate-and-polyfluoroalkyl-substances-pfass

[3] http://www.newmoa.org/cleanup/workshops.cfm

[4] http://www.itrcweb.org

time of their access and they will be subject to GZA's health and safety plan. Documentation of all non-GZA personnel within the exclusion zone shall be provided in the daily field summary as well as on the field sample data sheet.

PERSONAL PROTECTIVE EQUIPMENT

Disposable nitrile gloves must be worn at all times within the exclusion zone. Further, a new pair of nitrile gloves shall be donned prior to the following activities at each sample location:

1. Decontamination of re-usable sampling equipment.
2. Contact with sample bottles or water containers.
3. Insertion of anything into the well (e.g., tubing, pump, bailer, water level meter).
4. Insertion of silicon tubing into the peristaltic pump.
5. Sample collection upon completion of monitoring well purging.
6. Handling of any quality assurance/quality control samples including field blanks and equipment blanks.

New gloves shall also be donned after the handling of any non-dedicated sampling equipment, contact with non-decontaminated surfaces, or when judged necessary by field personnel.

Typically, 3 pairs of gloves are required when collecting PFAS samples at a location. Gloves may be worn in layers so that gloves are removed between tasks revealing a set of clean gloves below:

- One pair of gloves is used for sample preparation (exclusion zone setup, transporting coolers to the sample site, preparing field documentation);
- A new pair is donned for labeling sample bottles; and
- A new pair is donned for the sample collection. The use of a different colored glove (e.g., bright orange) for the collection of PFAS samples can help provide a visual reminder to prevent cross-contamination.

Note that field blanks and equipment blanks require a clean set of gloves to avoid cross-contamination with the field samples. Once PFAS samples are collected then bottles for other analytes may be filled if required.

SAMPLE COLLECTION METHOD/SEQUENCE

Bottleware for PFAS samples is provided by the laboratory and should arrive onsite or at the staging area in coolers separate from other (non-PFAS sample) bottleware. Additionally, PFAS bottleware should arrive packaged in Ziploc® brand or equivalent LDPE resealable bags. These bags are used to re-package the PFAS samples following collection. Samples are returned to the laboratory coolers separate from other types of samples to reduce the likelihood of cross-contamination.

During sample collection there are two individuals with different roles. One individual is responsible for handling and labelling the sample bottles and physically collecting the sample (referred to as Clean Hands). The other individual is responsible for purging and disposing of purge water and handling all non-dedicated equipment (referred to as Dirty Hands). The typical sampling procedures is:

1. Clean Hands puts on a new pair of gloves and labels the bottles with information for the lab.
2. Clean Hands then places the bottleware back in the Ziploc® bag provided by the laboratory.
3. After donning a new pair of nitrile gloves, Clean Hands collects the sample for PFAS ***first***, prior to collecting samples for any other parameters into any other containers; this avoids contact with any other type of sample container, bottles or packaging materials that may have PFAS-related content. Clean Hands shall remove the bottles (1 at a time) from the plastic bag, remove the cap and obtain the sample. Gloves are removed after each sample and clean gloves are donned for subsequent PFAS samples.

4. Do not place the sample bottle cap on any surface when collecting the sample and avoid all contact with the inside of the sample bottle or its cap. Do not allow sample ports, spigots, and tubes to touch the inside of the bottle or cap.
5. Once the sample is collected, capped and labeled, place the sample bottle(s) in the laboratory-provided Ziploc® bag and place in a PFAS sample-dedicated cooler packed only with double-bagged ice.

SAMPLES COLLECTED FROM MONITORING WELLS

1. If collecting field parameters using a multiparameter meter, samples for laboratory analyses must be collected before the flow-through cell and the three-way stopcock. This will be done by disconnecting the three-way stopcock from the pump discharge tubing so that the samples are collected directly from the pump tubing.
2. When feasible, use dedicated, single-use, or disposable polyethylene or silicone materials (tubing, bailers, etc.) for monitoring well purging and sampling equipment.
3. When reuse of materials or sampling equipment across multiple sampling locations is necessary, follow project decontamination protocols as defined in the QAPP and using allowed materials identified in the table below. If reusable equipment is used, incorporate collection of equipment blanks into the sampling program.
4. When using positive displacement/submersible pump or bladder pump sampling equipment, familiarize yourself with the sampling pump/accessory equipment specifications to confirm that device components are not made of nor contain polytetrafluoroethylene (PTFE, also known as Teflon®) or other PFAS-containing components. For details, please see the list of prohibited and allowed items below.

DECONTAMINATION

Decontamination fluids have been viewed as a possible source of equipment cross contamination. Therefore, more frequent changes of decontamination liquids may be warranted. Refer to the Equipment and Materials Table below for prohibited and acceptable decontamination liquids.

A final rinse with "PFAS-free" deionized (DI) water is required.

ADDITIONAL CONSIDERATIONS

1. No food or drink shall be brought on-site, with the exception of bottled water and hydration drinks (i.e., Gatorade® and Powerade®) and available for consumption only outside of the exclusion zone.
2. When field personnel require a break to eat or drink, they should remove their gloves and coveralls (if used) and move to an appropriate (downwind) location. When finished, field personnel should then wash with approved materials and put their coveralls (if used) and gloves back on prior to returning to the exclusion zone.
3. Visitors to the site are asked to remain outside of the exclusion zone. Visitors wishing to enter the exclusion zone must have appropriate PPE, be trained on applicable portions of this SOP, and will be subject to GZA's health and safety plan.
4. Note that "PFAS-free" water may contain other contaminants (such as VOCs); therefore, equipment blanks collected for PFAS should utilize "PFAS-free" water while those collected for other analytes should use laboratory-provided water or commercial deionized water depending on the site-specific QAPP requirements.
5. Collect a field blank from each batch of PFAS-free DI water while in the field by pouring an aliquot of the water into the appropriate PFAS sample container. Leaving the lid off of the PFAS-free water container and submitting that container to the laboratory is not acceptable.
6. Refer to the site-specific QAPP for the quantity of field blanks to be collected. At a minimum, field blanks must be collected by the person (clean hands) collecting PFAS samples. Consideration should also be given to when the field blank should be collected so that it is representative of the conditions most likely to influence the sample.

EQUIPMENT AND MATERIALS

The following table provides a summary of items that are likely to contain PFAS (i.e., prohibited items) and that are not to be used by the sampling team at the site, along with acceptable alternatives. This list may change as new information becomes available.

Category	Prohibited Items	Allowable Items
Field Equipment Including: • Pumps • Tubing • Bailers	Teflon and other fluoropolymer-containing materials (e.g., Teflon tubing, bailers, tape; Teflon-containing plumbing paste, or other Teflon materials) **Note**: The Grundfos Redi-Flow Submersible Pump is a submersible pump which, as of this revision, has a Teflon impeller and is not recommended for collecting PFAS samples.	High-density polyethylene (HDPE) - *preferred,* or silicone tubing HDPE or stainless steel bailers Peristaltic pumps Stainless steel submersible pumps (e.g., ProActive stainless steel pumps with PVC [polyvinyl chloride]) leads and Geotech Stainless Steel Geosub pumps) Bladder pumps with polyethylene bladders and tubing need to be evaluated on a case by case basis because the gaskets and O-rings may contain PFAS. Equipment with Viton components needs to be evaluated on a case by case basis. Viton contains PTFE but may be acceptable if used in gaskets or O-rings that are sealed away and will not come into contact with sample or sampling equipment.) Gasoila NT Non-PTFE Thread Sealant™ has been confirmed by the manufacturer to be PFAS-free and is acceptable for use.
Health & Safety Equipment	Leather Gloves (may be treated)	Cut resistant gloves: MaxiFlex Cut cut-resistant gloves
Decontamination	Decon 90	Alconox®, Liquinox®[1], or Citranox®, potable water followed by triple rinse with "PFAS-free" deionized water.
Sample Storage and Preservation	LDPE or glass bottles, PTFE-or Teflon-lined caps, chemical ice packs	Laboratory-provided sample container -*preferred*; or, HDPE or polypropylene bottles with an unlined plastic screw cap, as specified by the laboratory doing the analysis, regular ice double-bagged in Ziploc® brand bags. Bubble wrap may be used for shipping provided it does not come into contact with the inside of the bottle or cap before, during, or after sampling.
Field Documentation	Waterproof/treated paper or field books, recycled paper, plastic clipboards, binders, Sharpie® and other markers, electrical tape, Post-It® and other adhesive paper products.	Plain Paper, metal clipboard, ballpoint pens Duct Tape is acceptable provided it doesn't contact the media that is being sampled.

Category	Prohibited Items	Allowable Items
Clothing/Laundering	Clothing or boots made of or with Gore-Tex™ or other synthetic water proof/ resistant and/or stain resistant materials, coated Tyvek® material that may contain PFAS, fabric protectors (including UV protection), insect-resistant chemicals, stain-resistant chemicals; Fabric softener	Synthetic or cotton material, previously laundered clothing washed greater than six times without the use of fabric softeners. Polyurethane and wax coated materials. Boots made with polyurethane and PVC, untreated leather boots Tyvek material that is PFAS free (e.g., uncoated)
Personal Care Products (for day of sample collection)	Cosmetics, moisturizers, hand cream, antiperspirant/deodorant, scented body wash/shampoo/conditioner and other related products. Hand sanitizer gel. Dental floss and plaque removers.	**Personal Care Items:** Unscented soaps (7th Generation unscented, Tom's of Maine Unscented, or similar. No "naturally scented" items) **Sunscreens:** Alba Organics Natural Yes to Cucumbers Aubrey Organics Jason Natural Sun Block Kiss My Face Baby-safe sunscreens ('free' or 'natural') **Insect Repellents**: Jason Natural Quit Bugging Me Repel Lemon Eucalyptus Herbal Armor California Baby Natural Bug Spray BabyGanics Deep Woods OFF Sawyer Permethrin **Sunscreen and Insect Repellents:** Avon Skin So Soft Bug Guard-SPF 30
Food and Beverage	Pre-packaged food, fast food wrappers or containers. Non-stick cookware & containers, aluminum foil. Fast food shall not be consumed within 48 hours of sampling.	Food that is brought and consumed only outside the exclusion zone and does not include prohibited items listed in this table. Hands and faces must be thoroughly washed with soap and water after consuming food and before entering the exclusion zone. Bottled water or hydration drinks (i.e., Gatorade® and Powerade®)

[1.] While Alconox and Liquinox soap is acceptable for use for PFAS decontamination, they may contain 1,4-dioxane. If Alconox and Liquinox soap is used at sites where 1,4-dioxane is a COC, then equipment blanks must be analyzed for 1,4-dioxane.

REFERENCES

Bartlett SA, Davis KL. Evaluating PFAS cross contamination issues. *Remediation.* 2018;28:53-57. https://soi.org/10.1002/rem.21549.

Michigan Department of Environmental Quality (MDEQ), Draft Final Wastewater PFAS Sampling Standard Operating Procedures, April 2018.

The Northeast Waste Management Officials' Association (NEWMOA), five-part webinar training series, 2016; http://www.newmoa.org/cleanup/workshops.cfm

NH PFAS Investigation at https://www4.des.state.nh.us/nh-pfas-investigation/

APPENDIX K

SITE MANAGEMENT FORMS

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, shipping of laboratory samples, and the removal of waste.

	Current Reporting Period (miles)	**Total to Date (miles)**
Standby Engineer/Contractor		
Laboratory Courier/Delivery Service		
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		
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 (Attach additional sheets if needed)
Energy Usage:
Waste Generation:
Transportation/Shipping:
Water usage:
Land Use and Ecosystems:
Other:

CERTIFICATION BY CONTRACTOR
I, _____ (**Name**) do hereby certify that I am _____ (**Title**) of the Company/Corporation herein referenced and contractor for the work described in the foregoing application for payment. According to my knowledge and belief, all items and amounts shown on the face of this application for payment are correct, all work has been performed and/or materials supplied, the foregoing is a true and correct statement of the contract account up to and including that last day of the period covered by this application. _____ **Date** **Contractor**

APPENDIX L

RESPONSIBILITIES of

OWNER and REMEDIAL PARTY

Responsibilities

The responsibilities for implementing the Site Management Plan ("SMP") for the Former B.H. Aircraft site (the "site"), number C152247, are divided between the site owner(s) and a Remedial Party, as defined below. The owner(s) is/are currently listed as:
441 Eastern Parkway LLC, 37-14 36th Street, Long Island City, NY 10111. (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:
441 Eastern Parkway LLC, 37-14 36th Street, Long Island City, NY 10111.

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 a(n) 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 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. In the event that 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 1.3 - Notifications.

6) In the event 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 1.3 - Notifications and (ii) 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 2.4 of the SMP. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.

8) The RP remains ultimately responsible for maintaining the engineering controls.

9) 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 1.3 - Notifications of the SMP.

7) 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.

8) 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 Department 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 THE BH AIRCRAFT SITE

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