Honeywell

Shallow Groundwater IRM Work Plan

Former Oak Materials Fluorglas Division
John Street (NYSDEC Site No. 442049)

Village of Hoosick Falls
Rensselaer County, New York

Honeywell

June 2019

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I, James Ryan, certify that I am currently a NYS Registered Professional Engineer as defined in 6 NYCRR Part 375 and that this Shallow Groundwater Interim Remedial Measure Work 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).

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Date: 7 June 2019

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°C	Degrees Celsius
1,1,1-TCA	1,1,1-trichloroethane
bgs	below ground surface
CVOCs	Chlorinated Volatile Organic Compounds
DNAPL	Dense non-aqueous phase liquid
DOT	Department of Transportation
DTW	Depth to Water
DER	Division of Environmental Remediation
EDD	Electronic Data Deliverable
ERM	ERM Consulting and Engineering, Inc.
foc	Fraction organic carbon
ft/day	feet per day
gph/ft-s	gallons per hour per foot of screen
gpm	gallons per minute
HASP	Health and Safety Plan
Honeywell	Honeywell International Inc.
IRM	Interim Remedial Measure
IDW	Investigation-Derived Waste
NTU	Nepholometric Turbidity Units
NYCRR	New York Codes, Rules and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
ORP	Oxygen Reduction Potential
PFAS	Per- and Polyfluoroalkyl Substances
lbs	pounds
PFOA	Perfluorooctanoic acid
PDI	Pre-Design Investigation
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
SDS	Safety Data Sheet
SC	Site Characterization
SpC	Specific Conductivity
SSC	Sub-Surface Clearance Procedures
SVE/AS	Soil Vapor Extraction/Air Sparging
TCE	Trichloroethene
TOP	Total Oxidizable Precursor
UIC	Underground Injection Control
USEPA	United States Environmental Protection Agency
WP	Work Plan
ZVI	Zero Valent Iron

1.0 INTRODUCTION / PURPOSE

This Interim Remedial Measure (IRM) Work Plan (WP) provides the scope of work to mitigate the migration of chlorinated volatile organic compounds (CVOCs) in shallow groundwater at the John Street Site (Figures 1 and 2) in the Village of Hoosick Falls, Rensselaer County, New York.

Honeywell International Inc. (Honeywell) entered into an Order on Consent and Administrative Settlement with the New York State Department of Environmental Conservation (NYSDEC) dated 3 June 2016 (the Order; Index Number +CO 4-20160415-79) for the Former Oak Materials Fluorglas Division - John Street Site (the Site) (No. 442049) (NYSDEC, 2016).

In 2016, initial Site Characterization (SC) work was performed in accordance with the NYSDEC-approved SC Field Sampling and Analysis Plan (ERM, 2016). CVOCs were detected (primarily trichloroethene (TCE) and 1,1,1-trichloroethane (1,1,1-TCA)) in on-site soil and groundwater and in off-site groundwater. The draft report of the SC results for the Site has been submitted to NYSDEC for review (ERM, 2018a; ERM, 2019a).

In 2018, work on the Remedial Investigation (RI) commenced after the approval of several tasks proposed in the draft Remedial Investigation Work Plan (ERM, 2017; ERM, 2019b).

Additional site characterization activities/pre-design studies were performed during 2018 in accordance with the NYSDEC-approved work plan entitled "*Shallow Groundwater Interim Remedial Measure Pre-Design Investigation & Treatability Study Work Plan*" dated 16 March 2018 (ERM, 2018b). The Pre-Design Investigation (PDI) activities included the delineation of CVOCs in on-site shallow soil and groundwater, and additional data collection to determine the physical and chemical characteristics of the shallow subsurface environment at the Site. The additional characterization data from the PDI are presented in Appendix A and summarized in Section 2.0 of this IRM WP.

After completion of the PDI activities, a technology screening was conducted to select an appropriate approach for IRM implementation. The findings of the technology screening are presented in Section 3.0 of this IRM WP.

This WP provides for implementation of an IRM to mitigate the mass flux of CVOCs in shallow groundwater that are migrating off-site in shallow groundwater. This goal will be achieved through implementation of a permeable barrier composed of PlumeStop and Zero Valent Iron (ZVI) in the form of AquaZVI that will create a zone of enhanced adsorption and degradation of CVOCs to minimize off-site migration.

The design and scope of work for implementation and post-implementation performance monitoring are presented in Section 4.0 of this IRM WP.

This IRM WP and appendices also serve as the Technical Memorandum that was proposed under the PDI scope and present the findings of the PDI, technology screening, an IRM implementation plan, and a performance monitoring program.

2.0 PRE-DESIGN INVESTIGATION RESULTS

The results of the 2018 PDI activities are included in Appendix A and summarized below, along with relevant information collected during the SC and RI activities.

2.1 GEOLOGY AND HYDROGEOLOGY

The shallow unconsolidated geologic materials that are relevant to the IRM consist of the following:

- An upper shallow layer of fine-grained alluvium (predominantly silt and clay) deposited in the Hoosic River valley;
- A coarse-grained alluvium, consisting predominantly of sand and gravel, with lesser amounts of silt also deposited in the Hoosic River valley; and
- A clay and silt unit deposited in glacial and post-glacial lakes that is laterally continuous across the site.

Groundwater occurs in both the overburden deposits and bedrock beneath the Site. The water table surface is encountered in the alluvium unit above the clay and silt unit at the Site at depths of approximately 6 to 14 feet below ground surface (bgs), groundwater flow within this unit is controlled primarily by areal topography, and flows northward toward the Hoosic River. Available data suggest that the clay and silt unit appears to represent an aquitard separating the shallow groundwater table from deeper overburden deposits beneath the clay and silt.

A more detailed discussion of the hydrogeology and the geologic materials encountered at the Site and surrounding area during the SC and PDI are presented in Appendix A Section 2.1.1 and Figures A-3 and A-4.

2.2 PRE-DESIGN INVESTIGATION RESULTS

The 2018 PDI activities were performed in support of an IRM to address transport of CVOCs off-site in shallow groundwater. The PDI was designed to delineate CVOC impact in the subsurface and collect information to evaluate the viability of physical, chemical and biological technologies for treatment of the primary CVOCs (TCE and 1,1,1-TCA). The results of the PDI are presented in Appendix A and summarized below.

2.2.1 Soil and Groundwater PDI Results

Forty-eight (48) soil borings and 12 temporary groundwater monitoring wells were installed during the 2018 PDI. The locations of these borings and wells are shown in Appendix A Figure A-9. The results are included in Appendix A Tables A-4 to A-8 and Figures A-10 to A-14. The sampling results indicate the majority of the CVOC mass is present in the silt-clay unit, where the CVOC mass is generally located several feet below the top of the silt-clay, and the vertical extent of CVOC mass generally limited to less than 20 feet bgs. There is limited CVOC mass present in soil and groundwater within the overlying sand and gravel unit.

Two areas of CVOC impact were identified near JS-MW-001 and JS-MW-003 (northern and center portions of the Site) as shown in Figures A-11 and A-13 in Appendix A.

A dense non-aqueous phase liquid (DNAPL) was detected in one temporary monitoring well, JS-TMW-039. Analytical results of the DNAPL sample indicate that the primary constituent is TCE. DNAPL was not detected in surrounding wells screened in the silt-clay indicating that this is a localized pocket of mass.

2.2.2 *Pre-Design Studies*

Pre-design studies were conducted to provide information in support of technology selection and design for the shallow groundwater IRM. The results of these studies are summarized below and presented in more detail in the PeroxyChem report, which is attached as Appendix A-3 to the PDI memorandum in Appendix A.

2.2.2.1 *Total Oxidizable Precursor (TOP) Assay*

TOP Assays were conducted on five soil samples and showed no evidence of the presence of "precursors", which are PFAS that can be converted to perfluoroalkyl acids such as perfluorooctanoic acid (PFOA) by persulfate oxidation. These results confirm that the use of oxidants such as sodium persulfate will not create additional perfluoroalkyl acid mass.

2.2.2.2 *Infiltration Testing*

Infiltration testing ("falling-head") was conducted at 10 temporary groundwater monitoring wells screened in the silt-clay layer. Infiltration rates in nine of the 10 wells ranged between 0.02 – 1.6 gallons per hour per foot of screen (gph/ft-s) with an average rate of 0.39 gph/ft-s. A higher rate of 14.5 gph/ft-s was measured in the tenth well (JS-TMW-030). These low infiltration rates indicate that the efficacy of injection of a remedial reagent or air sparging would be limited in the silt-clay unit.

2.2.2.3 *Slug Testing*

As part of the ongoing RI, single-well aquifer slug tests were performed in three on-site and two off-site downgradient wells screened across the water table in the shallow sand and gravel to develop a range of hydraulic conductivities (K) for that aquifer unit.

Estimated hydraulic conductivities for on-site and downgradient wells screened in the shallow sand and gravel alluvium deposits ranged from 32.6 feet/day (ft/day) to 408.8 ft/day. This information was used to estimate groundwater flow velocities and design remedial injection approaches.

A groundwater flow velocity (seepage velocity) of 0.51 ft/day or 187 feet per year was calculated for use in designing the groundwater IRM using a K of 85.2, a horizontal hydraulic gradient (i) of 0.0015 (dimensionless) and an assumed effective porosity (n) of 0.25. A more detailed discussion of the slug testing and results is presented in Appendix A Section 2.2.7.

2.2.2.4 *Soil Mixability Results*

Two soil composites (one from the sand and gravel unit and one from the silt-clay unit) were submitted for simulated soil mixing. Both samples were found to be suitable for *in situ* mixing. The silt-clay material is plastic and may require more time to complete the mixing and to clean the mixing head periodically. These results indicate that soil mixing to blend reagents into the soil is likely feasible.

2.2.2.5 *Oxidation Treatability Study Results*

Oxidant treatability testing was conducted on two soil composites, one from the sand and gravel unit and one from the silt-clay unit, and a composite groundwater sample from on-site shallow monitoring wells screened in the sand and gravel unit.

Soil base buffer capacity and natural oxidant demand testing indicate a moderate base buffer capacity and a moderate oxidant demand in both soil composites. These results indicate moderate base buffer capacity and oxidant demand in the soil. This information can support the design for an oxidant technology.

Oxidant treatability tests were conducted to evaluate the destruction of CVOCs by oxidation with sodium persulfate or potassium permanganate. Reductions in TCE concentrations ranged from 65% to 93% in the alkali persulfate treatments and from 37% to greater than 95% in the permanganate treatments. PFAS concentrations before and after oxidation were also measured to assess potential formation of perfluoroalkyl acids from precursor substances during oxidation. No significant increases in PFOA concentrations were observed between the control and treatments.

2.2.2.6 *Microbial and Geochemical Analyses*

The results of geochemical analyses indicate that conditions within shallow groundwater are generally aerobic and oxidizing. The presence of aerobic cometabolic dechlorinating bacteria and the absence of anaerobic bacteria are consistent with the aerobic and oxidizing conditions. These results indicate that conditions within the shallow groundwater are conducive to natural degradation of CVOCs through aerobic cometabolism; however, use of enhanced anaerobic bioremediation would require generation of reducing conditions and potentially bioaugmentation with anaerobic dechlorinating microorganisms.

2.3 *SUMMARY*

Based on the SC and PDI results, the following findings are noted:

Sand and Gravel Unit:

- The water table surface is encountered in this unit at depths of approximately 6 to 14 feet bgs, groundwater flow is in this unit controlled primarily by areal topography, and flows northward toward the Hoosic River.
- Shallow groundwater is a likely source of CVOCs to indoor air in buildings to the north of the Site.
- Limited CVOC mass is present in soil and groundwater within this unit.
- This unit is very permeable and amenable to injection-based technologies.
- The soil was found to be "mixable" and suitable for *in situ* mixing technology.
- The soil was found to be amenable to oxidant treatment.
- Geochemical conditions are generally aerobic cometabolic and oxidizing; these conditions are conducive to aerobic degradation of CVOCs but not to anaerobic degradation of CVOCs.
- Former foundations, metal and concrete are present and may make implementation of an IRM more difficult.

Silt-Clay Unit

- Majority of the CVOC mass is present in this unit with the vertical extent of CVOC mass generally limited to less than 20 feet bgs.
- CVOC mass is generally located several feet below the top of the silt-clay.
- This unit appears to represent an aquitard separating the shallow groundwater table from deeper overburden deposits beneath the clay and silt.
- This unit has low permeability and is unlikely to be amenable to injection-based technologies.
- The soil was found to be "mixable" and suitable for *in situ* mixing technology; the silt-clay material is plastic and may require more time to complete mixing.
- The soil was found to be amenable to oxidant treatment.
- The surface of silt-clay beneath the Site is not flat, with up to nine feet relief observed resulting in variable groundwater saturated thickness.

Although the majority of the mass of CVOCs is in the slit-clay unit, migration of CVOCs in shallow groundwater in the sand and gravel unit is a likely source of CVOCs to indoor air in nearby buildings. The sand and gravel unit is also easily accessible and amenable to implementation of a number of technologies, which limit disruption to the surrounding residences and businesses.

Based on these factors, the shallow sand and groundwater unit is chosen for implementation of this IRM.

3.0 IRM TECHNOLOGY EVALUATION

After completion of the PDI activities, a technology screen was conducted to select an appropriate technology for IRM implementation with the goal of reducing CVOC migration off-site in shallow groundwater within the sand and gravel layer. The screening looked at barrier and source treatment technologies and considered whether the technology could be implemented in the shallow sand & gravel aquifer.

3.1 TECHNOLOGIES FOR REMOVAL OR DESTRUCTION OF CVOCS

Many technologies are applicable for the removal or destruction of CVOCs in soil and/or groundwater since they are amenable to treatment by physical, chemical and biological processes. The most common technologies for CVOCs are:

Soil Vapor Extraction and Air Sparging – CVOCs can be stripped from groundwater and volatilized from soil due to their high vapor pressures and Henry's Law constants. *In situ* approaches involve the injection/extraction of air with treatment of off-gases, if necessary by activated carbon, thermal oxidation with scrubbing, or other conventional air treatment technologies.

Adsorption – Due to their hydrophobicity, CVOCs are adsorbed by hydrophobic media such as activated carbon. Such media can be used *ex situ* for treatment of groundwater or vapors. Alternatively, hydrophobic media can be used *in situ* to create a highly adsorptive zone to remove CVOCs from groundwater. The adsorptive zone increases CVOC retention time allowing enhanced natural attenuation through abiotic and biotic degradation. Examples are mulch, activated carbon, and PlumeStop, which is a proprietary colloidal carbon material sold by Regenesis.

Anaerobic Biological Degradation – CVOCs are amenable to biological degradation by naturally occurring bacteria under anaerobic conditions through reductive dechlorination. In this process, chlorine atoms are successively removed with the transient production of less chlorinated intermediate daughter products. This process requires strong reducing conditions and the presence of a carbon substrate to act as a source of electron donor. Carbon substrates such as lactate or emulsified vegetable oils can be applied through *in situ* mixing or injected as liquids, or entrenched (e.g. mulch).

Chemical Oxidation – CVOCs can be mineralized to carbon dioxide, water and inorganic chloride through chemical oxidation. Chlorinated ethenes are amenable to more oxidants than are chlorinated ethanes. Only the chlorinated ethenes are amenable to sodium or potassium permanganate, while both classes of CVOCs are amenable to oxidation by hydrogen peroxide, activated persulfate and ozone. Hydrogen peroxide and persulfate can be applied through *in situ* mixing or injected as liquids; ozone is applied as a gas by injection.

Chemical Reduction – Chlorinated ethenes will react with reduced metals such as ferrous iron and zero valent iron (ZVI), while chlorinated ethanes are much less reactive to these reduced metals. ZVI is extremely reducing and can create an environment that is conducive to biological reductive dechlorination of both the ethenes and ethanes. ZVI can be applied by *in situ* mixing, slurry or microemulsion (e.g. AquaZVI) injection, or in a trench mixed with sand.

Thermal Treatment – Since vapor pressure increases with temperature, the application of heat increases the volatility of CVOCs and enhances the removal of CVOCs from soil and groundwater. Heat is commonly applied through steam injection or radio frequency (RF) heating. For enhancement of CVOC volatilization, temperatures of 40 to 100°C with capture of vapors by soil vapor extraction is required. Application of heat to 30 to 35°C can also be used to enhance abiotic or biological degradation processes.

Groundwater Extraction and Treatment – Extraction of groundwater containing dissolved CVOCs can slowly remove CVOC mass from the aquifer. Over time, CVOCs adsorbed to the soil matrix will slowly desorb into groundwater and will be removed. Extracted groundwater would require treatment through activated carbon, air stripping with vapor treatment by activated carbon, or other conventional technology.

Soil Excavation – Soil impacted with CVOCs can be removed by excavation and either disposed in a landfill or treated to remove CVOCs. This technology could be implemented in the sand and gravel and silt-clay layers; however, excavation would likely require stabilization of the excavation (e.g. with sheet piling), groundwater containment, and vapor controls.

3.2 SITE-SPECIFIC CONSIDERATIONS FOR TECHNOLOGY SELECTION

While all of the technologies discussed in Section 3.1 are generally applicable for CVOCs, site-specific features of the John Street site will constrain their implementation.

Environmental Considerations:

- ***High Permeability Shallow Sand and Gravel Layer*** – The high permeability of the shallow sand and gravel allows for a groundwater velocity estimated at 180 to 190 feet per year. The high permeability is conducive to the use of injection technologies and will allow for large radii of influence, which are favorable. Conversely, certain technologies, such as excavation and thermal treatment, have the potential to mobilize CVOC into shallow groundwater; therefore, these technologies would likely require groundwater containment through extraction or barriers to avoid potential negative impacts to downgradient properties.
- ***Silt-clay Layer*** – The zone with the most CVOC mass is the silt-clay layer, which has a low permeability and can accept only very low infiltration rates of water. Technologies that involve injection of water, air, or other gases, or the extraction of water will have limited application in the silt-clay layer. In addition, back-diffusion of CVOC mass from the silt-clay layer has the potential to continue to affect the shallow sand and gravel layer.

Physical Considerations:

- ***Sewer Line and Concrete Channel Structure*** – These structures need to be maintained and limit the ability to implement remedies such as excavation or *in situ* mixing. Investigation of CVOC extent near these structures has also been limited due to subsurface clearance concerns and, in the case of the channel structure, access limitation.
- ***Site Size and Surrounding Property Use*** – The Site is a very small parcel (approximately 0.6 acres) located adjacent to residential and commercial

properties. Technologies that cause noise, dust or other disturbances will need to be implemented with controls to limit these disturbances.

Presence of PFAS:

- ***PFAS in Soils and Groundwater*** – Although PFAS are not the target compounds for the IRM, their presence in soil and groundwater were considered during technology screening. For example, the presence of PFAS may influence treatment of extracted groundwater and soil disposal options.

3.3 IRM STRATEGIES FOR SHALLOW GROUNDWATER

The technologies discussed in Section 3.1 were evaluated as IRM treatment strategies, considering the site-specific conditions discussed in Section 3.2, with the goal of reducing off-site migration of CVOCs in shallow groundwater. A summary of the IRM strategies, their application and evaluation parameters is given in Table 1.

Selection Criteria Included:

- ***Implementability*** – Technologies such as injection technologies that can be easily implemented on a small site and that can be designed around access limitations and subsurface structures are ranked higher.
- ***Disruption to Surrounding Community*** – Technologies that can be quickly implemented with limited noise, dust, heavy equipment, etc. are ranked higher.
- ***Ability to Treat CVOCs That Back-diffuse From Clay Over Time*** – Technologies that can continue to treat any CVOC mass that back-diffuses from the clay will be more effective in preventing migration of CVOCs and are ranked higher.
- ***Likelihood of Reducing Vapor Intrusion*** – All technologies can treat CVOCs but it may take multiple years to see reductions in indoor air concentrations.
- ***Cost*** – Cost effectiveness is considered in technology selection. Both capital and long-term operations and maintenance are considered.
- ***Requirement for Active Operation and Maintenance (O&M)*** – Technologies with no requirement for O&M are rated higher than those that require active O&M.
- ***Soil Disposal*** – Due to current constraints on disposal of soil containing PFAS, technologies that generate little soil wastes are rated higher than those that yield more soil waste.

3.4 SELECTION OF IRM FOR SHALLOW GROUNDWATER

In the final selection of an IRM, preference was given to technologies that could be implemented to reduce off-site migration of CVOCs in shallow groundwater effectively with limited disruption to the surrounding residences and business. The technology that was ranked the highest was:

- ***Permeable Barrier With PlumeStop and ZVI Injection***

This technology has the ability to decrease CVOCs concentrations and migration in shallow groundwater. PlumeStop is a colloidal carbon material that will bind to the soil matrix and adsorb CVOCs, similar to activated carbon. The addition of ZVI can enhance abiotic and biotic degradation of CVOCs by inducing reducing conditions within the aquifer. Since these reagents are stable and stay in place, they are able to continue to treat CVOC mass that may back diffuse from the silt-clay layer.

Disruption to the community will be limited since implementation will only take one to two weeks and no operation and maintenance will be required as long as the barriers continue to remove CVOC mass from groundwater. The vendor of PlumeStop, Regenesis, estimates that the barrier can be designed to last at least 25 years and can be replenished if necessary to increase its longevity.

4.0 *IRM SCOPE OF WORK*

This section describes the scope of work for implementation of permeable barrier through the injection of PlumeStop and AquaZVI into the shallow aquifer. The goal of the IRM is to mitigate the mass flux of CVOCs in shallow groundwater and limit off-site migration of CVOCs in shallow groundwater.

4.1 *IRM APPROACH AND CONCEPTUAL DESIGN*

The IRM described in this document will provide a permeable barrier to reduce the migration of CVOCs in shallow groundwater off-site to the north of the John Street Site. The barrier will be implemented by the injection of a mixture of PlumeStop and AquaZVI into the shallow aquifer through a series of injection points near the northern property boundary of the Site. Within the barrier, CVOCs will be removed from groundwater primarily by enhanced adsorption with a lesser contribution by biodegradation. The barrier will capture CVOCs present in shallow groundwater, from both the southern and northern areas of the Site prior to CVOCs leaving the property.

4.1.1 *Design of Permeable Treatment Barrier*

The design length of the permeable barrier is approximately 65 feet to cover the accessible portions of the northern property boundary of the Site and extending into Village right-of-ways. See Figure 3 for the proposed locations of the injection points. The eastern portion of the site boundary is partially inaccessible due to subsurface structures including a sewer line owned by the Village and the footers of the concrete channel of Woods Brook. Access is also limited due to a setback from the NYSDEC-owned property around the Woods Brook channel.

The average vertical treatment thickness is approximately eight feet and extends from the water table down to the top of clay. The depth to the silt-clay layer is shown on Figure A-10 in Appendix A.

The injection configuration includes 16 injection points aligned in three offset rows and spaced approximately 12 feet apart. These proposed locations are shown in Figure 16. The final locations of the injection points may be adjusted based on subsurface clearance results and access limitations.

4.1.2 *Remedial Reagents*

PlumeStop, which is supplied by Regenesis, is a colloidal activated carbon in water. The activated carbon particles are 1 to 2 microns (µm) in diameter and suspended in water. PlumeStop is injected as a liquid, which will move with groundwater until it sorbs/coats the soil particles. A typical travel time from injection before sorption is 30 days, or 15 feet assuming a velocity of 0.51 ft/day. As with activated carbon used in *ex situ* groundwater treatment, PlumeStop will sorb CVOCs and other organic compounds into the carbon coating. In the case of CVOCs, which are amenable to abiotic and biotic degradation, the sorbed CVOCs may also be removed through these processes within the PlumeStop treatment zone. A Safety Data Sheet (SDS) and technical specifications for PlumeStop are in Attachment 1.

AquaZVI, also supplied by Regenesis, is an *in situ* chemical reduction (ISCR) reagent that promotes the destruction of CVOCs. The purpose of adding ZVI is to enhance the abiotic degradation of TCE and increase the useful lifetime of PlumeStop by reducing the mass of TCE to be adsorbed to PlumeStop.

The overall abiotic degradation reaction of TCE with ZVI is:

$$3Fe^{o} + C_2HCl_3 + 3H_2O \rightarrow C_2H_4 + 3Fe^{+2} + 3OH^{-} + 3Cl^{-}$$

Biotic degradation through reductive dechlorination may also occur, but is not the primary degradation pathway for ZVI. AquaZVI is composed of colloidal ZVI particles (3 to 4 microns) suspended in an aqueous medium with environmentally acceptable, proprietary dispersant (a carboxy methylcellulose stabilizer). The passivation technique of sulfidation, completed through proprietary processing methods, provides reactivity with CVOCs and increases its *in situ* stability and longevity. An SDS for ZVI and technical specifications for AquaZVI are in Attachment 2.

The addition of PlumeStop and AquaZVI are expected have limited effects on the aquifer. Both reagents consist of micron-sized particles that will create a thin coating on the aquifer soil grains. The amount of reagents added to the overall aquifer matrix is small and will not cause measurable changes to aquifer hydraulic characteristics such as effective porosity (n) or hydraulic conductivity (K). The addition of AquaZVI will lower the oxidation-reduction potential (ORP) of the aquifer near the injections for approximately two years.

4.1.3 Required Reagent Mass

The required mass of the remedial reagents was estimated based on:

- Mass flux of CVOCs in groundwater through the treatment zone;
- Mass flux of other organic compounds (for example, PFAS) that will compete with CVOCs for sorption sites on the carbon;
- Groundwater seepage velocity;
- Natural fraction organic carbon (f_{oc}) within the aquifer;
- Volume of the treatment barrier; and
- Barrier longevity of up to 25 years.

A summary calculation sheet provided by Regenesis is included in Attachment 3. Based on the existing data from the Site, the requirements for remedial reagents for the permeable barrier will be:

- PlumeStop - 11,200 pounds (lbs) (1,342 gallons); and
- AquaZVI - 1,600 lbs (120 gallons).

After the baseline groundwater sampling event discussed in Section 4.6.5 and the final placement of the injection wells, these requirements will be re-evaluated and adjusted if necessary. NYSDEC will be notified if the remedial reagent requirements are adjusted.

4.2 PERMITS AND APPROVALS

Necessary permits and approvals for the project will include:

- USEPA Underground Injection Control (UIC) Permit, if required;

- Village of Hoosick Falls road opening permit for any work that might infringe on Village right-of-ways; and
- Access approval from the Village of Hoosick Falls for work to be conducted on Village property.

4.3 HEALTH AND SAFETY PLAN FOR IRM

The Site Health and Safety Plan (HASP) will be modified to address the Shallow Groundwater IRM work activities and requirements as approved by NYSDEC.

4.4 COMMUNITY AIR MONITORING PLAN

Community air monitoring for CVOCs and particulates will be performed during all intrusive field activities in accordance with the previously approved Community Air Monitoring Plan for the Site.

4.5 SITE ACCESS/PREPARATION

Mobilization will involve designating general work zones on the Site and procurement/transport/delivery of the necessary resources to implement the project requirements (i.e. labor, materials, and equipment). General Site preparation activities include the following operations:

- Clearing of debris (e.g. gravel, vegetation, etc.) as necessary to access the work areas. Materials are to be staged in areas identified by ERM.
- A new underground utility mark out/subsurface clearance activity will be required in accordance with ERM's Sub-Surface Clearance Procedures (SSC).
- Construction of temporary decontamination pad for personnel and equipment.
- Mobilization of reagent injection and mixing equipment (including an injection trailer provided by Regenesis), reagent storage and application equipment, and necessary personnel.

4.5.1 Temporary Facilities

4.5.1.1 Site Access Control

The Site is currently surrounded by a six-foot high steel security fence with locking gates. Work and staging areas will be maintained inside of the perimeter fencing with the exception of injections on Village property along John Street and/or Lyman Street. Access to the Site shall be via Lyman Street.

4.5.1.2 Storage Areas

Designated storage areas will be established in a secured portion of the Site. The locations will be chosen to not interfere with access to the specific areas to be treated and provide secure storage, weather resistance, proper labelling and segregation of incompatibles, if required for the materials to be used. Materials shall not be stockpiled outside the designated area. Mobile equipment, such as drilling rigs, mixers, and trucks, shall be parked within the designated area at the end of each workday, unless otherwise approved by ERM.

4.5.1.3 *Sanitary Facilities*

Temporary sanitary facilities with regular maintenance services shall be provided for Site workers.

4.5.2 *Security Provisions*

The Site will be secured against trespass, vandalism and theft by the existing security fencing and vehicle gates that will be locked at the end of each workday. A daily visitor's log will be maintained to document all visitors to the Site.

Site security will be maintained to control access to the injection trailer, application system and injection well locations. A minimum two-person field crew will be required on-site at all times; no unattended injections will be conducted. Additional security measures will include:

- Securing chemical storage and mixing/distribution areas with a padlock to lock the fence at all times when the Site is unoccupied;
- Site personnel should anticipate no/limited pedestrian traffic in the work area; however, field activities shall maintain an exclusion zone, demarked by traffic cones, caution tape or equivalent;
- Site personnel should maintain access around all work areas sufficient to facilitate access for fire and/or emergency vehicles; and
- All non-ERM personnel should be accompanied by an ERM person at all times.

4.5.3 *Equipment Decontamination*

Injection rods and equipment in direct contact with contaminated media or remedial amendments will be cleaned and flushed with PFAS-free clean water at least daily. This equipment includes injection pumps, delivery hose/piping and fully draining batch mixing tanks.

Pressurized water with a detergent solution (Alconox®) is preferred for equipment decontamination at the conclusion of activities and prior to demobilizing from the Site. A temporary decontamination pad will be established on-site that is of suitable size and provides containment of decontamination liquids and solids. The decon wastes shall be managed in accordance with Investigation-Derived Waste (IDW) management requirements specified in Section 4.7.

4.5.4 *Survey and Work Stake-out*

The new well locations and treatment areas will be staked from existing site control control points. Final well locations/treatment areas will be mapped by a New York-licensed surveyor utilizing traditional survey equipment and/or Global Positioning Equipment (GPS) equipment, as appropriate, will be employed. Each injection point will be numbered for identification purposes and the location will be surveyed in the field.

4.6 *IRM IMPLEMENTATION PLAN*

4.6.1 *Installation of Temporary Performance Monitoring Wells*

Prior to implementation of the IRM, new temporary monitoring points will be installed with screen intervals in the shallow sand and gravel layer for performance monitoring of the proposed IRM. These points will consist of six wells, with two wells to be located approximately 10 feet upgradient of the injection zone, two wells approximately 25 feet downgradient of the zone, and two wells within the injection zone. The proposed locations of these temporary monitoring wells are shown on Figure 3.

These new temporary performance wells will be installed via the rotosonic drilling method. Each new well will be constructed of two-inch polyvinyl chloride (PVC) pipe. Monitoring wells will be constructed using 10-foot long, 0.010-inch pre-slotted screens to the top of clay. Sand filter packs will be placed around each well screen using Morie #1 or equivalent sand to a minimum of two-feet above the top of the well screen. A minimum two-foot thick bentonite seal will be installed and hydrated above the filter pack using approved potable water. Cement-bentonite grout will be tremie-grouted with a Portland cement/high-grade bentonite mixture to backfill the remainder of the borehole to approximately one-foot below ground surface. The cement-bentonite grout will be mixed using approved potable water. A flush-mounted steel protective casing will be cemented in place over each performance well.

New groundwater monitoring well locations will be surveyed by a New York-licensed land surveyor. Survey crews utilizing traditional survey equipment and/or Global Positioning Equipment (GPS) equipment will be employed, as appropriate.

4.6.2 *Well Development*

The new wells will be developed via pumping, surging, or bailing to facilitate collection of representative groundwater samples. Field parameters will be measured and recorded during well development activities using a calibrated multi-parameter meter with a flow cell and a water level indicator which allows for measurement of temperature (°C), specific conductivity (SpC), dissolved oxygen (DO), pH, turbidity (nepholometric turbidity units {NTU}), oxidation-reduction potential (ORP), and depth to water (DTW) data.

4.6.3 *Installation of Temporary Soil Vapor Monitoring Points*

Three temporary soil vapor monitoring points will be installed to provide information on soil gas concentrations in the vicinity of the treatment zone. One point will be installed upgradient of the treatment zone and two points will be installed at downgradient locations. Stainless steel rods equipped with a detachable stainless steel sampling point will be driven to a depth of approximately 3 to 4 feet below ground surface, or a minimum of 1 foot above groundwater. Dedicated Nylaflow® tubing will be attached to each sampling point. Boreholes will be backfilled with glass beads to a minimum of 6 inches above the soil vapor sampling point. The remainder of the annular space will be filled with bentonite chips and immediately hydrated with PFAS-free water.

4.6.4 *DNAPL Removal*

DNAPL will be removed from well JS-TMW-039 on a quarterly basis using a peristaltic pump, double-check valve bailer or sinkable absorbent socks. Observations will be made monthly after the first event to determine if more frequent removal or change out of absorbent socks is warranted. The frequency will be adjusted based on the rate of return of product to the well, in consultation and agreement with NYSDEC. Wells surrounding JS-TMW-039 will be checked for product at the same frequency. The volume of recovered free-phase liquid will be reported to NYSDEC.

The recovered DNAPL/water mixture or socks will be placed in a new DOT 55-gallon drum for accumulation and proper disposal. As part of this effort, depth to water and DNAPL thickness measurements will be collected to confirm product thickness over time.

4.6.5 Baseline Groundwater Sampling Event

Prior to implementation of the IRM, the six new performance monitoring wells and select existing on-site and off-site shallow groundwater monitoring wells will be sampled to provide a groundwater quality baseline for measuring IRM performance. See Section 4.7 and Table 2. Changes in CVOC concentrations from current interpretations outlined in Appendix A may require a modification to the IRM implementation plan, in consultation with NYSDEC. Any change to the plan will be documented in the deviation section of the monthly project reports.

4.6.6 Baseline Soil Vapor Sampling Event

Soil vapor samples will be collected from the three new temporary soil vapor monitoring points using Summa canisters over a 24-hour period and will be analyzed for CVOCs by USEPA Method TO-15. An outdoor ambient air sample will also be collected upwind during soil vapor sampling activities.

4.6.7 Process and Equipment Requirements

Regenesis will provide equipment for mixing and dilution of the remedial amendments. The equipment will be trailer-mounted and will include pumps, mixing tanks, delivery manifold, injection heads with flow and pressure gauges, and safety bypass valves.

The approach is based on Direct Push Technology (DPT) application techniques utilizing a Geoprobe® DT series track rigs (or equivalent) with 1.5-inch injection rods. The PlumeStop and Aqua ZVI material will be prepared for injection via an injection trailer to be supplied by Regenesis.

During injection, the injection pressures are typically less than 20 psi. The application delivery system is designed to mix and deliver PlumeStop and AquaZVI solutions that range from 3% to 20% weight/weight at up to 20 gallons per minute (gpm).

The remedial reagents will be delivered to the Site in advance of the injection event and will be securely stored within the locked security fence. PlumeStop will be delivered in 2,000-lb totes and 400-lb drums on pallets. AquaZVI will be delivered in 500-lb drums and 50-lb pails on pallets.

All water used for mixing, dilution of remedial amendments, drilling, steam cleaning and decontamination will be PFAS-free water. Information on the source of PFAS-free water and associated analytical results will be provided to NYSDEC for approval prior to use.

4.6.8 Injection Event

Prior to injection, PlumeStop and AquaZVI will be mixed together and diluted with PFAS-free water to the desired concentration (17,300 milligrams per liter PlumeStop). In total, 1,342 gallons of PlumeStop plus 120 gallons of AquaZVI will be mixed with 7,496 gallons PFAS-free water for a total injection volume of 8,958. This volume equates to the injection of approximately 70 gallons of injectate solution containing 87.5 lbs PlumeStop and 12.5 lbs AquaZVI per foot of injection well screen (16 wells times an average 8-foot treatment interval) in one injection event. These volumes are based on current estimates of remedial reagent requirements and may be adjusted after the baseline sampling.

Injection will be by direct-push (DP) drilling equipment. These rigs provide greater flexibility for site access and mobility and they can inject the volumes of reagents at precise intervals in the anticipated shallow depths of the site treatment zones.

The injection configuration includes 16 injection points aligned in three off-set rows and spaced approximately 12 feet apart. Injections will begin at the bottom of the average 8-ft injection interval. The drive rods will be retracted slowly as the reagent mixture is injected to allow for the appropriate quantity of reagent to be injected into each vertical foot of aquifer being treated.

During injection, the downhole operating injection pressures are typically less than 20 psi. Injection rates of approximately 20 gallons per minute (gpm) are anticipated. The injection into the 16 proposed points will occur at one event over five days.

4.7 PERFORMANCE MONITORING PLAN

The performance monitoring plan to evaluate the effectiveness of the IRM treatment is presented below. The plan is to conduct a baseline sampling event prior to the injection event, monthly sampling for three months after the injection, followed by three quarterly sampling events. Select wells will be sampled annually until the final remedy has been implemented. Table 2 summarizes the performance monitoring plan.

During the injection event and weekly for the first month afterwards, observations will be made in the performance monitoring wells to look for the presence of PlumeStop in groundwater. Since PlumeStop may remain suspended in groundwater for a few weeks after injection, select wells may not be sampled at the first sampling event after injection if PlumeStop is still observed in the temporary performance monitoring wells. NYSDEC will be notified of any change in the planned sampling frequency or locations.

4.7.1 Well Selection

In addition to the six temporary performance monitoring wells shown on Figure 3, select existing monitoring wells will be included in the sampling plan as listed in Table 2.

The injection of PlumeStop and AquaZVI are not expected to have any effect on the silt-clay layer or the sand-gravel aquifer beneath the silt-clay layer. However, two wells (JS-MW-001B and -003B) that are screened immediately below the silt-clay layer are included in the monitoring plan.

The screened interval, location relative to the PlumeStop barrier, and the rationale for selection of these wells is provided in Table 2.

As part of the proposed RI work, all on-site and off-site permanent monitoring wells (A, B, C, D and BR) associated with the Site will be sampled twice a year for two years. This two-year RI monitoring period is expected to overlap with, and supplement the first two years of IRM performance monitoring

4.7.2 *Groundwater Sampling*

All groundwater sampling will be performed using low flow well purging /sample collection techniques, in accordance with the NYSDEC-approved SC Field Sampling and Analysis Plan (ERM, 2016) and will include the PFAS sampling considerations. Samples will be stored on ice and transported under chain-of-custody procedures to a NYSDOH-approved environmental laboratory, for analysis in accordance with the 2018 NYSDEC-approved QAPP (ERM, 2018c).

4.7.3 *Groundwater Sample Analysis*

All performance monitoring groundwater samples, including baseline samples, will be analyzed for the following parameters:

- VOCs by EPA 8260;
- PFAS by USEPA Method 537 Revision 1.1 (modified);
- Total Organic Carbon (TOC) by Lloyd Kahn method; and
- pH by Standard Method 9045D.

PFAS analyses will include the following 21 target analytes:

Compounds	*CAS Number*	*Acronym*
1. Perfluorobutanoic acid	375-22-4	PFBA
2. Perfluoropentanoic acid	2706-90-3	PFPeA
3. Perfluorohexanoic acid	307-24-4	PFHxA
4. Perfluoroheptanoic acid	375-85-9	PFHpA
5. Perfluorooctanoic acid	335-67-1	PFOA
6. Perfluorononanoic acid	375-95-1	PFNA
7. Perfluorodecanoic acid	335-76-2	PFDA
8. Perfluoroundecanoic acid	2058-94-8	PFUnA
9. Perfluorododecanoic acid	307-55-1	PFDoA
10. Perfluoro-n-tridecanoic acid	72629-94-8	PFTriA
11. Perfluorotetradecanoic acid	376-06-7	PFTeA
12. Perfluorobutanesulfonic acid	375-73-5	PFBS
13. Perfluorohexanesulfonic acid	355-46-4	PFHxS
14. Perfluoroheptanesulfonic acid	375-92-8	PFHpS
15. Perfluorooctanesulfonic acid	1763-23-1	PFOS
16. Perfluorodecanesulfonic acid	335-77-3	PFDS
17. 6:2 Fluorotelomersulfonic acid	27619-97-2	6:2FTS
18. 8:2 Fluorotelomersulfonic acid	39108-34-4	8:2 FTS
19. Perfluorooctanesulfonamide	754-91-6	FOSA
20. N-methyl perfluoro-1-octanesulfonamidoacetic acid	2355-31-9	N-MeFOSAA
21. N-ethyl perfluoro-1-octanesulfonamidoacetic acid	2991-50-6	N-EtFSOSAA

The temporary performance monitoring wells will also be sampled and analyzed at the baseline, 6-month and one-year events for:

- Dissolved gases (methane, ethane, and ethene).

The laboratory analytical report will contain NYSDEC Analytical Services Protocol (ASP) Category B deliverables to facilitate data validation or usability evaluation. Electronic data deliverables (EDDs) will also be provided by the project laboratory.

Reductions in CVOC concentrations within the treatment area are expected to occur within three months. Based on groundwater flow velocity (~ 187 feet per year) and the estimated retardation factor for TCE (3.125), the reductions in CVOC concentrations downgradient of the treatment area may be observed at the performance monitoring wells (located about 25 ft away) within 1 year and at OS-MW-31A (located about 187 ft away) within about 3 to 4 years. These estimates do not take into account other factors such as CVOC mass adsorbed to soil in the unsaturated and capillary fringe zones.

If the monitoring results indicate that breakthrough of the original PlumeStop/AquaZVI injections is occurring before a final remedy has been implemented, injection of additional PlumeStop and AquaZVI, or other remedies, will be considered in consultation with NYSDEC.

4.7.4 Soil Vapor Sampling

Soil vapor samples will be collected from the three new temporary soil vapor monitoring points at six months and 12 months after implementation. The samples will be collected using Summa canisters over a 24-hour period and will be analyzed for CVOCs by USEPA Method TO-15. An outdoor ambient air sample will also be collected upwind during soil vapor sampling activities.

4.8 INVESTIGATION-DERIVED WASTES (IDW)

All investigation-derived waste (IDW) will be handled as discussed in Section 2.4 of Appendix A.

4.9 SITE RESTORATION

Construction debris, waste materials, and other solid wastes shall be covered and secured at the work site on a daily basis and removed from the work site per applicable waste handling requirements. Upon completion of IRM construction and after removal of materials and equipment, the areas used for storage and transporting equipment and/or materials between work areas, will be restored to original or better condition.

4.10 DEMOBILIZATION

Following completion and acceptance of the work, equipment, materials, supplies, debris/waste generated by the IRM construction activities, temporary utilities and facilities, and manpower will be removed from the Site.

5.0 IRM SCHEDULE AND REPORTING

5.1 IRM SCHEDULE

The estimated IRM schedule is provided in Table 3. Work on Site will begin within approximately 30 days of written approval from NYSDEC. This schedule is contingent upon securing any required permits or other approvals, cooperation of stakeholders, and does not contemplate significant delays due to weather or other conditions beyond ERM and/or Honeywell's control. NYSDEC will be provided with written notice a minimum of five business days prior to the initiation of IRM site work.

5.2 IRM SITE MANAGEMENT PLAN

An IRM Site Management Plan will be prepared.

5.3 IRM PROGRESS REPORTING

IRM construction and performance monitoring activities will be included in the John Street monthly progress reports that are submitted to the NYSDEC Project Manager and the New York State Department of Health Project Manager.

5.4 IRM CONSTRUCTION COMPLETION REPORT

An IRM Construction Completion Report (CCR) will be prepared and incorporated into the final RI Report and the Final Engineering Report (FER).

6.0 REFERENCES

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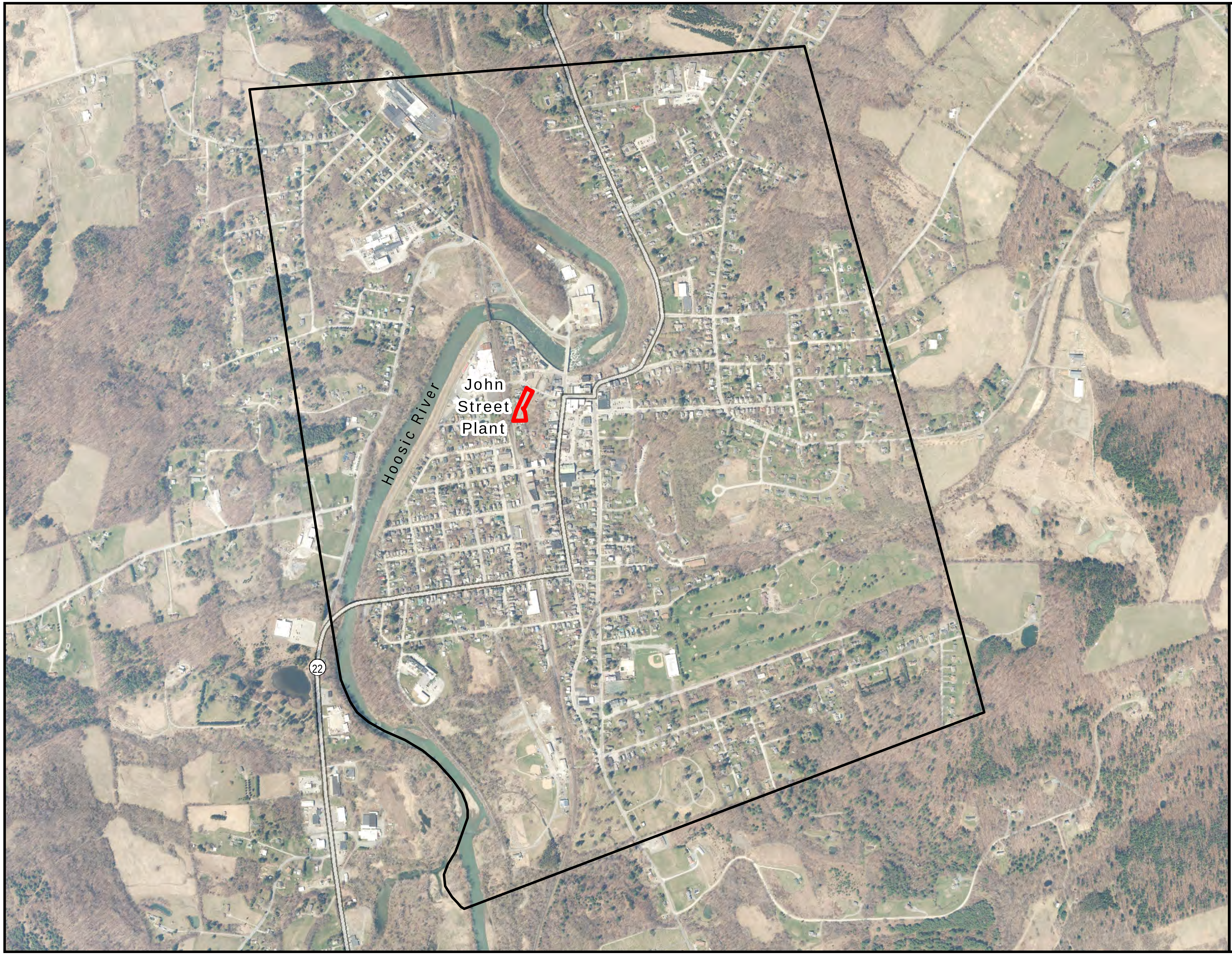
FIGURES



Legend

🟥	Approximate Property Boundary
⬜	Village of Hoosick Falls Boundary
═	State Route 22

N

0 0.05 0.1 0.2 0.3
Miles

Figure 1: Property Location

Former Oak Materials Fluorglas Division
John Street Site
Village of Hoosick Falls, New York

ERM

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Figure 2: Site Layout
Former Oak Materials Fluorglas Division
John Street Site
Village of Hoosick Falls, New York

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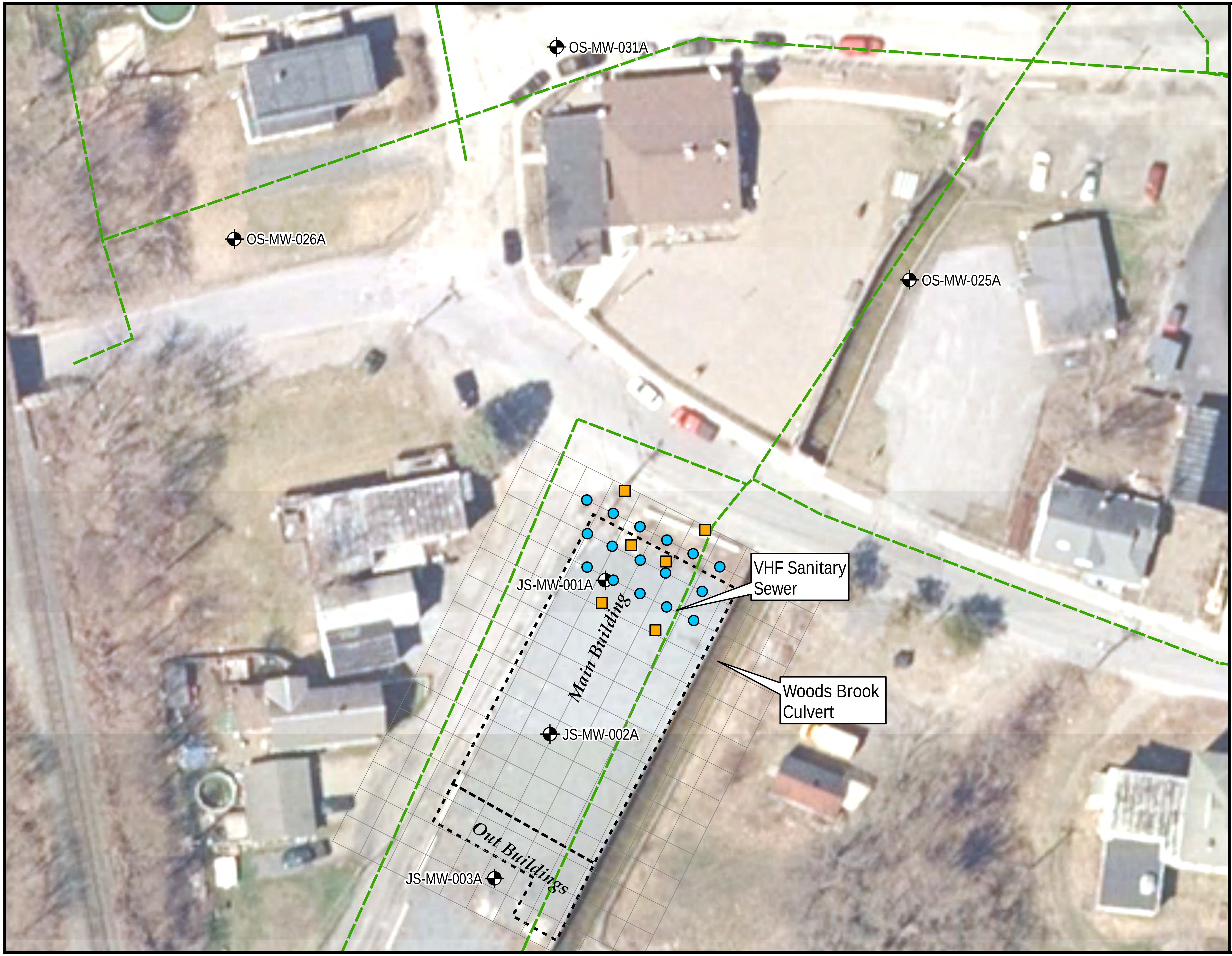

Legend

✛ Monitoring Well Location

— — Storm/Sanitary Utility Line (Approximate)

⬚ Approx Historic Building Footprint

— 12 ft x 12 ft grid

Proposed Locations

● Proposed Injection Locations

■ Temporary Performance Monitoring Wells

N

0 5 10 20 30 40 Feet

Figure 3: Proposed Injection Locations for Permeable Barrier

Former Oak Materials Fluorglas Division
John Street Site
Village of Hoosick Falls, New York

ERM

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TABLES

Table 1
Technology Screening
Former Oak Materials Fluorglas Division - John Street

Technology	**Application**		**Weighting Factors**						
	Barrier	Source Treatment	Implement-ability	Disruption to Surrounding Community	Treat Back Diffused Mass	Likelihood of Reducing VI	Cost	Active O&M	**Soil Disposal**
Injection – Oxidant	Yes	Yes	**High**	**Low**	No	Moderate	**Low**	**No**	No
Injection – Bioremediation	Yes	Yes	**High**	Moderate	**Yes**	Low	**Low**	Yes	No
Injection – ZVI	Yes	Yes	**High**	**Low**	**Yes**	Low	**Low**	**No**	No
Injection - PlumeStop + ZVI	**Yes**	**Yes**	**High**	**Low**	**Yes**	**Moderate**	**Low**	**No**	**No**
Air Sparge Barrier /SVE – 5 yr	Yes	Yes	**High**	Moderate	**Yes**	Moderate	Moderate	Yes	No
ZVI Barrier	Yes	No	Moderate	Moderate	**Yes**	Moderate	Moderate	**No**	**Yes**
Mulch Barrier (Bioremediation)	Yes	No	Moderate	Moderate	**Yes**	Low	Moderate	**No**	No
Groundwater Extraction – 5 yr	Yes	No	**High**	Moderate	**Yes**	Moderate	Moderate	Yes	No
Excavation	No	Yes	Low	High	No	Moderate	High	**No**	**Yes**
Thermal treatment	No	Yes	Low	High	**Yes**	Moderate	High	**No**	No

Table 2
John Street Shallow IRM Groundwater Performance Monitoring Plan

Sampling Location	Status of Well	Sampled Aquifer	Location Relative to Barrier	Methods/Work Scope Summary	Sampling Method	Performance Monitoring Sampling Events							
						Baseline	Month 1	Month 2	Month 3	Month 6	Month 9	Month 12	Annually until Final Remedy Note 1
PMW--1	New	Shallow overburden	Immediately upgradient	Monitor influent concentrations to the treatment zone	Low-flow Sampling	VOCs, PFAS, TOC, pH, dissolved gases	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH, dissolved gases	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH, dissolved gases	VOCs, PFAS, TOC, pH
PMW--2	New	Shallow overburden	Immediately upgradient	Monitor influent concentrations to the treatment zone	Low-flow Sampling	VOCs, PFAS, TOC, pH, dissolved gases	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH, dissolved gases	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH, dissolved gases	VOCs, PFAS, TOC, pH
PMW--3	New	Shallow overburden	Within treatment zone	Monitor concentrations within the treatement zone and assess breakthrough	Low-flow Sampling	VOCs, PFAS, TOC, pH, dissolved gases	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH, dissolved gases	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH, dissolved gases	VOCs, PFAS, TOC, pH
PMW--4	New	Shallow overburden	Within treatment zone	Monitor concentrations within the treatement zone and assess breakthrough	Low-flow Sampling	VOCs, PFAS, TOC, pH, dissolved gases	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH, dissolved gases	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH, dissolved gases	VOCs, PFAS, TOC, pH
PMW--5	New	Shallow overburden	Immediately downgradient	Monitor effluent concentrations from the treatment zone and assess breakthrough	Low-flow Sampling	VOCs, PFAS, TOC, pH, dissolved gases	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH, dissolved gases	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH, dissolved gases	VOCs, PFAS, TOC, pH
PMW--6	New	Shallow overburden	Immediately downgradient	Monitor effluent concentrations from the treatment zone and assess breakthrough	Low-flow Sampling	VOCs, PFAS, TOC, pH, dissolved gases	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH, dissolved gases	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH, dissolved gases	VOCs, PFAS, TOC, pH
JS-MW-001A	Existing	Shallow overburden	Within treatment zone	Monitor concentrations within the treatement zone and assess breakthrough	Low-flow Sampling	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	na	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH
JS-MW-001B	Existing	Deep overburden	Within treatment zone	Assess potential effects on the lower overburden aquifer	Low-flow Sampling	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	na	na	VOCs, PFAS, TOC, pH	na	VOCs, PFAS, TOC, pH	na
JS-MW-002A	Existing	Shallow overburden	Upgradient	Monitor influent concentrations to the treatment zone	Low-flow Sampling	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	na	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH
JS-MW-003A	Existing	Shallow overburden	Upgradient	Monitor influent concentrations to the treatment zone	Low-flow Sampling	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	na	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH
JS-MW-003B	Existing	Deep overburden	Upgradient	Assess potential effects on the lower overburden aquifer	Low-flow Sampling	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	na	na	VOCs, PFAS, TOC, pH	na	VOCs, PFAS, TOC, pH	na
TMW-0xx	Proposed	Shallow overburden	Cross-gradient	Assess groundwater quality and potential effects in westward flow direction	Low-flow Sampling	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	na	na	VOCs, PFAS, TOC, pH	na	VOCs, PFAS, TOC, pH	na
TMW-0xx	Proposed	Shallow overburden	Cross-gradient	Assess groundwater quality and potential effects in westward flow direction	Low-flow Sampling	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	na	na	VOCs, PFAS, TOC, pH	na	VOCs, PFAS, TOC, pH	na
OS-MW-025A	Existing	Shallow overburden	Downgradient /cross-gradient	Monitor effectiveness	Low-flow Sampling	VOCs, PFAS, TOC, pH	na	na	na	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH
OS-MW-026A	Existing	Shallow overburden	Downgradient /cross-gradient	Monitor effectiveness	Low-flow Sampling	VOCs, PFAS, TOC, pH	na	na	na	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH
OS-MW-031A	Existing	Shallow overburden	Downgradient	Monitor effectiveness	Low-flow Sampling	VOCs, PFAS, TOC, pH	na	na	na	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH	VOCs, PFAS, TOC, pH
Other existing and proposed John St wells, as agreed to in RIWP	Existing	Shallow (A), deep (B, C, D) overburden; shallow bedrock (BR)	Various	Monitor VOC concentrations in wells surrounding the treatment area.	Low-flow Sampling	na	na	na	na	na	na	na	Note 2

Abbreviations:

PFAS - Perfluorinated Alkyl Substances (21 PFAS analytes as listed in the text)

VOCs - Volatile Organic Compounds

TOC = Total Organic Carbon by the Lloyd Kahn method

Dissolved gases - methane, ethene, ethane

Notes:

1. The wells selected for annual sampling after the first year are based on currently available information.

2. Four semi-annual groundwater sampling events for all wells are proposed in the RIWP and relevant data (VOCs, PFAS, pH, TOC) will be used for performance monitoring of the IRM.

Field Parameters including Specific Conductance (SpC), pH, Dissolved Oxygen (DO), and Oxidation-Reduction Potential (ORP) will be collected at every sampling events

Table 3
Estimated IRM Project Schedule
Former Oak Materials Fluorglas Division - John Street

Milestone	*Estimated Completion Date**
Final IRM Work Plan submitted to NYSDEC	10 June 2019
NYSDEC Approval of IRM Work Plan	14 June 2019
Initiate IRM Field Work	15 July 2019
Baseline Sampling Event	19 August 2019
Finalize design (reagent loading) based on baseline sampling results, in consultation with NYSDEC	26 September 2019
Mobilization for injection event	24 October 2019
Injection event	28 October to 8 November 2019
Month 1 Sampling Event	Late-November 2019
Month 2 Sampling Event	Late-December 2019
Month 3 Sampling Event	Late-January 2020
Month 6 Sampling Event	Late-April 2020
Month 12 Sampling Event	October 2020
Continued annual sampling until final remedy	October 2021 through TBD
Submission of Construction Completion Report with RI Report and FER	TBD

TBD – to be determined

*The schedule is estimated and is subject to change based on site access and other conditions.

Attachment 1
PlumeStop – SDS and Technical Specifications

PLUME STOP®
Liquid Activated Carbon

PlumeStop® Liquid Activated Carbon™ Technical Description

PlumeStop Liquid Activated Carbon is an innovative groundwater remediation technology designed to rapidly remove and permanently degrade groundwater contaminants. PlumeStop is composed of very fine particles of activated carbon (1-2µm) suspended in water through the use of unique organic polymer dispersion chemistry. Once in the subsurface, the material behaves as a colloidal biomatrix, binding to the aquifer matrix, rapidly removing contaminants from groundwater, and expediting permanent contaminant biodegradation.

This unique remediation technology accomplishes treatment with the use of highly dispersible, fast-acting, sorption-based technology, capturing and concentrating dissolved-phase contaminants within its matrix-like structure. Once contaminants are sorbed onto the regenerative matrix, biodegradation processes achieve complete remediation at an accelerated rate.

Distribution of PlumeStop in water

To see a list of treatable contaminants with the use of PlumeStop, view the Range of Treatable Contaminants Guide.

Chemical Composition

- Water - CAS# 7732-18-5
- Colloidal Activated Carbon ≤2.5 - CAS# µm 7440-44-0
- Proprietary Additives

Properties

- Physical state: Liquid
- Form: Aqueous suspension
- Color: Black
- Odor: Odorless
- pH: 8 - 10

Storage and Handling Guidelines

Storage
Store in original tightly closed container
Store away from incompatible materials
Protect from freezing

Handling
Avoid contact with skin and eyes
Avoid prolonged exposure
Observe good industrial hygiene practices
Wash thoroughly after handling
Wear appropriate personal protective equipment

PLUME STOP®
Liquid Activated Carbon

PlumeStop® Liquid Activated Carbon™ Technical Description

Applications

PlumeStop is easily applied into the subsurface through gravity-feed or low-pressure injection.

Health and Safety

Wash hands after handling. Dispose of waste and residues in accordance with local authority requirements. Please review the Material Safety Data Sheet for additional storage, usage, and handling requirements here: PlumeStop SDS.

REGENESIS
Technology-Based Solutions for the Environment

SAFETY DATA SHEET

1. Identification

Product identifier	**PlumeSTOP® S**
Other means of identification	None.
Recommended use	Soil and Groundwater Remediation.
Recommended restrictions	None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name	Regenesis
Address	1011 Calle Sombra San Clemente, CA 92673
Telephone	949-366-8000
E-mail	CustomerService@regenesis.com
Emergency phone number	CHEMTREC® at 1-800-424-9300 (International)

2. Hazard(s) identification

Physical hazards	Not classified.
Health hazards	Not classified.
OSHA defined hazards	Not classified.

Label elements

Hazard symbol	None.
Signal word	None.
Hazard statement	The mixture does not meet the criteria for classification.

Precautionary statement

Prevention	Observe good industrial hygiene practices.
Response	Wash hands after handling.
Storage	Store away from incompatible materials.
Disposal	Dispose of waste and residues in accordance with local authority requirements.
Hazard(s) not otherwise classified (HNOC)	None known.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Water	7732-18-5	>75
Colloidal activated carbon ≤2.5 µm	7440-44-0	<25
Proprietary additives		≤2

Composition comments	All concentrations are in percent by weight unless otherwise indicated.

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye contact	Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Direct contact with eyes may cause temporary irritation.

Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	If you feel unwell, seek medical advice (show the label where possible). Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media	Carbon dioxide, alcohol-resistant foam, dry chemical, water spray, or water fog.
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed. Combustion products may include: carbon monoxide, carbon dioxide, sodium oxides, metal oxides.
Special protective equipment and precautions for firefighters	Use protective equipment appropriate for surrounding materials.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials. Use water spray to keep fire-exposed containers cool.
General fire hazards	This material will not burn until the water has evaporated. Residue can burn. When dry may form combustible dust concentrations in air.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Avoid contact with spilled material. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	This product is miscible in water. Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Avoid contact with skin and eyes. Avoid prolonged exposure. Observe good industrial hygiene practices. Wash thoroughly after handling. Wear appropriate personal protective equipment (See Section 8).
Conditions for safe storage, including any incompatibilities	Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Protect from freezing.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value	Form
Colloidal activated carbon ≤2.5 µm (CAS 7440-44-0)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Colloidal activated carbon ≤2.5 µm (CAS 7440-44-0)	TWA	2.5 mg/m3	Respirable.

Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment	
Eye/face protection	Wear approved chemical safety goggles.
Skin protection	
Hand protection	Rubber, neoprene or PVC gloves are recommended. Wash hands after handling.
Other	Avoid contact with the skin. Wear suitable protective clothing.
Respiratory protection	Not normally needed. In case of insufficient ventilation, wear suitable respiratory equipment. If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	
Physical state	Liquid.
Form	Aqueous suspension.
Color	Black.
Odor	Odorless.
Odor threshold	Not available.
pH	8 - 10
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	Not flammable.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	1 - 1.2
Solubility(ies)	
Solubility (water)	Miscible
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Contact with incompatible materials. Keep from freezing.
Incompatible materials	Strong oxidizing agents. Water reactive materials.

Hazardous decomposition products	Combustion may produce: carbon oxides.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Prolonged inhalation may be harmful.
Skin contact	Prolonged or repeated skin contact may result in minor irritation.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics	Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity	Not expected to be acutely toxic.

Components	**Species**	**Test Results**
Colloidal activated carbon ≤2.5 µm (CAS 7440-44-0)		
Acute		
Inhalation		
LC50	Rat	> 8500 mg/m³, air
Oral		
LD50	Rat	> 2000 mg/kg, (Female)

Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.
Respiratory or skin sensitization	
Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not an aspiration hazard.
Chronic effects	Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
Persistence and degradability	No data is available on the degradability of this product.
Bioaccumulative potential	No data available.
Mobility in soil	Expected to be temporarily highly mobile in soil.
Other adverse effects	None known.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not established.

15. Regulatory information

US federal regulations	All components are listed on or exempt from the U.S. EPA TSCA Inventory List. This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - No Delayed Hazard - No Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical	No

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA)	Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Not regulated.

US. New Jersey Worker and Community Right-to-Know Act

Colloidal activated carbon ≤2.5 µm (CAS 7440-44-0)

US. Pennsylvania Worker and Community Right-to-Know Law

Not listed.

US. Rhode Island RTK

Not regulated.

US. California Proposition 65

Not Listed.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date	26-February-2015
Revision date	-
Version #	01
Further information	HMIS® is a registered trade and service mark of the American Coatings Association (ACA).
HMIS® ratings	Health: 0 Flammability: 0 Physical hazard: 0

NFPA ratings

Disclaimer

Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

REGENESIS

Technology-Based Solutions for the Environment

SAFETY DATA SHEET

1. Identification

Product identifier	**PlumeSTOP® Nutrients**
Other means of identification	None.
Recommended use	Soil and Groundwater Remediation.
Recommended restrictions	None known.
Manufacturer/Importer/Supplier/Distributor information	
Company Name	Regenesis
Address	1011 Calle Sombra San Clemente, CA 92673
Telephone	949-366-8000
E-mail	CustomerService@regenesis.com
Emergency phone number	CHEMTREC® at 1-800-424-9300 (International)

2. Hazard(s) identification

Physical hazards	Not classified.
Health hazards	Not classified.
OSHA defined hazards	Not classified.
Label elements	
Hazard symbol	None.
Signal word	None.
Hazard statement	The mixture does not meet the criteria for classification.
Precautionary statement	
Prevention	Observe good industrial hygiene practices.
Response	Wash hands after handling.
Storage	Store away from incompatible materials.
Disposal	Dispose of waste and residues in accordance with local authority requirements.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

3. Composition/information on ingredients

Mixtures

The manufacturer lists no ingredients as hazardous according to OSHA 29 CFR 1910.1200.

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye contact	Do not rub eyes. Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Dusts may irritate the respiratory tract, skin and eyes.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2). Apply extinguishing media carefully to avoid creating airborne dust.
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Use water spray to cool unopened containers. Avoid dust formation.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Avoid the generation of dusts during clean-up. Collect dust using a vacuum cleaner equipped with HEPA filter. This product is miscible in water. Stop the flow of material, if this is without risk. Large Spills: Wet down with water and dike for later disposal. Shovel the material into waste container. Following product recovery, flush area with water. Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Minimize dust generation and accumulation. Provide appropriate exhaust ventilation at places where dust is formed. Practice good housekeeping.
Conditions for safe storage, including any incompatibilities	Store in original tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
PlumeSTOP® Nutrients (as dust)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value	Form
PlumeSTOP® Nutrients (as dust)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
		50 mppcf	Total dust.
		15 mppcf	Respirable fraction.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
PlumeSTOP® Nutrients (as dust)	TWA	3 mg/m3	Respirable particles.
		10 mg/m3	Inhalable particles.

Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Ensure adequate ventilation, especially in confined areas. Local exhaust is suggested for use, where possible, in enclosed or confined spaces.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear safety glasses with side shields (or goggles). Unvented, tight fitting goggles should be worn in dusty areas.
Skin protection	
Hand protection	Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.
Skin protection	
Other	Wear suitable protective clothing.
Respiratory protection	In case of inadequate ventilation, use MSHA/NIOSH approved dust respirator.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	
Physical state	Solid.
Form	Powder.
Color	White.
Odor	Odorless.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	The product is non-combustible.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Completely soluble.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.

Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use. Ammonia fumes may be released upon heating.
Conditions to avoid	Contact with incompatible materials. Excessive heat.
Incompatible materials	Strong oxidizing agents. Bases.
Hazardous decomposition products	Ammonia fumes may be released upon heating

11. Toxicological information

Information on likely routes of exposure

Inhalation	Dust may irritate respiratory system.
Skin contact	Dust or powder may irritate the skin.
Eye contact	Dust may irritate the eyes.
Ingestion	Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics	Dusts may irritate the respiratory tract, skin and eyes.

Information on toxicological effects

Acute toxicity	Not expected to be acutely toxic.
Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.
Respiratory or skin sensitization	
Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

NTP Report on Carcinogens

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not an aspiration hazard.

12. Ecological information

Ecotoxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
Persistence and degradability	No data is available on the degradability of this product.
Bioaccumulative potential	No data available.
Mobility in soil	This product is completely water soluble and will disperse in soil.
Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

US federal regulations This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Ammonium sulfate	7783-20-2	40-50

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Ammonium sulfate (CAS 7783-20-2)

US. New Jersey Worker and Community Right-to-Know Act

Not listed.

US. Pennsylvania Worker and Community Right-to-Know Law

Ammonium sulfate (CAS 7783-20-2)

US. Rhode Island RTK

Not regulated.

US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date	07-January-2016
Revision date	-
Version #	01
HMIS® ratings	Health: 1 Flammability: 0 Physical hazard: 0

NFPA ratings

Disclaimer

Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

Attachment 2

AquaZVI – SDS and Technical Specifications

AquaZVI Specification Sheet

AquaZVI Technical Description

AquaZVI^{TM} is an *In Situ* Chemical Reduction (ISCR) reagent that promotes the destruction of many organic pollutants and is most commonly used with chlorinated hydrocarbons. It is engineered to provide an optimal source of micron-scale zero valent iron (ZVI) that is both easy to use and delivers enhanced reactivity with the target contaminants of concern via multiple pathways. AquaZVI will stimulate anaerobic biological degradation by rapidly creating a reducing environment favorable for reductive dechlorination. In many cases this improved formulation of ZVI can also destroy contaminants through a direct chemical reaction, see Figure 1.

AquaZVI is composed of colloidal, sulfidated zero-valent iron (ZVI) particles suspended in an aqueous medium with environmentally-acceptable, proprietary dispersants. The passivation technique of sulfidation, completed through proprietary processing methods, provides unparalleled reactivity with chlorinated hydrocarbons like PCE and TCE, and increases its stability and longevity *in situ* by minimizing undesirable side-reactions.

In addition to superior reactivity, AquaZVI is designed for easy handling that is unmatched by any ZVI material on the market. Shipped as an aqueous suspension, AquaZVI requires no powder feeders, no thickening with guar, and pneumatic or hydraulic fracturing is not mandatory. When diluted with water in the field, the resulting suspension is easy to mix and inject using direct push or injections wells.

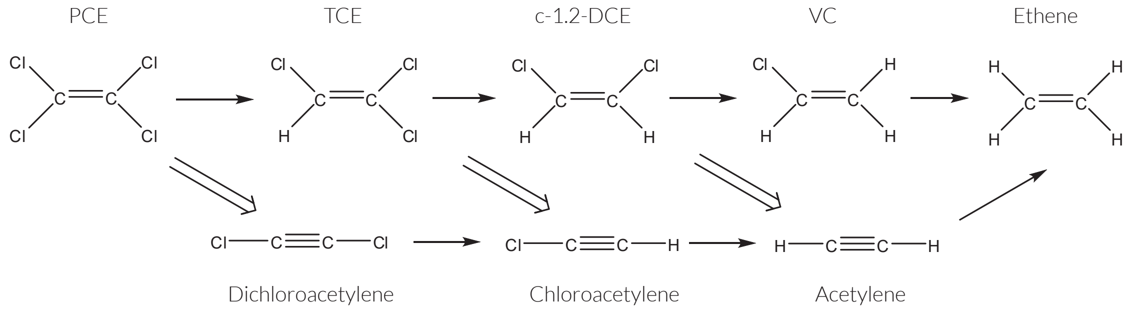


Figure 1. Example of chlorinated ethene degradation pathways and products. The top line with single-line arrows represents the reductive dechlorination (hydrogenolysis) pathway. The downward facing double-arrows represent the abiotic beta-elimination pathway.

To see a list of contaminants treatable by AquaZVI, view the Range of Treatable Contaminants Guide.

AquaZVI Specification Sheet

Chemical Composition

Iron, powders CAS 7439-89-6
Iron(II) sulfide CAS 1317-37-9

Properties

Physical State: Liquid
Form: Viscous metallic suspension
Color: Dark gray
Odor: Slight
pH: Typically 7-9 as applied
Density: 14 lbs/gal

Storage and Handling Guidelines

Storage:

- Use within two weeks of delivery
- Store at temperatures above freezing and below 95°F
- Store in original containers
- Store away from incompatible materials

Handling:

- Never mix with oxidants or acids.
- Wear appropriate personal protective equipment
- Do not taste or swallow.
- Observe good industrial hygiene practices.

Applications

AquaZVI is diluted with water on site and easily applied into the subsurface through low-pressure injections. AquaZVI can also be mixed with products like 3-D Microemulsion® or PlumeStop® prior to injection.

Health and Safety

Material is relatively safe to handle; however, avoid contact with eyes, skin and clothing. OSHA Level D personal protection equipment including: vinyl or rubber gloves and eye protection are recommended when handling this product. Please review the Safety Data Sheet for additional storage, usage, and handling requirements here: AquaZVI SDS.

SAFETY DATA SHEET

1. Identification

Product identifier	**AquaZVI**
Other means of identification	None.
Recommended use	Remediation of contaminants in soil and groundwater.
Recommended restrictions	None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name	Regenesis
Address	1011 Calle Sombra San Clemente, CA 92673 USA
General information	949-366-8000
E-mail	CustomerService@regenesis.com

Emergency phone number	For Hazardous Materials Incidents ONLY (spill, leak, fire, exposure or accident), call CHEMTREC 24/7 at:
USA, Canada, Mexico	1-800-424-9300
International	1-703-527-3887

2. Hazard(s) identification

Physical hazards	Not classified.
Health hazards	Not classified.
OSHA defined hazards	Not classified.

Label elements

Hazard symbol	None.
Signal word	None.
Hazard statement	The mixture does not meet the criteria for classification.

Precautionary statement

Prevention	Observe good industrial hygiene practices.
Response	Wash hands after handling.
Storage	Store away from incompatible materials.
Disposal	Dispose of waste and residues in accordance with local authority requirements.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	Contact with acids liberates very toxic gas.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Iron, powders	7439-89-6	30 - 50
Iron(II) sulfide	1317-37-9	0 - 2

Composition comments	All concentrations are in percent by weight unless otherwise indicated. Components not listed are either non-hazardous or are below reportable limits.

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye contact	Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed	Direct contact with eyes may cause temporary irritation.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Use extinguishing agent suitable for type of surrounding fire.
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed. Combustion products may include: carbon oxides, iron oxides, sulfur oxides.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	This material will not burn until the water has evaporated. Residue can burn. When dry may form combustible dust concentrations in air.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits	No exposure limits noted for ingredient(s).
Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear safety glasses with side shields (or goggles).
Skin protection	
Hand protection	Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.
Skin protection	
Other	Wear suitable protective clothing.
Respiratory protection	In case of insufficient ventilation, wear suitable respiratory equipment.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	
Physical state	Liquid.
Form	Viscous metallic suspension.
Color	Dark gray.
Odor	Slight.
Odor threshold	Not available.
pH	7 - 8 (When mixed with water) 10 (As shipped)
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	3000 cP (77 °F (25 °C))
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport. Contact with acids will cause evolution of heat.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Contact with acids liberates very toxic gas. Can react with some acids with the evolution of hydrogen.
Conditions to avoid	Contact with incompatible materials. Avoid drying out product. May generate combustible dust if material dries.
Incompatible materials	Strong oxidizing agents. Strong acids.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure	
Inhalation	Spray mist may irritate the respiratory system. For dry material: Dust may irritate respiratory system.
Skin contact	May cause mild skin irritation upon prolonged and excessive contact.

Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	May cause discomfort if swallowed.
Symptoms related to the physical, chemical and toxicological characteristics	Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity	Not expected to be acutely toxic.
Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

NTP Report on Carcinogens

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not an aspiration hazard.

12. Ecological information

Ecotoxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
Persistence and degradability	The majority of components in this product are inorganic compounds that are not biodegradable. No data is available for the organic components.
Bioaccumulative potential	No data available.
Mobility in soil	No data available.
Other adverse effects	None known.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not established.

15. Regulatory information

US federal regulations This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Not regulated.

US. New Jersey Worker and Community Right-to-Know Act

Not listed.

US. Pennsylvania Worker and Community Right-to-Know Law

Not listed.

US. Rhode Island RTK

Not regulated.

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 2016 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Iron, powders (CAS 7439-89-6)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes

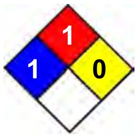
Country(s) or region	Inventory name	On inventory (yes/no)*
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date	15-February-2018
Revision date	12-April-2018
Version #	02
HMIS® ratings	Health: 1 Flammability: 1 Physical hazard: 0

NFPA ratings



Disclaimer

Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

Attachment 3
Summary Calculation Sheet for Remedial Reagents

REGENESIS

Project Info

John Street Area
Hoosick Falls NY
JSMW001A barrier
Prepared For:
ERM Maureen Leahy

Target Treatment Zone (TTZ) Info	Unit	Value
Barrier Length	ft	65
Top Treat Depth	ft	11.0
Bot Treat Depth	ft	19.0
Vertical Treatment Interval	ft	8.0
Treatment Zone Volume	ft^3	7,800
Treatment Zone Volume	cy	289
Soil Type	---	silty sand
Porosity	cm^3/cm^3	0.30
Effective Porosity	cm^3/cm^3	0.25
Treatment Zone Pore Volume	gals	17,504
Treatment Zone Effective Pore Volume	gals	14,587
Treatment Zone Pore Volume	liters	66261
Treatment Zone Effective Pore Volume	liters	55218
Fraction Organic Carbon (foc)	g/g	0.002
Soil Density	g/cm^3	1.6
Soil Density	lb/ft^3	100
Soil Weight	lbs	7.8E+05
Hydraulic Conductivity	ft/day	85.2
Hydraulic Conductivity	cm/sec	3.01E-02
Hydraulic Gradient	ft/ft	0.002
GW Velocity	ft/day	0.51
GW Velocity	ft/yr	187

Sources of Hydrogen Demand	Unit	Value
Dissolved Phase Contaminant Mass	lbs	0
Sorbed Phase Contaminant Mass	lbs	0
Competing Electron Acceptor Mass	lbs	13
Total Mass Contributing to H_2 Demand	**lbs**	**13**

Stoichiometric Demand	Unit	Value
Stoichiometric H_2 Demand	lbs	1
Stoichiometric HRC Demand	**lbs**	**38**

Application Dosing	Unit	Value
PlumeStop to be Applied	**lbs**	**6,800**
PlumeStop-S	**lbs**	**4,400**
AquaZVI to be Applied	**lbs**	**1,600**

PlumeStop® Application Design Summary

JSMW001A barrier

PlumeStop	
Barrier Length (ft)	**65**
Spacing Within Barrier (ft)	12
Number of Lines	3
Application Points	**16**
Application Method	**Direct Push**
Top Application Depth (ft bgs)	11
Bottom Application Depth (ft bgs)	19
PlumeStop to be Applied (lbs)	**11,200**
PlumeStop to be Applied (gals)	1,342
In Situ Chemical Reduction - AquaZVI	
AquaZVI to be added to PlumeStop (lbs)	**1,600**
AquaZVI to be added to PlumeStop (gals)	120
PlumeStop + AquaZVI Volume Totals	
Mixing Water (gal)	7,496
Total Application Volume (gals)	**8,958**
Injection Volume per Point (gals)	560
Anaerobic Bioremediation - HRC	
HRC Application Points	**16**
HRC to be Applied (lbs)	**0**
HRC per point (lbs)	0
Total Application Volume (gals)	**0**
Injection Volume per Point (gals)	0.0
Bioaugmentation - BDI Plus	
BDI Plus Application Points	**16**
BDI Plus to be Applied (Liters)	**0**
BDI Plus per point (Liters)	0.0

Technical Notes/Discussion

PSTOP Injection Concentration (mg/L)
17,500

Assumptions/Qualifications

In generating this preliminary estimate, Regenesis relied upon professional judgment and site specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site.

REGENESIS developed this Scope of Work in reliance upon the data and professional judgments provided by those whom completed the earlier environmental site assessment(s). The fees and charges associated with the Scope of Work were generated through REGENESIS' proprietary formulas and thus may not conform to billing guidelines, constraints or other limits on fees. REGENESIS does not seek reimbursement directly from any government agency or any governmental reimbursement fund (the "Government"). In any circumstance where REGENESIS may serve as a supplier or subcontractor to an entity which seeks reimbursement from the Government for all or part of the services performed or products provided by REGENESIS, it is the sole responsibility of the entity seeking reimbursement to ensure the Scope of Work and associated charges are in compliance with and acceptable to the Government prior to submission. When serving as a supplier or subcontractor to an entity which seeks reimbursement from the Government, REGENESIS does not knowingly present or cause to be presented any claim for payment to the Government.

Prepared by: DaP61626
Date: 9/25/2018

Appendix A

Shallow Groundwater IRM PDI Summary Memorandum

Shallow Groundwater Interim Remedial Measure Pre-Design Investigation Summary Memorandum

Former Oak Materials Fluorglas Division
John Street (NYSDEC Site No. 442049)

Village of Hoosick Falls
Rensselaer County, New York

Honeywell

June 2019

The business of sustainability

I, Chris Wenczel, certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Shallow Groundwater Interim Remedial Measure Pre-Design Investigation Summary Memorandum 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).

Chris W. Wenczel

Chris W. Wenczel, P.G.
New York State Professional Geologist License No. 000744
ERM Consulting & Engineering, Inc.

Date: 18 June 2019

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

°C	Degrees Celsius
1,1,1-TCA	1,1,1-trichloroethane
1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethene
APS	Advanced Profiling System
BBC	Base Buffer Capacity
bgs	below ground surface
cis-1,2-DCE	cis-1,2-dichloroethene
CVOCs	Chlorinated Volatile Organic Compounds
DER	Division of Environmental Remediation
DO	Dissolved Oxygen
eV	electron volt
ERM	ERM Consulting and Engineering, Inc.
gph/ft-s	gallons per hour per foot of screen
g/kg	Grams per Kilogram
Honeywell	Honeywell International Inc.
ISCO	*In Situ* Chemical Oxidation
ISM	*In Situ* Soil Mixing
IRM	Interim Remedial Measure
KMnO4	Potassium Permanganate
µg/kg	Micrograms per Kilogram (parts per billion {ppb})
µg/L	Micrograms per Liter (parts per billion {ppb})
MOB	Methane Oxidizing Bacteria
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
mV	millivolts
ng/L	Nanograms per liter (parts per trillion)
NOD	Natural Oxidant Demand
NTU	Nepholometric Turbidity Units
NYCRR	New York Codes, Rules and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSGS	New York State Geological Survey
ORP	Oxygen Reduction Potential
PFAS	Per- and Polyfluoroalkyl Substances
PCBs	Polychlorinated Biphenyls
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonic acid
PXC	PeroxyChem
PID	Photoionization detector
PPE	Personal Protective Equipment
ppm	Parts Per Million
PTFE	Polytetrafluoroethylene
PDI	Pre-Design Investigation
RI	Remedial Investigation
SOW	Scope of Work
SVOCs	Semi-Volatile Organic Compounds
SC	Site Characterization
SCOs	Soil Cleanup Objectives
SVE/AS	Soil Vapor Extraction/Air Sparging
TCE	Trichloroethene
TCL	Target Compound List

TOC	Total Organic Carbon
TOP	Total Oxidizable Precursor
TPH	Total Petroleum Hydrocarbon
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds

1.0 INTRODUCTION/PURPOSE

This Shallow Groundwater Interim Remedial Measure (IRM) Pre-Design Investigation (PDI) Summary Memorandum summarizes the findings of investigative activities undertaken to develop data to design a shallow groundwater IRM intended to mitigate the migration of chlorinated volatile organic compounds (CVOCs) in shallow groundwater at the John Street Property (Shallow Groundwater IRM Work Plan Figures 1 and 2) in the Village of Hoosick Falls, Rensselaer County, New York.

Honeywell International Inc. (Honeywell) entered into an Order on Consent and Administrative Settlement with the New York State Department of Environmental Conservation (NYSDEC) dated 3 June 2016 (the Order; Index Number CO 4-20160415-79: NYSDEC, 2016) for the Former Oak Materials Fluorglas Division - John Street Site (No. 442049), hereafter referred to as the Site.

In 2016, initial Site Characterization (SC) work was performed in accordance with the NYSDEC-approved SC Field Sampling and Analysis Plan (ERM, 2016a), where CVOCs were detected in on-site soil and groundwater and in off-Site groundwater. The draft report of the SC results for the Site has been submitted to NYSDEC for review (ERM, 2017).

To refine the conceptual IRM intended to mitigate migration of CVOCs in shallow groundwater, additional Site characterization activities and pre-design studies were performed during 2018 in accordance with the NYSDEC-approved work plan entitled "*Shallow Groundwater Interim Remedial Measure Pre-Design Investigation & Treatability Study Work Plan*" dated 16 March 2018 (ERM, 2018b). The Pre-Design Investigation (PDI) activities included the delineation of CVOCs in on-site shallow soil, further delineation in groundwater and collection of additional data to determine the physical and chemical characteristics of the shallow subsurface. Additional characterization data are presented in Section 2.0 along with relevant data collected during SC and Remedial Investigation (RI) activities.

2.0 SITE CHARACTERIZATION AND PRE-DESIGN INVESTIGATION RESULTS

The investigation activities and findings of the 2016 SC and 2018 PDI that are relevant to the IRM technology screening and design are described in the following sections.

2.1 2016 SITE CHARACTERIZATION

The soil and groundwater exploratory and sampling activities completed at the Site during the 2016 SC included:

- Five Waterloo Advanced Profiling System (APS)™ borings (JS-APS-001 through JS-APS-005) were installed to provide continuous soil logging and provide data on inferred hydraulic conductivity.
- Twelve direct-push borings (JS-B-001 through JS-B-012) were completed and continuous soil samples were collected and field screened with a photoionization ionization detector (PID) via soil headspace methodology. Soil samples were also collected at select intervals from the direct-push borings for laboratory analysis.
- Surface (0 to 2 inches) and near-surface (2 to 12 inches) soil samples were collected at JS-SS-001 and boring locations JS-B-003 through JS-B-005. Shallow soil samples (10 to 12 and 12 to 24 inches) were collected at JS-SS-002.
- Five monitoring well clusters (JS-MW-001 to JS-MW-005) were installed and representative groundwater samples were collected using low-flow procedures.

The soil and groundwater sampling locations completed during the SC are presented in Figure A-1. The results of the SC were used to develop an initial understanding of the geologic, hydrogeologic, soil and groundwater quality conditions upgradient, beneath and downgradient of the Site. Full details are presented in the draft Site Characterization Report for the Site.

The following sections present summaries of information used in the shallow groundwater IRM technology screening and design that includes the:

- Shallow subsurface geologic/hydrogeologic conditions,
- Soil and groundwater sample analytical results driving the need for a shallow groundwater IRM and continued remedial investigation, and
- Follow-up 2018 PDI.

2.1.1 Geology and Hydrogeology

2.1.1.1 Soil

Native soil in the area, mapped by the New York State Geological Survey (NYSGS), is shown primarily as alluvium and lacustrine silt and clay (Caldwell and Dineen, 1987). Localized areas of soil include coarse material associated with channel sand and glacial outwash sand and gravel (Caldwell and Dineen, 1987).

Surface soil at the Site is primarily fill material from grade to between eight and 17 feet below grade. Underlying native soil consists predominantly of Hamlin silt loam (USDA, 2017).

2.1.1.2 *Geologic Setting*

Figure A-2 summarizes geologic material identified on the Site and surrounding areas which were investigated during the SC and PDI. Unconsolidated geologic material above bedrock (collectively referred to as overburden) consist of the following:

- An upper shallow layer of fine-grained post-glacial alluvium (predominantly silt and clay) deposited in the Hoosic River valley.
- A coarse-grained alluvium, consisting predominantly of sand and gravel, with lesser amounts of silt.
- A clay and silt unit deposited in glacial and post-glacial lakes that is laterally continuous within the study area.
- Glacial outwash (predominantly sand and gravel) with interbedded sandy-silt, deposited by glacial meltwaters. Gravel and cobbles have been observed near the top of bedrock.
- Glacial till, where present, is typically a dense, compact, poorly sorted mix of silt, clay, sand, gravel, cobbles and boulders derived from material eroded and entrained beneath glaciers.

Bedrock consists of dark gray to black slate or phyllite which is weathered in varying thickness intervals between the overburden and competent rock.

2.1.1.3 *Hydrogeologic Setting*

The trace of cross-sectional plane A-A′ is shown on Figure A-1 and the cross-section is presented in Figure A-3 which depicts the shallow subsurface stratigraphy beneath the Site.

Groundwater occurs in both the overburden deposits and bedrock beneath the Site. The water table surface is encountered in the alluvium unit (above the clay and silt unit at the Site) at depths of approximately 6 to 14 feet below ground surface (bgs) and groundwater flow within this unit is controlled primarily by areal topography.

Groundwater elevations from shallow overburden monitoring wells (“A” Wells) and mapped groundwater contours for 19 July 2018 are shown in Figure A-4. Review of these data indicate that groundwater flow in the shallow sandy overburden unit is towards the north (i.e., towards the Hoosic River) as depicted the blue arrows in cross-section A-A′.

Available data suggest that the upper sandy alluvium unit at the Site appears to represent an unconfined hydrogeologic unit. The clay and silt unit appears to represent an aquitard, while the lower sand and gravel unit appears to represent one semi-confined hydrogeologic unit.

Vertical hydraulic gradient data were calculated using groundwater elevations and screened interval elevations between the “A” and deeper “B” monitoring wells screened in the lower glacial outwash sand and gravel beneath the clay and silt. A negative vertical gradient indicates a net potential for downward groundwater flow, whereas a positive vertical gradient indicates net potential for upward groundwater flow. As noted in the SC Report, these data also show that vertical gradient is typically negative and suggest the potential for downward groundwater flow from the upper sandy unit through the clay and silt unit towards the lower sand and gravel unit. Calculated vertical gradient values range from -0.353 to +0.003 (dimensionless).

2.1.2 SC Soil and Groundwater Analytical Results

Volatile organic compound (VOC) analytical results in soil and groundwater are presented in Tables A-1 through A-3 and are compared to the Part 375 Soil Cleanup Objectives and New York State (NYS) Class GA groundwater quality standards and/or guidance values.

2.1.2.1 Soil Results

Eight VOCs (TCE, 1,1,1-TCA, cis-1,2-dichloroethene (cis-1,2-DCE), 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), acetone, toluene, and vinyl chloride (VC)) were detected in shallow on-site samples at one or more locations. TCE and 1,1,1-TCA were detected at maximum concentrations of 420,000 micrograms per kilogram (µg/kg), and 88,000 µg/kg, respectively. The highest concentrations of TCE and 1,1,1-TCA in soil were found in a silt and clay layer occurring between 10 feet and 18 feet bgs on the Site. Multiple borings on the Site showed the highest concentrations occur in two limited "hot-spot" areas located in the central and northern portions of the property. These results prompted the 2018 PDI, which was intended to define the horizontal extent of the "hot-spots".

2.1.2.2 Groundwater Results

Groundwater at and near the Site is encountered in the overburden at depths of approximately 6 to 14 feet bgs and flows northward toward the Hoosic River.

Three VOCs (TCE, 1,1,1-TCA and cis-1,2-DCE) were detected in shallow groundwater at concentrations that exceed their respective NYS Class GA Standards. TCE was the only VOC detected at concentrations exceeding its NYS GA Standard at more than one shallow groundwater sample location. TCE concentrations ranged from 1 microgram per liter (µg/L) to 130 µg/L. No other VOCs exceeded applicable NYS Class GA Standards.

The SC results are summarized in plan and cross-sectional views that present TCE concentrations in shallow soil (Figures A-5 and A-6) and groundwater (Figures A-7 and A-8), respectively.

2.2 2018 PRE-DESIGN INVESTIGATION

The 2018 PDI activities were performed in support of the IRM. The PDI was designed to delineate CVOC impact in the subsurface and collect information to evaluate the viability of multiple physical, chemical and biological technologies for treatment of the primary CVOCs (TCE, 1,1,1-TCA and cis-1,2-DCE) including:

- *In situ* chemical oxidation (ISCO) or reduction (ISCR);
- Soil vapor extraction/air sparging (SVE/AS);
- Anaerobic bioremediation; and
- Adsorption.

2.2.1 2018 PDI Activities

The 2018 PDI activities were based on iterative field screenings. These included:

- Installation of soil borings and temporary groundwater monitoring wells;
- Sampling to delineate CVOCs in on-site shallow soils and groundwater; and
- Gathering additional information about the physical and chemical characteristics of the Site's shallow subsurface environment.

The 2018 PDI activities specifically included:

- Advancement of 48 direct-push soil borings with continuous lithological logging and PID screening from ground surface to termination depth (ranging from 2.5 to 40 feet bgs).
- Field screening in discrete one-foot intervals for VOCs using a PID equipped with an 11.7 electron volt (eV) lamp and the soil headspace method to facilitate delineation of the horizontal and vertical extents of impacted soils.
- Analyses of 55 confirmatory soil samples for VOCs, per- and polyfluoroalkyl substances (PFAS), total organic carbon (TOC), and pH (Table A-4).
- Duplicate soil samples collected for PFAS analyses were submitted to the laboratory and held for potential Total Oxidizable Precursor (TOP) Assay. Five samples were selected in consultation with NYSDEC personnel and analyzed for TOP Assay following a review of the preliminary VOC and PFAS results of the primary samples (Table A-5).
- Installation of 12 temporary groundwater monitoring wells constructed with screens straddling intervals in the silt-clay where field screening indicated VOC readings of 10 parts per million (ppm) or greater.
- Analyses of a non-aqueous free-phase liquid (DNAPL) discovered in one temporary well (JS-TMW-039) for PFAS, VOCs, semi-volatile organic compounds (SVOCs), total petroleum hydrocarbon (TPH) fingerprinting, polychlorinated biphenyls (PCBs) and pesticides (Table A-6).
- Analyses of 12 groundwater samples collected from temporary wells for VOCs, PFAS, TOC and pH (Table A-7).
- Submittal of two representative composites of soil exceeding 10 ppm by field screening, one from a predominant sand and gravel unit and one from a predominant silt and clay unit, to:
    - PeroxyChem's (PXC) treatability laboratory for oxidant (sodium persulfate and permanganate) treatability testing to establish performance of an ISCO alternative:
        - Demand testing to determine short- and total oxidant demand, and potential activators;
        - Soil acidity;
        - Oxidant stability and possible dosing requirements; and
        - PFAS concentrations before and after oxidation to assess potential formation of perfluoroalkyl acids such as PFOA from precursor substances during oxidation.
    - A soil-mixing contractor to complete bench-scale mixing simulations using mechanical equipment. The samples were also analyzed for:
        - Grain size distribution – sieve and hydrometer
        - Atterberg limits – clay samples only
        - Standard proctor - compaction

- Collection of groundwater samples from existing on-site shallow monitoring wells (JS-MW-001A, -002A, -003A, -004A and -005A) using low-flow sampling procedures and submittal to PXC for use in the treatability studies and the environmental laboratory TestAmerica for analysis of:
  - Target Compound List (TCL) VOCs using United States Environmental Protection Agency (USEPA) Method 8260C;
  - PFAS by USEPA Method 537-1.1 (modified; 21 analytes as listed in Section 2.8);
  - TOC by Lloyd Kahn method;
  - pH by Standard Method 9045D;
  - Dissolved gases (methane, ethane, and ethene);
  - Geochemical parameters (nitrate, nitrite, sulfate, sulfide, total and dissolved iron, total and dissolved manganese); and
  - Field parameters (pH, dissolved oxygen (DO), oxidation-reduction potential (ORP), specific conductance, temperature and turbidity).

  Groundwater samples were also filtered through Bio-Flo filters and the filters were submitted to Microbial Insights for:

  - Microbial analyses for *Dehalococcoides*, *Dehalobacter* spp., methane oxidizing bacteria, and the functional genes for TCE and vinyl chloride reductases and soluble methane monooxygenase.

  Groundwater analytical results from monitoring well samples are included in Table A-8.

- Infiltration testing ("falling-head") of 10 of the 12 temporary groundwater monitoring wells to evaluate the infiltration rate of liquids in the soil strata and the potential use of injection technology, specifically the zones where PID screening indicated results of greater than 10 ppm.

The locations of the 48 soil borings and 12 temporary groundwater monitoring wells installed during the 2018 PDI are shown in Figure A-9. Also shown are the permanent well clusters (MWs 001A/B/C, 002A and 003A/B/C) installed during the SC, the former building footprint, the municipal sewer line, and the concrete box culvert that conveys Woods Brook to the Hoosic River.

Historic maps indicate that Woods Brook formerly ran across the Site from south to north beneath the former building. Woods Brook was redirected and contained in the current concrete box culvert as part of a flood control project undertaken by the Army Corps of Engineers in 1952. The facility building was razed in 2012. Subsurface clearance activities performed as part of the SC and 2018 PDI drilling programs indicated the presence of foundations, metal and concrete in the subsurface.

2.2.2 *Soil Results*

The soil borings were advanced using an iterative approach based on PID soil headspace screening to facilitate a stepwise horizontal delineation. With the exception of six locations, soil borings were advanced downward until five continuous feet of soil exhibiting PID headspace readings of less than 1.0 ppm were encountered to determine the vertical extent of impacted soils.

Soil boring logs that include soil descriptions, headspace readings, and identify analytical sample intervals are presented in Appendix A-1. The soil boring information indicates the sand and gravel overburden layer that contains the shallow groundwater table is variable in thickness ranging from 8 to 17 feet, or conversely, the underlying silt-clay layer surface is variable in depth by up to 9 feet as illustrated in Figure A-10. Consequently, the groundwater-saturated thickness varies across the Site.

The plan-view map presented in Figure A-11 was prepared using the maximum headspace reading from each boring. Delineation of two separate "hot-spot" areas (near JS-MW-001 and JS-MW-003) was achieved wherever possible, in step-out directions as indicated by the distribution of lower headspace readings depicted by blue and green symbols. Installation of additional soil borings along the east side of the southerly hot-spot area (MW-003) could not be completed safely, due to the presence of the active municipal sewer and the Woods Brook culvert.

Analytical results for VOCs, PFAS, TOC and pH from the 55 confirmatory soil samples collected from the silt-clay layer are summarized in Table A-4. The primary chemicals of concern are TCE and perfluorooctanoic acid (PFOA).

- TCE concentrations ranged from non-detect to 1,300,000 µg/kg. Note that the 1,300,000 µg/kg is a data outlier with all other detected concentrations between non-detect and 980,000 µg/kg with an average concentration of 166,960 µg/kg.
- PFOA concentrations ranged from non-detect to 21 µg/kg with an average concentration of 3.6 µg/kg.
- TOC concentrations ranged from 1,060 milligrams per kilogram (mg/kg) to 55,700 mg/kg with an average concentration of 4,912 mg/kg.
- pH values ranged from 7.6 to 11.1 with an average of 8.3.

The total CVOC[1] analytical results are shown by location in the plan-view map presented in Figure A-12. The PID headspace readings and total CVOC analytical results were used to prepare the cross-section presented in Figure A-13.

PFOA analytical results were used to prepare the plan-view map presented in Figure A-14.

Based on the soil borings and distribution of VOCs and PFOA in the subsurface, the following points are noted:

- Former foundations, metal and concrete are present in the subsurface;
- The surface of an underlying, site-wide silt-clay layer is not flat and displays up to a nine feet differential, from surface to top of clay. The observed differential results in variable groundwater saturated thickness;
- Fine sand bedding planes or "partings" were observed in the silt-clay at some PDI boring locations;
- Relatively low concentrations of CVOCs (limited mass) are present in the shallow sand and gravel;
- Relatively low concentrations of PFAS (limited mass) are present in the silt-clay layer;

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[1] Sum of PCE, TCE, 1,2-DCE, VC, 1,1,1-TCA, 1,1-DCA, 1,1-DCE.

- The majority of the CVOC mass is in the silt-clay and present several feet below the top of the silt-clay; this location below the top of the silt-clay limits its ability to diffuse back into shallow groundwater; and
- The vertical extent of VOC mass is generally limited to less than 20 feet bgs.

2.2.3 *Total Oxidizable Precursor (TOP) Assay*

The analytical results of the primary and duplicate TOP Assay samples are summarized in Table A-5. Comparison of the primary PFAS results and the TOP Assay PFAS results by Relative Percent Difference (RPD) indicates that:

- PFOA concentrations in the TOP Assay increased slightly in two sample pairs:
  - JS-B-019 (16-17 ft bgs): 9% RPD
  - JS-B-047 (4-6 ft bgs): 7% RPD
- PFOA concentrations in the TOP Assay decreased in two pairs:
  - JS-B-044 (17-19 ft bgs): 13% RPD
  - JS-B-055 (5-7 ft bgs): 59% RPD
- In one sample (JS-B-039 (13-15 ft bgs)), no PFAS compounds were detected in the TOP assay sample but the detection limits were higher than the detections in the primary sample and an RPD for PFOA was not calculated.

These results show no evidence of the presence of "precursors", which are PFAS that can be converted to perfluoroalkyl acids such as PFOA by persulfate oxidation. These results confirm that the use of oxidants such as sodium persulfate will not create additional perfluoroalkyl acid mass.

2.2.4 *Dense Non-Aqueous Phase Liquid*

Approximately 0.77 feet of DNAPL (apparent thickness) was measured in temporary monitoring well JS-TMW-039. DNAPL was not detected in the surrounding temporary wells which indicates it is limited in extent. Analytical results of the DNAPL sample are presented in Table A-6 and summarized below:

- 28% TCE (280 grams per kilogram (g/kg));
- 0.64% Naphthalene (6.4 g/kg);
- 1.8% unknown hydrocarbons (18 g/kg);

- no PCBs were detected above method detection limits (<38 mg/kg);
- pesticides: (0.18 (estimated) to 0.31 mg/kg);
- PFAS: (1.1 (estimated) nanograms per liter (ng/L) for Perfluorooctane sulfonic acid (PFOS) to 170 ng/L for PFOA); and
- No other VOCs or SVOCs were detected, although method detection levels were elevated.

The DNAPL is limited in horizontal extent as evidenced by its absence in the surrounding temporary wells. The DNAPL will be addressed as part of the IRM as described in the Shallow Groundwater IRM Work Plan.

2.2.5 *Groundwater Results*

Groundwater sampling logs are provided in Appendix B. Analytical results for VOCs, PFAS, TOC and pH from the 12 temporary groundwater monitoring wells constructed with screens straddling intervals in the silt-clay are summarized in Table A-7. The predominant detected VOC and PFAS were TCE and PFOA, respectively.

- TCE concentrations ranged from 0.48 milligrams per liter (mg/L) to 1,900 mg/L with an average concentration of 655 mg/L.
- PFOA concentrations ranged from 680 ng/L to 4,100 ng/L with an average concentration of 1,568 ng/L.
- TOC concentrations ranged from 1.6 mg/L to 4.7 mg/L with an average concentration of 2.48 mg/L.
- pH values ranged from 7.35 – 9.31 with an average of 7.94.

The areal distribution of TCE and PFOA concentrations are shown in Figures A-12 and A-14, respectively.

2.2.6 *Infiltration Testing*

Infiltration testing ("falling-head") of 10 of the 12 temporary groundwater monitoring wells was conducted to evaluate the infiltration rate of liquids into the silt-clay layer, specifically the zones where PID screening values were greater than 10 ppm, and evaluate the potential use of injection technology. The testing results were normalized to gallons per hour per foot of screen (gph/ft-s) because the screen lengths of the temporary groundwater monitoring wells ranged from 4 feet to 14 feet depending on location.

Infiltration rates in nine of the 10 wells ranged between 0.02 – 1.6 gph/ft-s with an average rate of 0.39 gph/ft-s. A higher rate of 14.5 gph/ft-s was measured in the tenth well (JS-TMW-030).

These low infiltration rates confirm the low permeability of the silt-clay layer and indicate that the efficacy of a gravity-fed or pressurized injected remedial reagent or air sparging would be limited.

2.2.7 *Slug Testing*

As part of the ongoing RI, single well aquifer slug tests were performed in on-site and off-site wells screened across the water table in the shallow sand and gravel to develop a range of hydraulic conductivities (K) for that aquifer unit.

The slug test is designed to measure the response of an aquifer to an instantaneous displacement of a known volume of water within a well. Wells screened across the water table were tested using a physical method of water displacement with a physical slug.

Recovery of the water levels to the pre-test condition (static) were measured and stored at frequent time intervals using an electronic programmable data logger equipped with a pressure-sensitive water level transducer. The data set was then analyzed to calculate a hydraulic conductivity value for each well screen interval. A range of hydraulic conductivity values can be obtained for an aquifer unit by performing slug tests in multiple wells across the site. That information was used to estimate groundwater flow velocities and design remedial injection approaches.

A summary of the estimated hydraulic conductivities for on-site and downgradient wells screened in the shallow sand and gravel alluvium deposits is provided below.

Well ID	**Analytical Solution**	**K (ft/day)**
JS-MW-001A	Bouwer-Rice	85.2
JS-MW-003A	Bouwer-Rice	408.8
JS-MW-004A	Bouwer-Rice	123.4
OS-MW-025A	Bouwer-Rice	32.6
OS-MW-026A	Springer-Gelhar	205.4

The highest concentration of total VOCs in shallow on-site groundwater was 160 μg/L in well JS-MW-001A on the north end of the Site. A groundwater flow velocity (seepage velocity) of 0.51 ft/day or 187 feet per year was calculated for use in designing the groundwater IRM using:

- A hydraulic conductivity (K) of 85.2 ft/day (JS-MW-001A);
- A horizontal hydraulic gradient (i) of 0.0015 (dimensionless);
- An effective porosity (n) of 0.25 (estimated range 0.20 to 0.25); and
- The formula to calculate seepage velocity: v = K*i/n.

2.2.8 *Soil Mixability Results*

The representative composite soil volumes, one from a predominant sand and gravel unit and one from the silt-clay unit were submitted to Redox Tech, LLC, a treatability subcontractor for characterization and simulated Soil Mixing (SM). This mixing test evaluated the physical parameters (grain size and proctor by ASTM Methods) for soil "*mixability*". In combination with other analytical and treatability data, these data facilitate evaluation of the applicability of soil mixing as a remedial option for these strata. The mixability was simulated using a scaled-down version of the mixing apparatus and compared to reference standards for sand and clay materials.

Composite Material	Classification *(ASTM D422)*	Maximum Dry Density *(PCF)*	Moisture Content *(%)*	Optimal Moisture *(%)*	Mixable *(Yes/No)*
Upper Sand-Gravel	**Sandy gravel with silt** (***SW-SM***) 9.5% < #200 Slightly plastic	129.4	13.6%	9.5%	Yes
Lower Silt-Clay	**Clay** (***CL***) 99.3% < #200 Medium plastic Saturated - sticky	101.9	49.3%	20.8%	Yes

Both samples were found to be suitable for transverse rotating head mixing technology. The silt-clay material is plastic and may require more time to complete the mixing (relative to non-plastic material) and to clean the mixing head periodically.

These results indicate that soil mixing to blend remedial reagents into the soil is likely feasible. However, significant preparatory work would be required to protect the existing sanitary sewer line and Woods Brook box culvert, and remove the remaining concrete foundation structures, and other wood, metal and concrete debris. Groundwater containment and vapor controls may also be required since mixing may mobilize CVOCs to shallow groundwater during the site preparatory and mixing work.

2.2.9 *Oxidation Treatability Study Results*

PeroxyChem (PXC), a treatability laboratory for oxidant (sodium persulfate and permanganate) testing, was provided representative soil composites (one from the sand-and-gravel unit and one from the silt-clay unit) and a composite groundwater sample from existing on-site shallow monitoring wells (JS-MW-001A, -002A, -003A, -004A and -005A). This information will be used in conjunction with other evaluations such as the mixability or infiltration testing to determine the viability of, and/or potential design of an ISCO remedial alternative. PXC's summary report is presented in Appendix A-3. The results are summarized below.

2.2.9.1 *Soil Base Buffer Capacity and Natural Oxidant Demand*

Soil base buffer capacity (BBC) for sodium hydroxide (NaOH) was determined to be:

- Sand and gravel material: 1.09 grams of 25% NaOH per kilogram of soil; and
- Silt-clay material: 1.64 grams of 25% NaOH per kilogram of soil.

Natural oxidant demand (NOD) of potassium permanganate ($KMnO_4$) was determined to be:

- Sand and gravel material: 4.36 grams of $KMnO_4$ per kilogram (g KMnO4/kg) of soil; and
- Silt-clay material: 7.43 g KMnO4/kg of soil.

2.2.9.2 *Oxidant Treatability Study*

Oxidant treatability tests were conducted to evaluate the destruction of CVOCs by oxidation with sodium persulfate or potassium permanganate. The treatment evaluated using separate test conditions for sand and gravel and silt-clay soil samples.

- Sand and gravel:
  - Permanganate - TCE concentrations were reduced by greater than 95% after 7 days in both high and low dose treatments; and
  - Alkali Persulfate – TCE concentrations were reduced by 93% in the high dose treatment and 85% in the low dose treatment.
- Silt-clay:
  - Permanganate – TCE concentrations were reduce by 37% in the low dose treatment and 100% in the high dose treatment; and
  - Alkali Persulfate – TCE concentrations were reduced by 65.2% and 76.1% in the two low-dose treatments and 87 and 87.8% in the high dose treatment.

PFAS concentrations before and after oxidation were also measured to assess potential formation of perfluorinated alkyl acids from precursor substances during oxidation. Comparison of the PFAS concentrations in the control and the three treatment conditions (sodium hydroxide alone, alkali persulfate and permanganate) with the TOP Assay PFAS results by RPD indicates that PFOA concentrations in the three treatment conditions are well within the acceptable range for duplicates with RPDs ranging from 20% to 29% and were higher in the control than treatment conditions.

2.2.10 *Microbial and Geochemical Analyses*

The results of microbial and geochemical analyses from on-site shallow groundwater monitoring wells are included in Table A-8 and summarized below.

ORP and DO:

- ORP values ranged from -2.8 to 59.9 millivolts (mV) with an average of 32.46 mV; and
- Dissolved oxygen (DO) concentrations ranged from 1.76 to 9.05 mg/L with an average of 6.7 mg/L.

These results indicate aerobic and low to moderately oxidizing conditions.

Geochemistry:

- Nitrate and Nitrite: Nitrite was not detected in the samples while nitrate concentrations ranged from 0.2 to 2.9 mg/L with an average concentration of 1.04 mg/L;
- Sulfate and Sulfide: Sulfide was not detected in the samples, while sulfate concentrations ranged from below the detection limit to 218 mg/L with an average concentration of 106.7 mg/L;
- Iron: Total iron concentrations ranged from 0.058 to 4.2 mg/L (with an average concentration of 2.13 mg/L; dissolved iron was not detected in the samples;
- Manganese: Total manganese and dissolved manganese were only detected in one sample at 1 mg/L for both; and
- Total Organic Carbon (TOC): TOC ranged from an estimated 1.2 mg/L to an estimated 2.7 mg/L with an average concentration of 1.52 mg/L.

The absence of nitrate, sulfide, and dissolved iron and manganese and the low TOC concentrations are consistent with the aerobic and low to moderately oxidizing conditions that were indicated by ORP and DO results.

Dissolved Gases:

- Methane, which is a product of anaerobic methanogenesis and a primary substrate for methane oxidizing bacteria (MOB), was only detected in a groundwater sample from one shallow monitoring well JS-MW-002A; and
- Ethene and ethane, which are produced from the complete dechlorination of TCE and 1,1,1-TCA under anaerobic conditions, were not detected.

These results are consistent with the ORP, DO and geochemistry results, which indicate that the shallow aquifer exhibits generally aerobic conditions, which can support aerobic cometabolic degradation of CVOCs but are not suitable to support methanogenesis or anaerobic reductive dechlorination of CVOCs.

Microbial Analyses:

- Dechlorinating bacteria were detected in groundwater from JS-MW-001A and JS-MW-002A, but at low concentrations. *Dehalococcoides* was detected in samples from both wells, while *Dehalobacter* spp. was only detected in the sample from JS-MW-002A.
- Functional genes for the *Dehalococcoides* TCE and vinyl chloride reductase enzymes that are responsible for complete dechlorination were only detected at low concentrations in the sample from JS-MW-002A.
- Methane oxidizing bacteria (MOB) were detected in groundwater samples from four of the five shallow monitoring wells at moderate to high concentrations.
- Functional MOB gene for soluble methane monooxygenase was only detected in the groundwater sample from one well JS-MW-002A.

These microbial results are consistent with the geochemistry, which indicates generally aerobic conditions that are capable of supporting aerobic bacteria such as methane oxidizing bacteria, but not anaerobic bacteria such as the dechlorinating bacteria - *Dehalococcoides* and *Dehalobacter* spp. Hence, a bioremediation remedial alternative would require significant augmentation of the shallow subsurface environment to create and maintain anaerobic geochemical conditions, as well as, inoculation of dechlorinating bacteria.

2.3 CONCLUSIONS BASED ON SC AND PDI RESULTS

Based on the soil borings and distribution of VOCs and PFOA in the subsurface, the following points are noted:

2.3.1 Sand and Gravel Unit

- Shallow groundwater is a likely source of CVOCs to indoor air in buildings to the north of the Site.
- Limited CVOC mass is present in soil and groundwater within this unit.
- This unit is very permeable and amenable to injection-based technologies.
- The soil was found to be “mixable” and suitable for in situ mixing technology.
- The soil was found to be amenable to oxidant treatment.
- Geochemical conditions are generally aerobic cometabolic and oxidizing; these conditions are conducive to aerobic degradation of CVOCs but not to anaerobic degradation of CVOCs.
- Former foundations, metal and concrete are present and may make implementation of an IRM more difficult.

2.3.2 Silt-Clay Unit

- Majority of the CVOC mass is present in this unit with the vertical extent of CVOC mass generally limited to less than 20 feet bgs.
- CVOC mass is generally located several feet below the top of the silt-clay.
- This unit has low permeability and is unlikely to be amenable to injection-based technologies.
- The soil was found to be “mixable” and suitable for in situ mixing technology; the silt-clay material is plastic and may require more time to complete mixing.

- The soil was found to be amenable to oxidant treatment.
- The surface of silt-clay beneath the Site is not flat, with up to nine feet relief observed resulting in variable groundwater saturated thickness.

Based on these conclusions, the shallow sand and groundwater unit is chosen for implementation of the IRM. This unit is amenable to implementation of a number of technologies, with limited disruption to the surrounding residences and businesses as discussed in Section 3.0 of the Shallow Groundwater IRM Work Plan.

The silt-clay layer, in which the majority of the mass of CVOCs has been identified, has the potential to be treated to remove or destroy the CVOC mass. However, due to its low permeability, treatment of this unit may require highly intrusive technologies such as excavation or in situ mixing.

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FIGURES

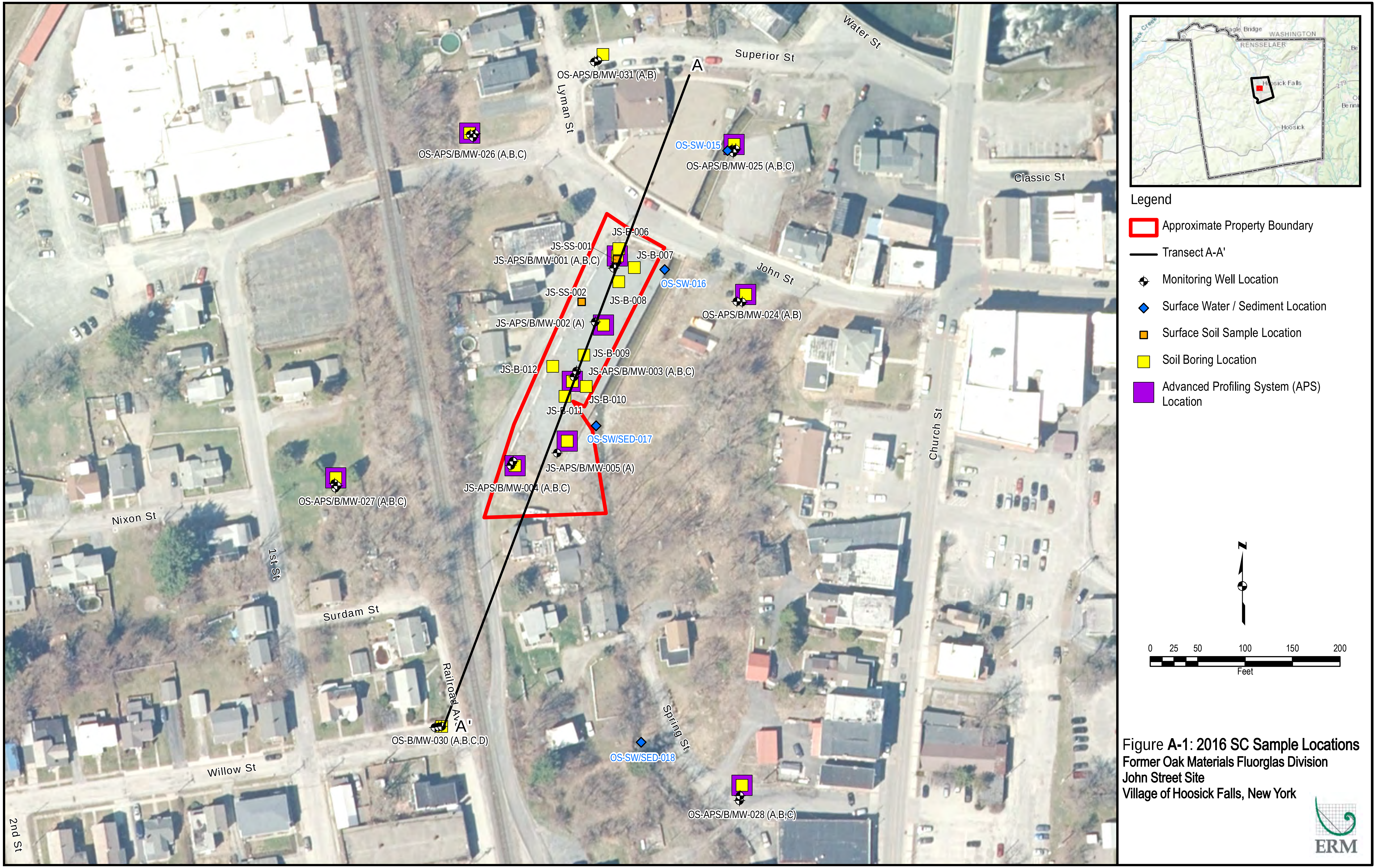

Figure **A-1: 2016 SC Sample Locations**
Former Oak Materials Fluorglas Division
John Street Site
Village of Hoosick Falls, New York

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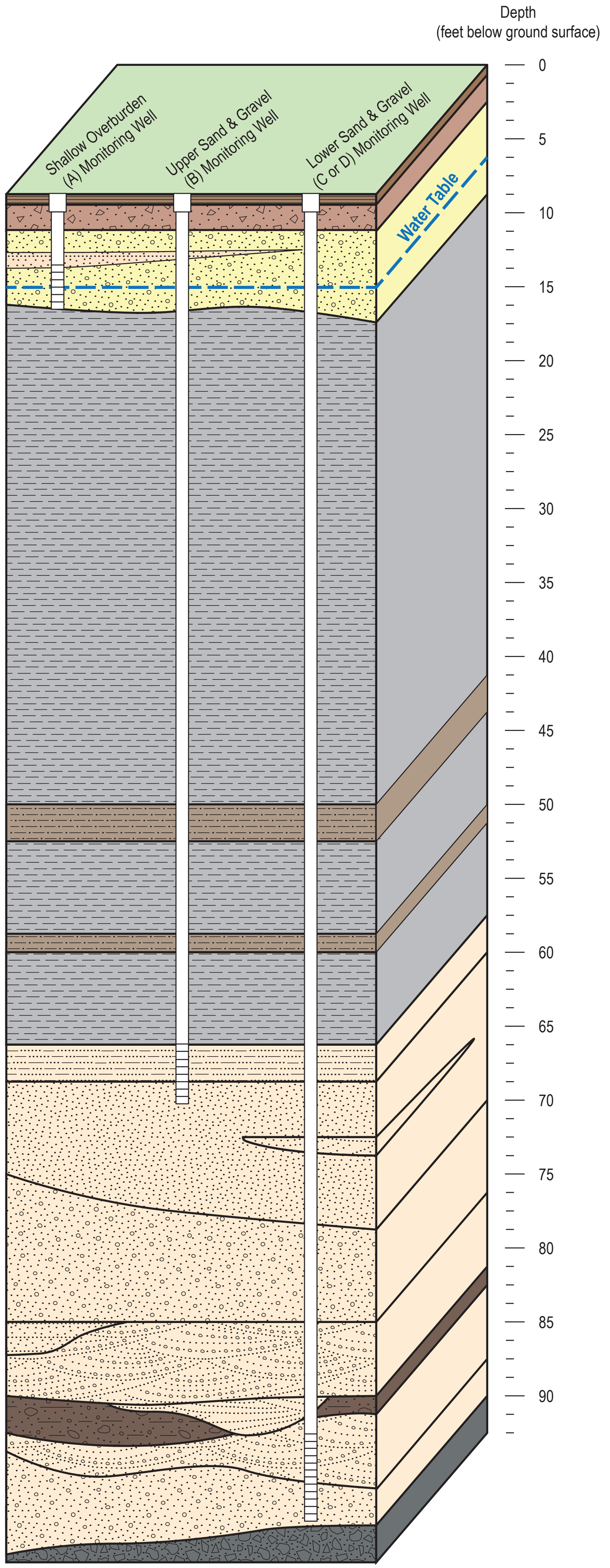
John Street Section

Hydrogeological Unit	*Geological Unit* [1]	*Lithology (Thickness)*
Shallow Overburden	Fill	Soil (0 - 1') Fill: Mixed Sand & Gravel (0 - 8') Fine to coarse angular gravel in sand and silt matrix. Brick and metal debris present.
	Alluvium (al)	Interbedded Sand & Gravel (1 - 9.8') Fine to medium subangular gravels in sand and silt matrix. Thin interbeds of silt and clay.
Confining Unit	Lacustrine Silt & Clay (lsc)	Clay (5.9 - 66.7') Thinly laminated clay, plastic with variable silt content. Thin to medium silt interbeds common in lower third of unit, trace fine sand.
Sand & Gravel	Outwash Sand & Gravel (og)	Fine Silty Sand (0.5 - 7.5') Thinly laminated, silty fine lithic sand, well sorted. Sorted Sand (1 - 15.5') Fine to coarse lithic sand with trace fine gravel. Interbedded Gravel & Sand (3.5 - 34') Fine to medium lithic sand with thin sandy silt interbeds. Basal fine to coarse gravel, sub-rounded lithic clasts and sand matrix.
	Till (t)	Diamict (0 - 5') Subangular gravel in silt and clay matrix.
	Outwash Sand & Gravel (og)	Interbedded Gravel & Sand (0 - 9') Fine to coarse gravel and cobbles with lithic sand and silt matrix. Thin zones of sorted lithic sands. Increasing slate/phyllite fragments with depth.
		Weathered Bedrock (0 - 5.2') Slate/phyllite fragments with fine sand and silt matrix.



Notes:

1 - Except for fill, geological unit nomenclature is from the Surficial Geologic Map of New York, Hudson-Mohawk Sheet (Caldwell and Dineen, 1987).

2 - Lithological descriptions, thickness ranges, and approximate water table elevations are from ERM's on-site boring logs.

Explanation

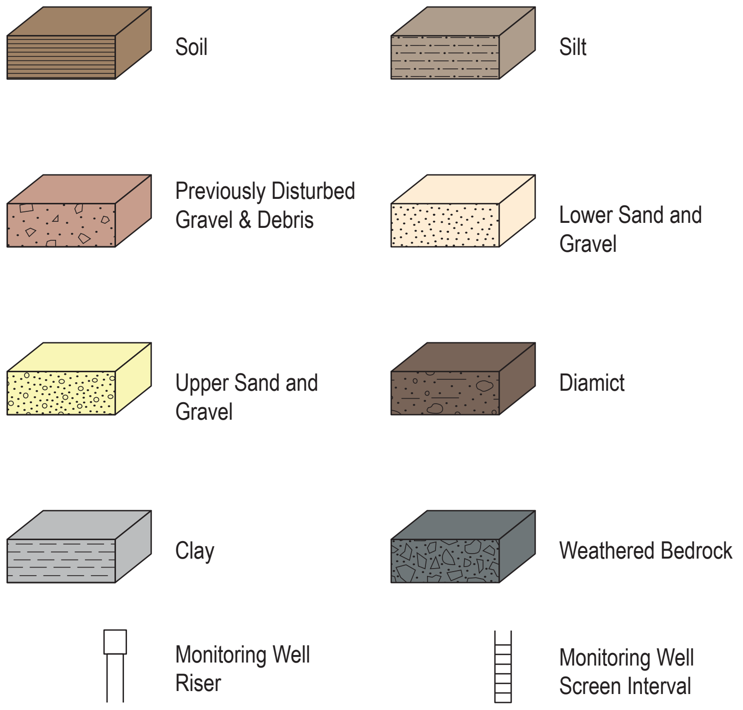
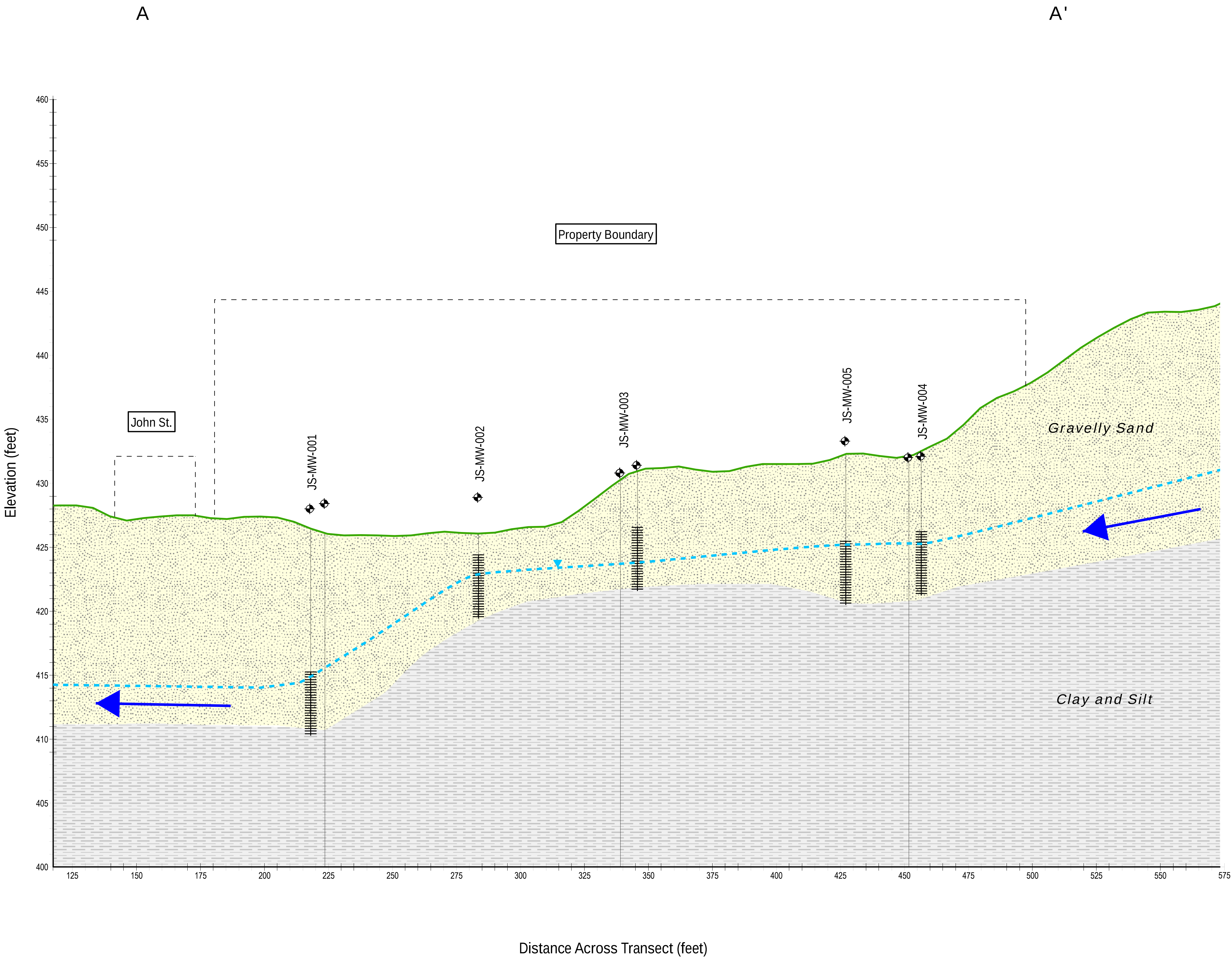
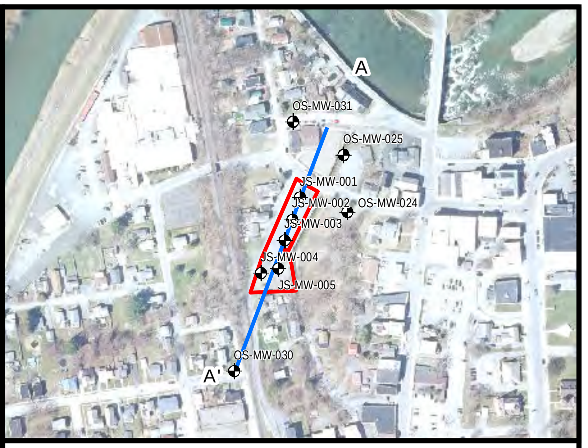


Figure A-2: Typical Stratigraphic Section
John Street Site
Village of Hoosick Falls, New York

ERM





Legend

- ⌖ Monitoring Wells
- ─ Ground Surface
- ┼┼┼ Monitoring Well Screen
- ▼ Groundwater Elevation
- - - Approximate Water Table

Predominant Geology Type

- ▨ Gravelly Sand
- ▤ Clay and Silt

← Groundwater Flow Direction

NOTES:

- Fill material or debris locally present near surface

-Vertical Exaggeration = 5X

Figure A-3: Cross Section A-A'

Former Oak Materials Fluorglas Division
John Street Site
Village of Hoosick Falls, New York

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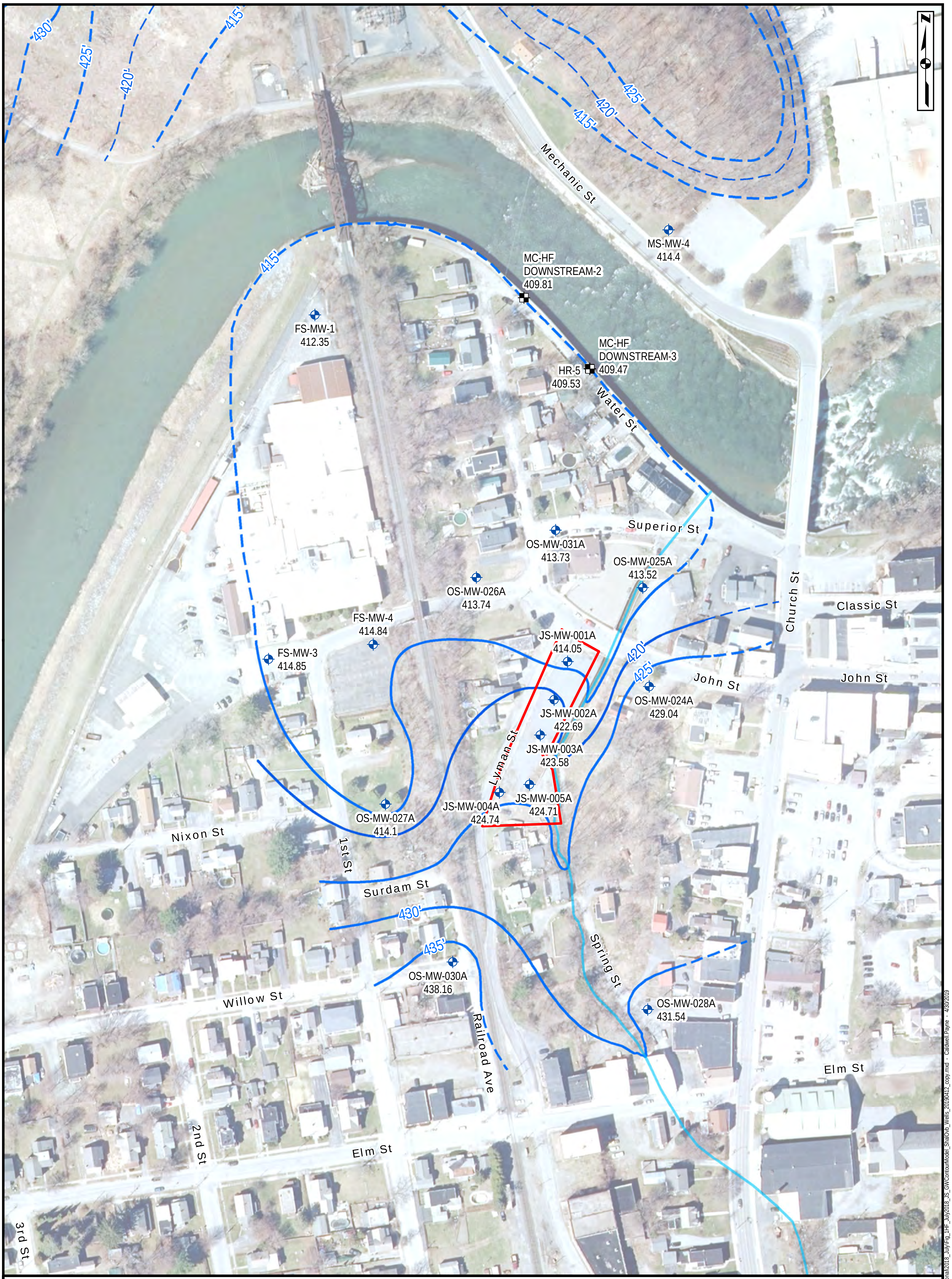


Legend

- Perennial Stream
- Approximate Property Boundaries
- ⊕ Monitoring Well Location
- Stream Gauge
- 5 ft. Groundwater Elevation - Observed
- 5 ft. Groundwater Elevation - Inferred

0 25 50 100 150 200
Feet

NOTES:
- Groundwater elevation measured on 19-July-2018 and labeled as feet above mean sea level.

Figure A-4: Shallow Overburden Water Table Contours - July 2018 Gauging Event

Village of Hoosick Falls
Town of Hoosick, New York

ERM

Q:\Team\DMMV\Clients_A_E\ArnoldandPorter\HoosickFalls\MXD\GroundwaterElevation\Regional\2018_July\Fig_1HF_July2018_JS_GWContourModel_ShalOvb_Wells_20190412_copy.mxd - Caldwell.Payne - 4/30/2019

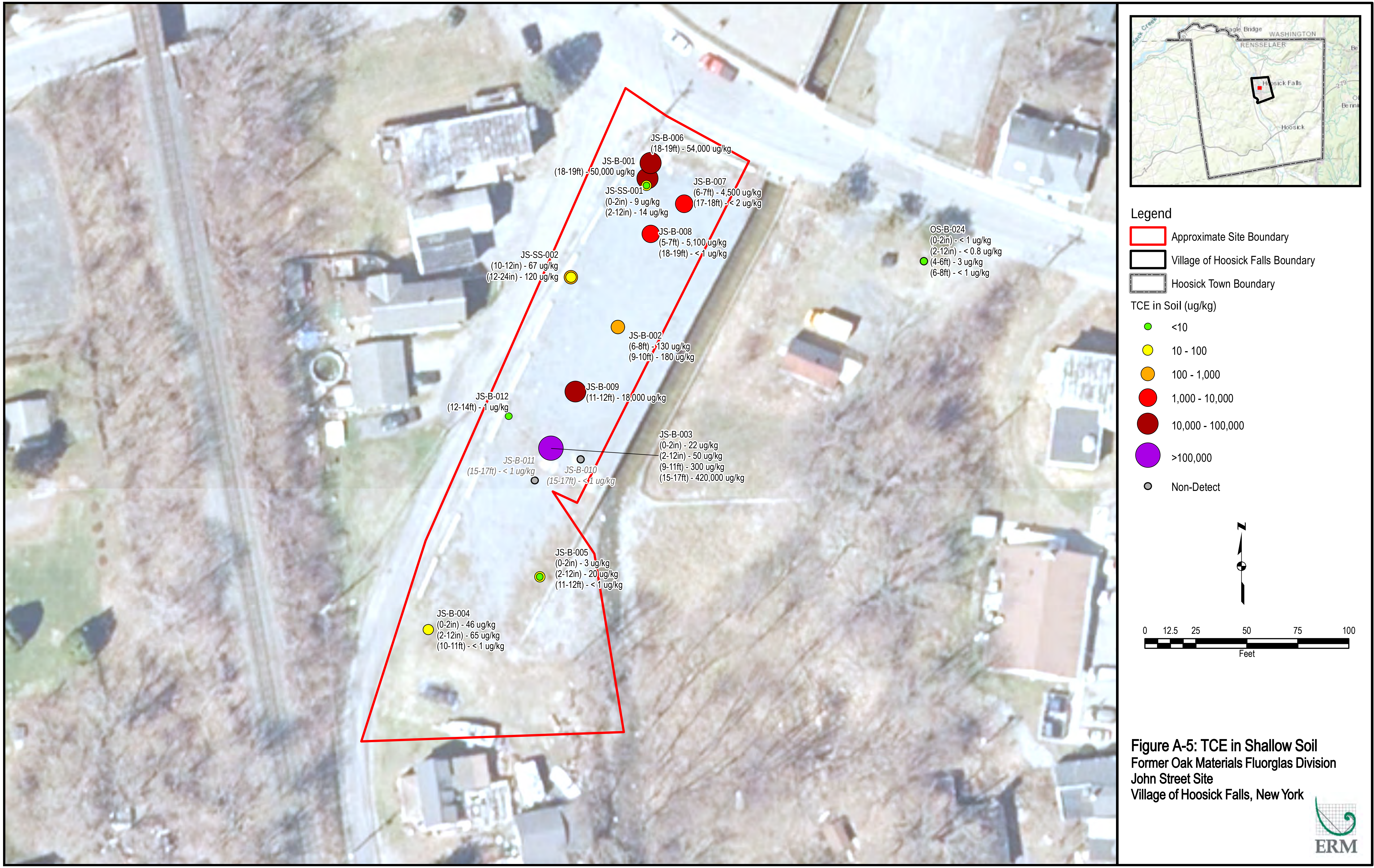
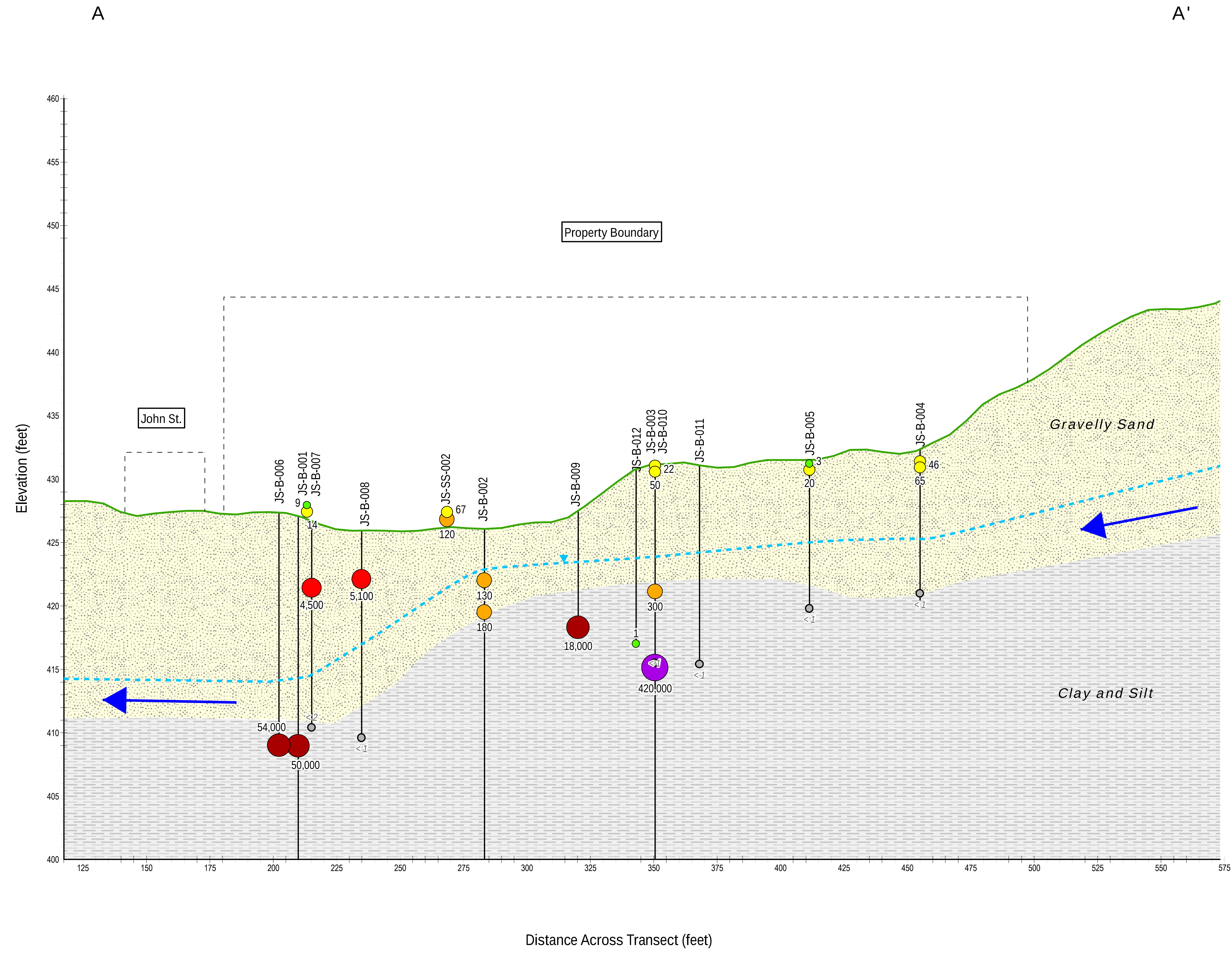
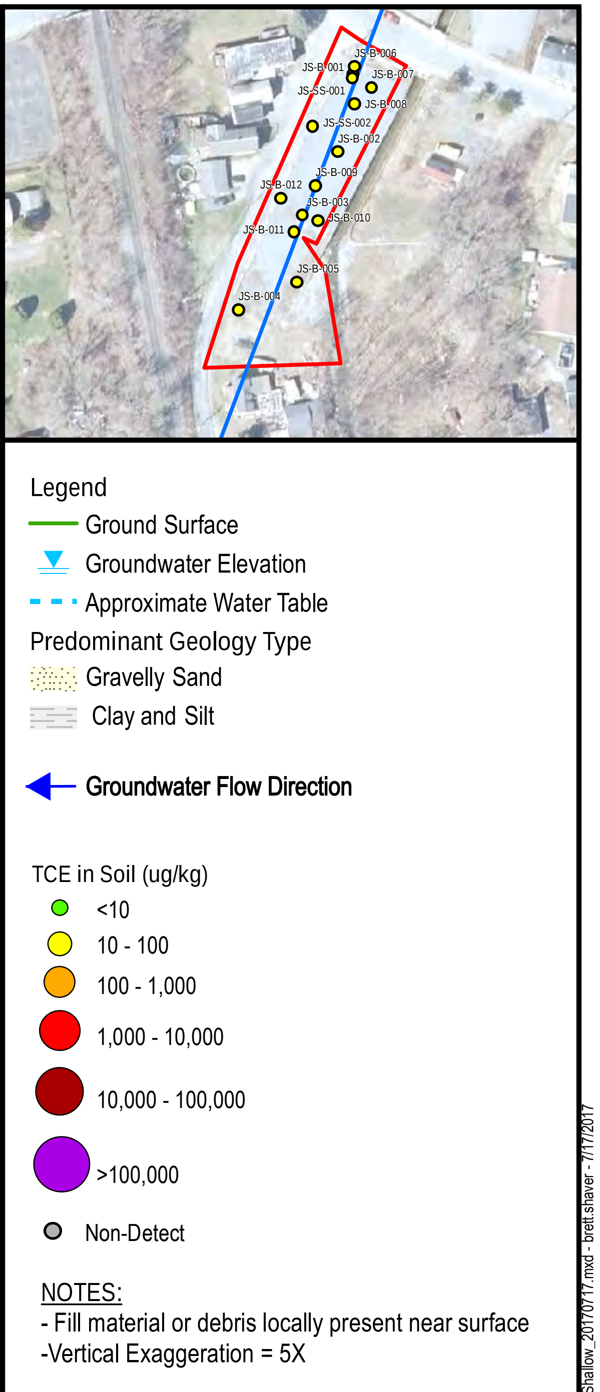


Figure A-5: TCE in Shallow Soil
Former Oak Materials Fluorglas Division
John Street Site
Village of Hoosick Falls, New York

Q:\Team\DMMV\Clients_A_E\ArnoldandPorter\HoosickFalls\MXD\Soil_IRM\Figure5_TCE_inSoil_Shallow_20170717.mxd - brett.shaver - 7/17/2017





NOTES:
- Fill material or debris locally present near surface
-Vertical Exaggeration = 5X

Figure A-6: TCE in Soil Cross Section A-A'

Former Oak Materials Fluorglas Division
John Street Site
Village of Hoosick Falls, New York

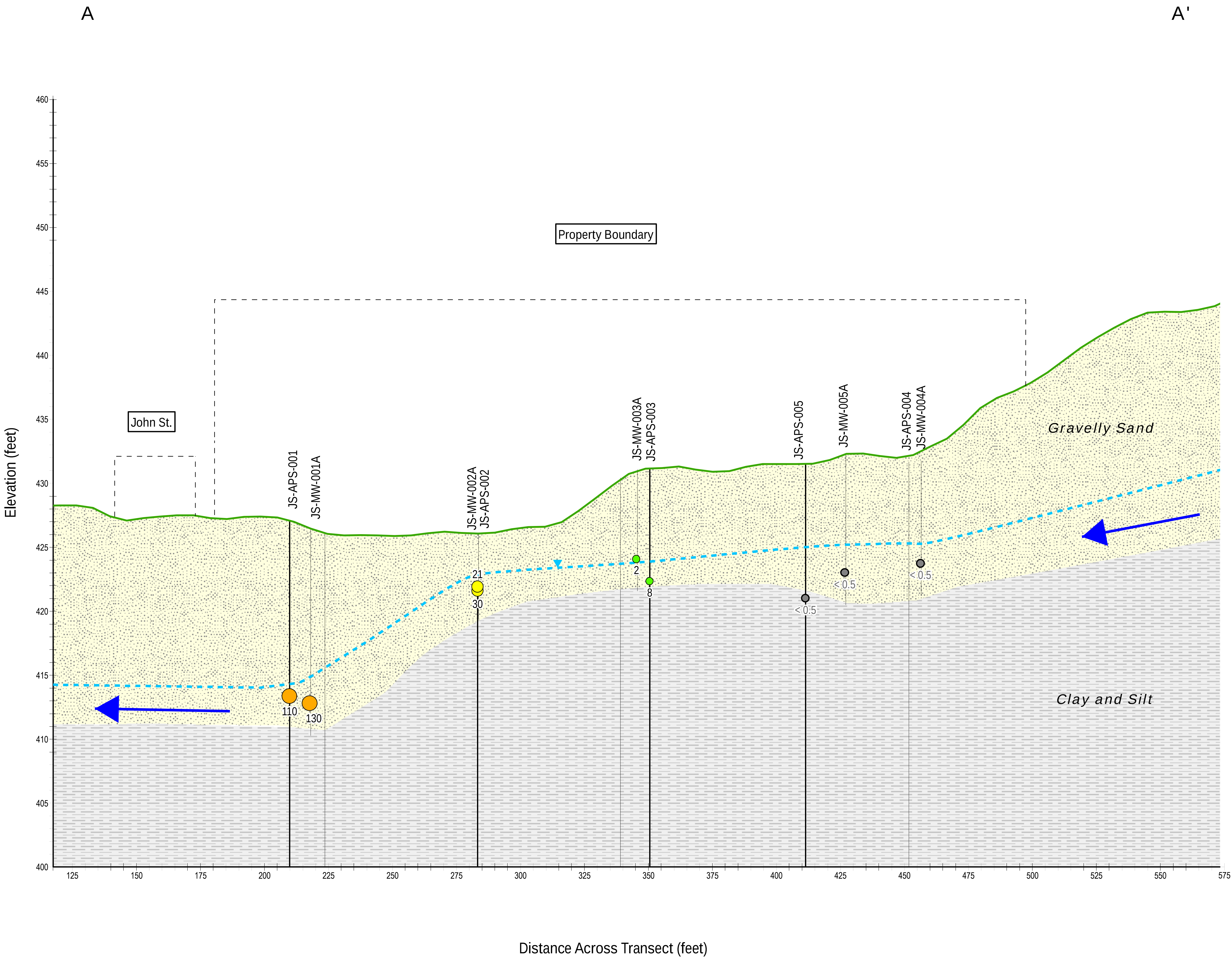
ERM

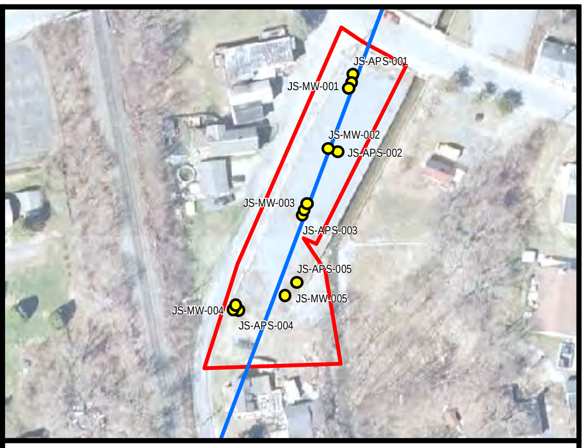
Q:\Team\DMMV\Clients_A_E\ArnoldandPorter\HoosickFalls\MXD\Soil_IRM\Figure6_CrossSection_TCE_inSoil_Shallow_20170717.mxd - brett.shaver - 7/17/2017

Figure A-7: TCE in Shallow Groundwater

Former Oak Materials Fluorglas Division
John Street Site
Village of Hoosick Falls, New York

Q:\Team\DMM\Clients_A_E\ArnoldandPorter\HoosickFalls\MXD\Soil_IRM\Figure7_TCE_inShallowGW_20170717.mxd - brett.shaver - 7/17/2017





Legend

- Ground Surface
- ▼ Groundwater Elevation
- Approximate Water Table

TCE in Groundwater (ug/L)

- ● <10
- ● 10 - 100
- ● 100 - 1,000

Predominant Geology Type

- ▨ Gravelly Sand
- ▨ Clay and Silt

- ← Groundwater Flow Direction

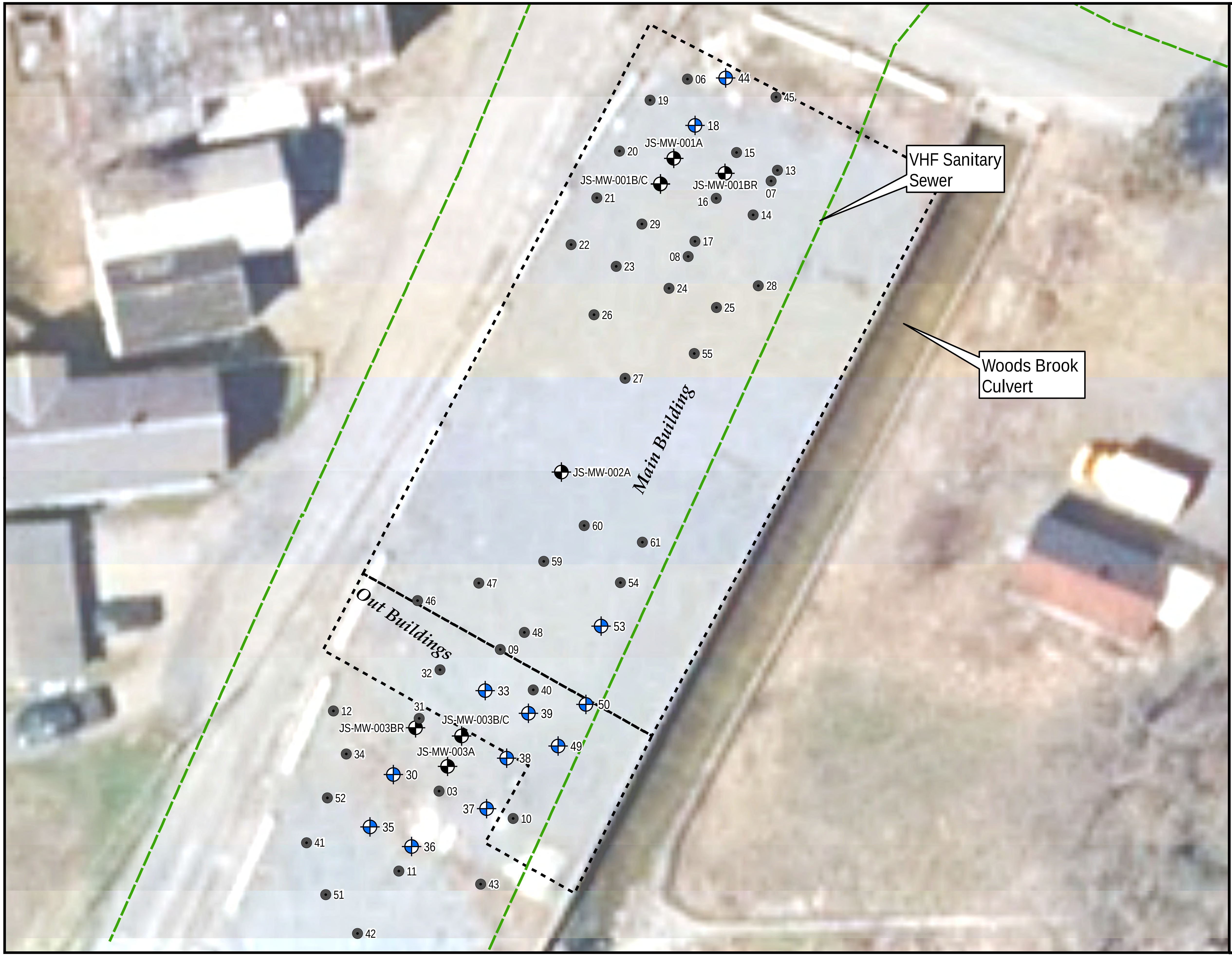
NOTES:
- Fill material or debris locally present near surface
-Vertical Exaggeration = 5X

Figure A-8: TCE in Groundwater Cross Section A-A'

Former Oak Materials Fluorglas Division
John Street Site
Village of Hoosick Falls, New York

ERM

Q:\Team\DMMV\Clients_A_E\ArnoldandPorter\HoosickFalls\MXD\Soil_IRM\Figure8_CrossSection_TCE_inGW_Shallow_20170717.mxd - brett.shaver - 7/17/2017



Legend

- Temporary Well/Soil Boring Location
- ● Soil Boring Location
- Monitoring Well Location
- Storm/Sanitary Utility Line (Approximate)
- Approx Historic Building Footprint

NOTES:

1. Numerical designations indicate soil boring numbers completed as part of the Groundwater IRM (i.e. JS-B-013)
2. Aerial Imagery from New York State (2014)

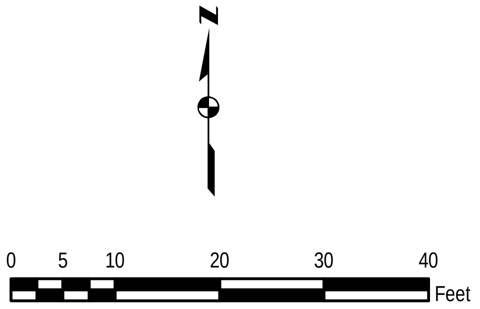
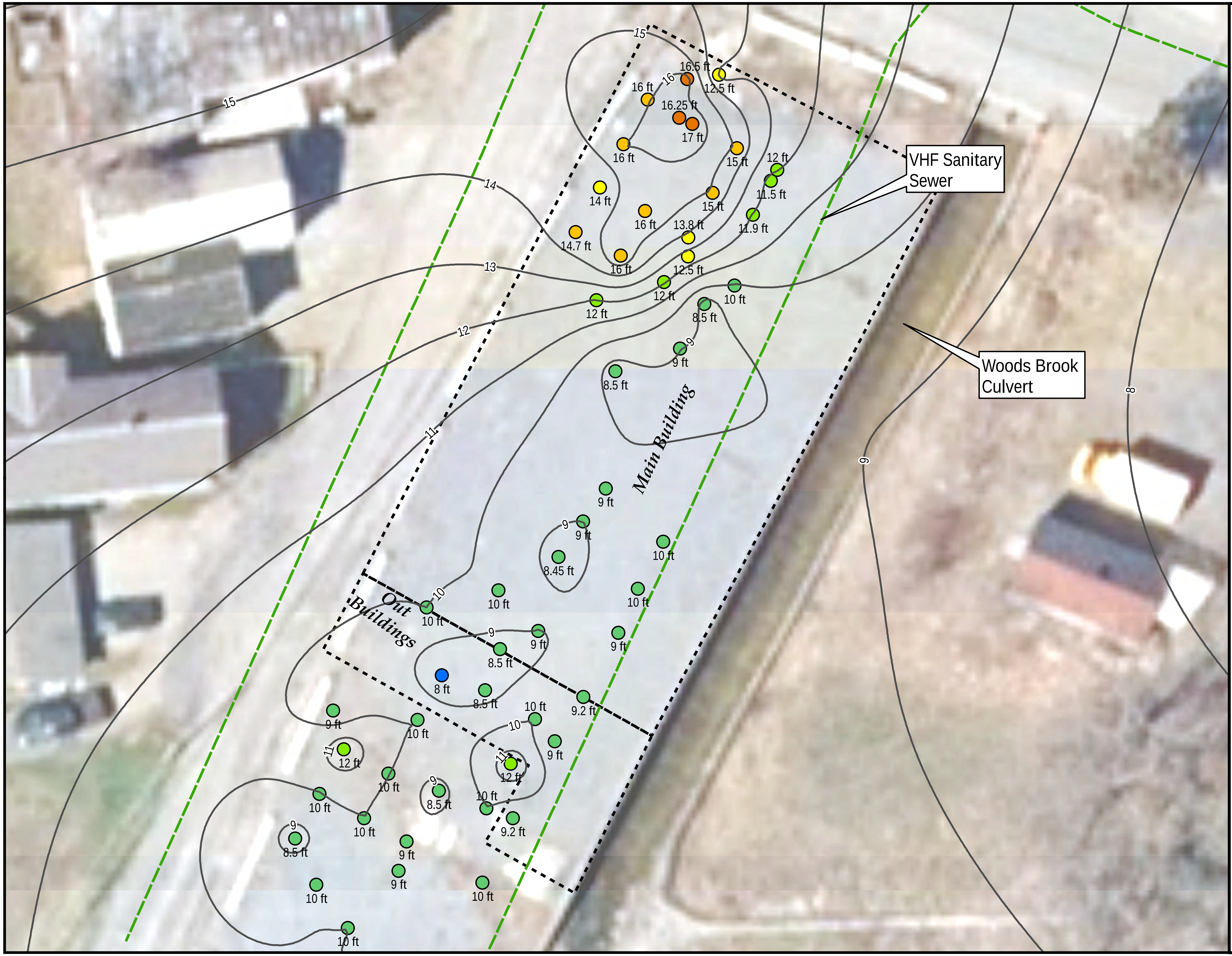


Figure **A-9**: Soil Boring Locations
Former Oak Materials Fluorglas Division
John Street Site
Village of Hoosick Falls, New York

ERM

Q:\Team\DMMV\Clients_A_E\ArnoldandPorter\HoosickFalls\MXD\RI_WorkPlan\JohnSt\2018_IRM\JS_IRM_SoilBoringLocations_20190513.mxd - brett.shaver - 5/13/2019



Legend

Shallow Sand/Gravel Thickness Contours (ft)

Storm/Sanitary Utility Line (Approximate)

Approx Historic Building Footprint

Shallow Sand/Gravel Thickness (ft)

- ● <8
- ● 8 - 10
- ● 10 - 12
- ● 12 - 14
- ● 14 - 16
- ● 16 - 18
- ● 18 - 20.3

N

0 5 10 20 30 40 Feet

Figure **A-10 Shallow Sand/Gravel Thickness - Depth To Silt-Clay**

Former Oak Materials Fluorglas Division
John Street Site
Village of Hoosick Falls, New York

ERM

Q:\Team\DMMV\Clients_A_E\ArnoldandPorter\HoosickFalls\MXD\RI_WorkPlan\JohnSt\2018_IRM\JS_IRM_ShallowSandGravelThickness_20181101.mxd - brett.shaver - 11/2/2018

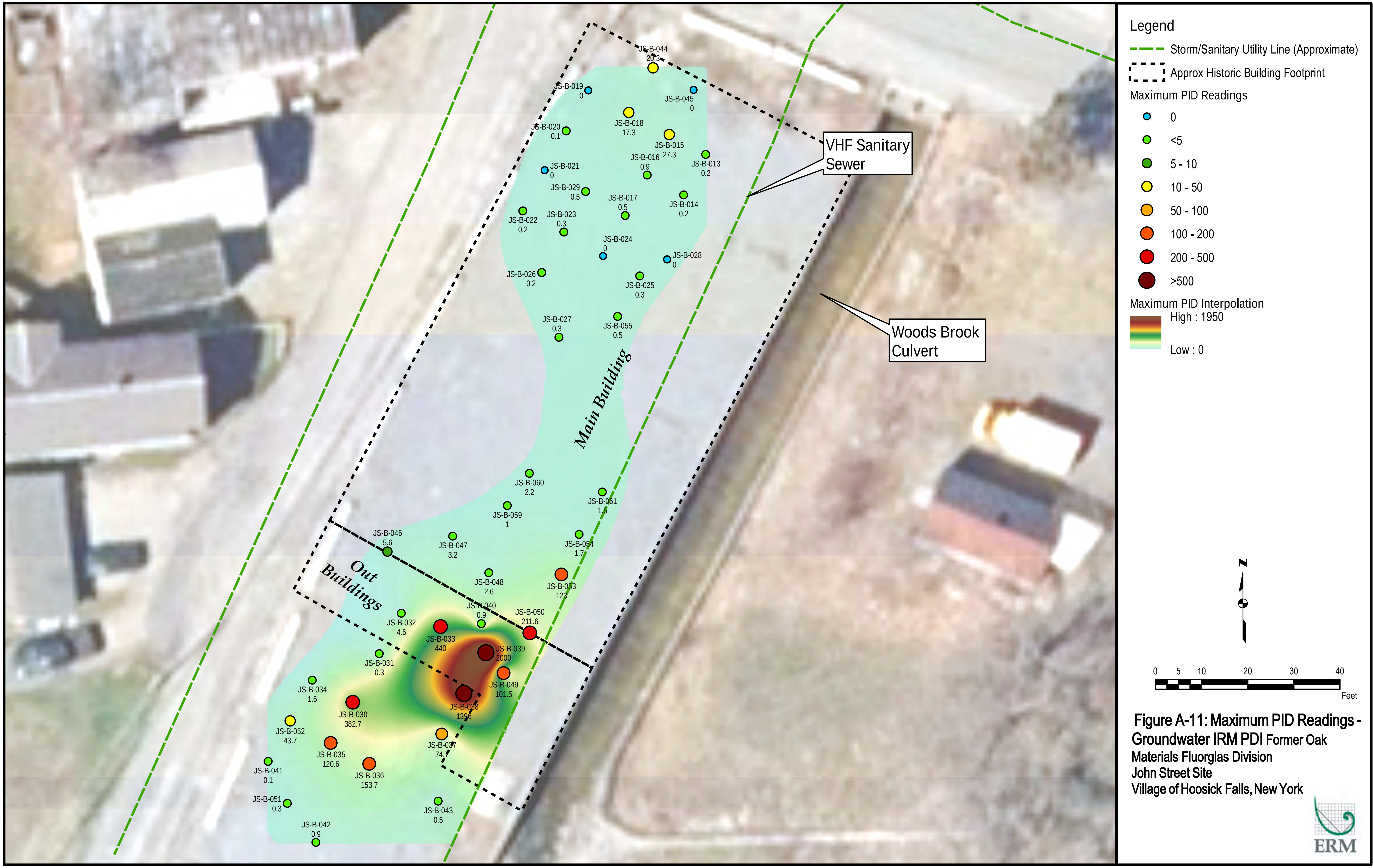
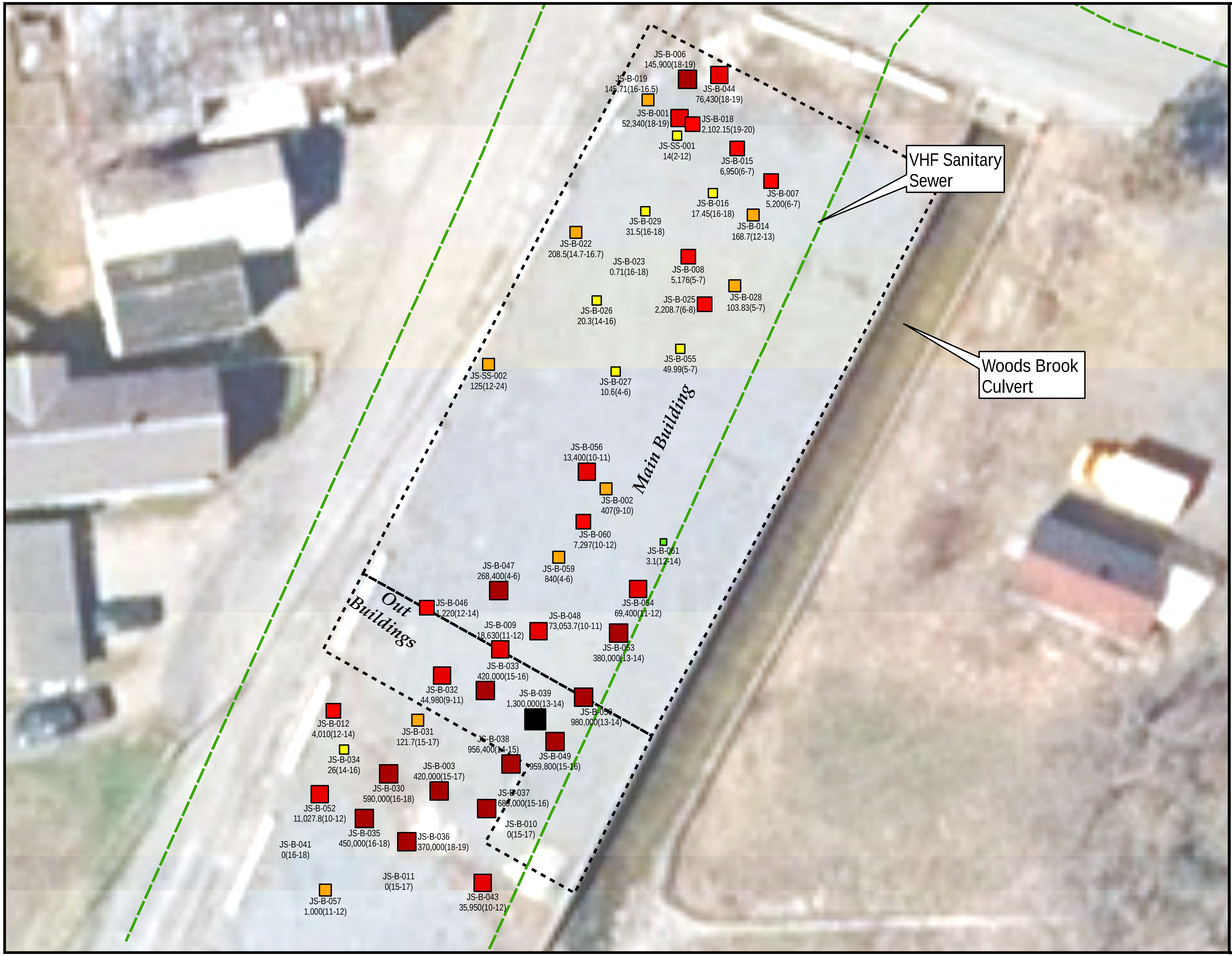


Figure A-11: Maximum PID Readings - Groundwater IRM PDI Former Oak Materials Fluorglas Division John Street Site Village of Hoosick Falls, New York

ERM



Legend

- Storm/Sanitary Utility Line (Approximate)
- Approx Historic Building Footprint

Max Total VOC (ug/kg)

labeled with depth interval (ft) and concentration

- 🟩 <10
- 🟨 10-100
- 🟧 100 - 1,000
- 🟥 1,000 - 10,000
- 🟥 10,000 - 100,000
- 🟥 100,000 - 1,000,000
- ⬛ >1,000,000

NOTES:
Total VOC:Sum of PCE, TCE, 1,2-DCE, VC, 1,1,1-TCA, 1,1-DCA, 1,1-DCE

N

0 5 10 20 30 40
Feet

Figure A-12: Maximum Total VOCs - Groundwater IRM PDI

Former Oak Materials Fluorglas Division
John Street Site
Village of Hoosick Falls, New York

ERM

Q:\Team\DMMV\Clients_A_E\ArnoldandPorter\HoosickFalls\MXD\RI_WorkPlan\JohnSt\2018_IRM\JS_IRM_TotalVOC_20181101.mxd - brett.shaver - 11/2/2018

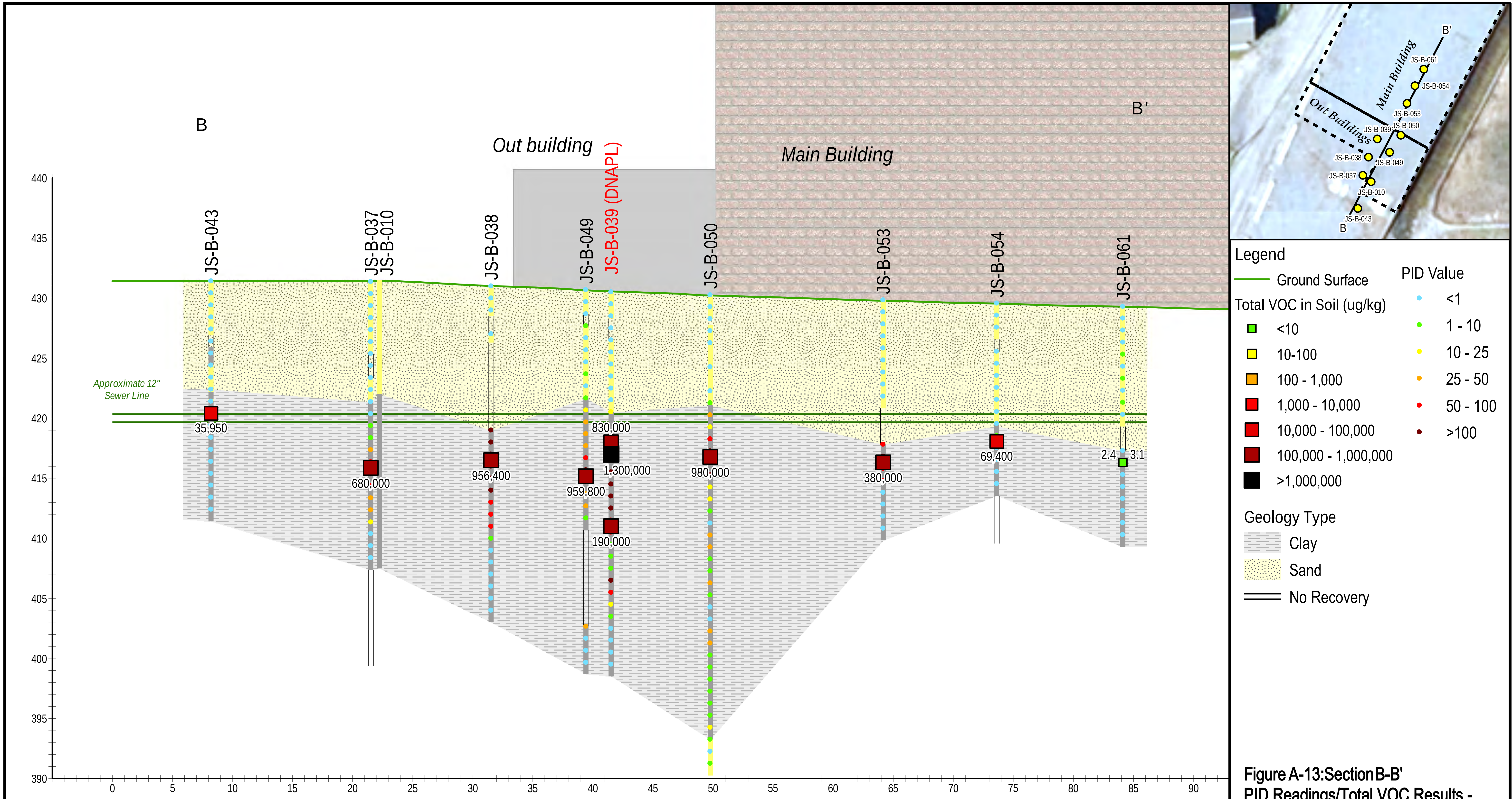
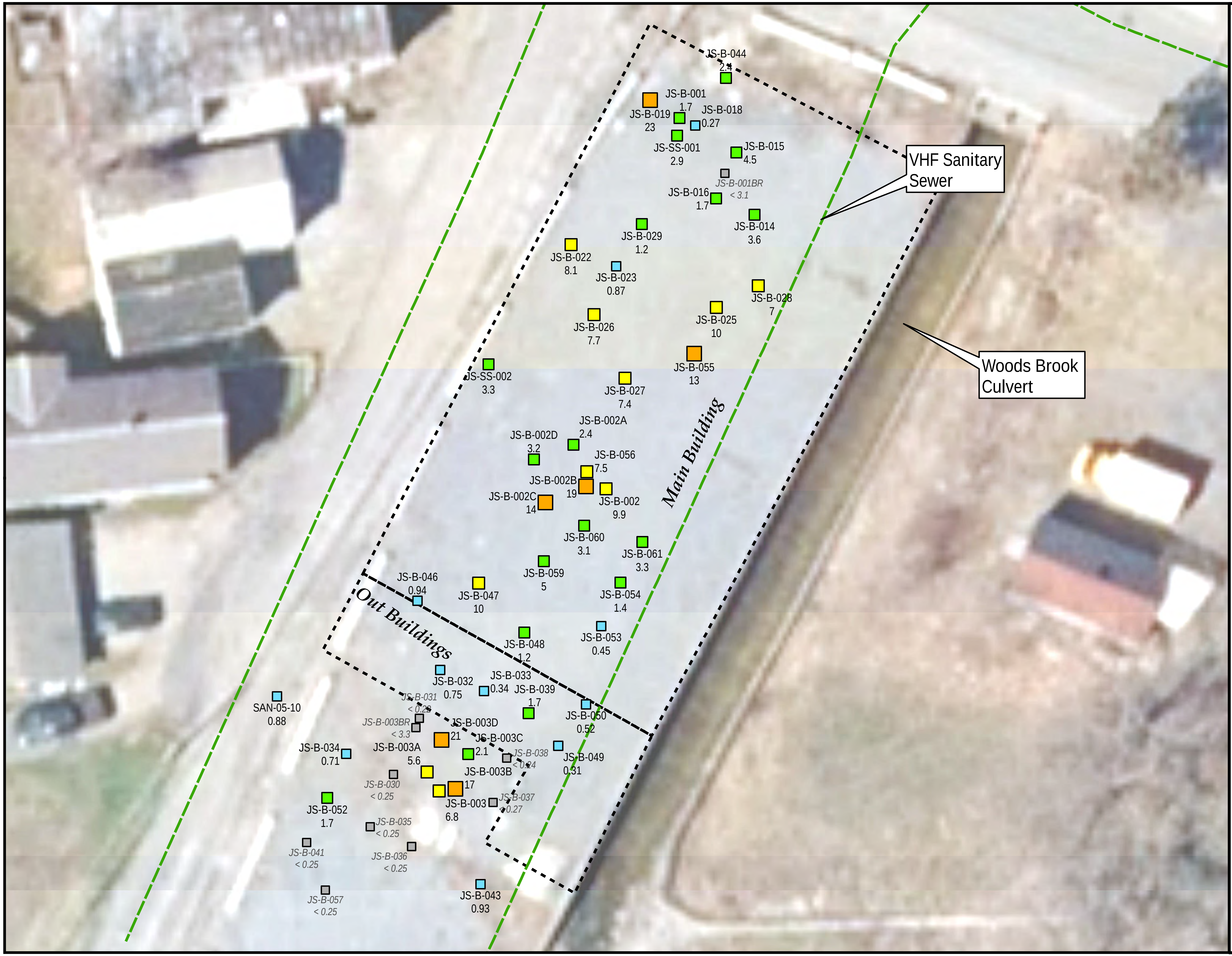


Figure A-13: Section B-B'
PID Readings/Total VOC Results - Groundwater IRM PDI

Former Oak Materials Fluorglas Division
John Street Site
Village of Hoosick Falls, New York

ERM

Q:\Team\DMMV\Clients_A_E\ArnoldandPorter\HoosickFalls\MXD\RI_WorkPlan\JohnSt\2018_IRM\JS_IRM_CrossSectionB_TotalVOC_20181101.mxd - brett.shaver - 11/2/2018



Legend

- - - Storm/Sanitary Utility Line (Approximate)

⬚ Approx Historic Building Footprint

Maximum PFOA
in Soil (ug/kg)

🟦 <1
🟩 1 to <5
🟨 5 to <10
🟧 10 to <50
🟥 50 to <100
🟫 >100
◼ Non-Detect

NOTES:
Total VOC:Sum of PCE, TCE, 1,2-DCE, VC, 1,1,1-TCA, 1,1-DCA, 1,1-DCE

N

0 5 10 20 30 40
Feet

Figure A-14: Maximum PFOA in Soil Groundwater IRM PDI

Former Oak Materials Fluorglas Division
John Street Site
Village of Hoosick Falls, New York

ERM

Q:\Team\DMM\Clients_A_E\ArnoldandPorter\HoosickFalls\MXD\RI_WorkPlan\JohnSt\2018_IRM\JS_IRM_MaxPFOA_20181101.mxd - brett.shaver - 11/2/2018

LIST OF TABLES

Table A-1
Detected VOC Analytical Results from Shallow Soil Samples
Former Oak Materials Fluorglas Division - John Street

								Location ID:	JS-B-001	JS-B-001	JS-B-002	JS-B-002	JS-B-003	JS-B-003	JS-B-003	JS-B-003	JS-B-004	JS-B-004
								Sample Date:	08/16/2016	08/16/2016	08/11/2016	08/11/2016	07/21/2016	07/21/2016	08/08/2016	08/08/2016	07/21/2016	07/21/2016
								Sample Depth:	18 - 19 ft	18 - 20 ft	6 - 8 ft	9 - 10 ft	0 - 2 in	2 - 12 in	9 - 11 ft	15 - 17 ft	0 - 2 in	2 - 12 in
								Sample Type:	N	N	N	N	N	N	N	N	N	N
Constituent	**Units**	**NY375 1UNRES**	**NY375 2RPGW**	**NY375 3RRES**	**NY375 4RRRES**	**NY375 5RCOMM**	**NY375 6RINDU**	**NY375 7PER**										
Volatile Organic Compounds (VOCs) by USEPA Method 8260																		
1,1,1-Trichloroethane	µg/kg	680	680	100000	100000	500000	1000000	-	**480**	na	**3 J**	1 U	**1 J**	**1 J**	1 U	510 U	0.9 U	0.8 U
1,1,2-Trichloroethane	µg/kg	-	-	-	-	-	-	-	65 U	na	1 U	1 U	0.9 U	0.9 U	1 U	510 U	0.9 U	0.8 U
1,1-Dichloroethane	µg/kg	270	270	19000	26000	240000	480000	-	**1400**	na	1 U	**5 J**	0.9 U	0.9 U	**27**	510 U	0.9 U	0.8 U
1,1-Dichloroethene	µg/kg	330	330	100000	100000	500000	1000000	-	**310 J**	na	**1 J**	**7**	0.9 U	0.9 U	**15**	510 U	0.9 U	0.8 U
1,2,4-Trimethylbenzene	µg/kg	3600	3600	47000	52000	190000	380000	-	65 U	na	1 U	1 U	0.9 U	0.9 U	1 U	510 U	0.9 U	0.8 U
1,3,5-Trimethylbenzene	µg/kg	8400	8400	47000	52000	190000	380000	-	65 U	na	1 U	1 U	0.9 U	0.9 U	1 U	510 U	0.9 U	0.8 U
2-Butanone	µg/kg	120	120	100000	100000	500000	1000000	100000	260 U	na	4 U	5 U	4 U	4 U	4 U	2100 U	**16**	**6 J**
Acetone	µg/kg	50	50	100000	100000	500000	1000000	2200	**780 J**	na	**24**	**9 J**	**27**	**19**	8 U	3600 U	**190**	**73**
Benzene	µg/kg	60	60	2900	4800	44000	89000	70000	32 U	na	0.5 U	0.6 U	0.4 U	0.4 U	0.5 U	260 U	0.4 U	0.4 U
Carbon Disulfide	µg/kg	-	-	-	-	-	-	-	65 U	na	**7**	1 U	0.9 U	0.9 U	1 U	510 U	**0.9 J**	0.8 U
cis-1,2-Dichloroethene	µg/kg	250	250	59000	100000	500000	1000000	-	**150 J**	na	**13**	**180**	0.9 U	0.9 U	1 U	510 U	0.9 U	0.8 U
Ethylbenzene	µg/kg	1000	1000	30000	41000	390000	780000	-	65 U	na	1 U	1 U	0.9 U	0.9 U	1 U	510 U	0.9 U	0.8 U
Methyl Acetate	ug/kg	-	-	-	-	-	-	-	130 U	na	2 U	2 U	2 U	2 U	2 U	1000 U	2 U	2 U
n-Butylbenzene	µg/kg	12000	12000	100000	100000	500000	1000000	-	65 U	na	1 U	1 U	0.9 U	0.9 U	1 U	510 U	0.9 U	0.8 U
p-Isopropyltoluene	µg/kg	-	-	-	-	-	-	-	65 U	na	1 U	1 U	0.9 U	0.9 U	1 U	510 U	**2 J**	0.8 U
sec-Butylbenzene	µg/kg	11000	11000	100000	100000	500000	1000000	-	65 U	na	1 U	1 U	0.9 U	0.9 U	1 U	510 U	**0.9 J**	0.8 U
Tetrachloroethene	µg/kg	1300	1300	5500	19000	150000	300000	2000	65 U	na	**2 J**	**2 J**	**2 J**	**3 J**	1 U	510 U	0.9 U	0.8 U
Toluene	µg/kg	700	700	100000	100000	500000	1000000	36000	**170 J**	na	**2 J**	1 U	0.9 U	0.9 U	1 U	510 U	**1 J**	0.8 U
trans-1,2-Dichloroethene	µg/kg	190	190	100000	100000	500000	1000000	-	65 U	na	**2 J**	**2 J**	0.9 U	0.9 U	1 U	510 U	0.9 U	0.8 U
Trichloroethene	µg/kg	470	470	10000	21000	200000	400000	2000	**50000**	na	**130**	**180 J**	**22**	**50 J**	**300**	**420000**	**46 J**	**65**
Vinyl Chloride	µg/kg	20	20	210	900	13000	27000	-	65 U	na	1 U	**33**	0.9 U	0.9 U	1 U	510 U	0.9 U	0.8 U

Notes and Abbreviations
µg/kg - microgram per kilogram
U - Compound not detected
J - Estimated value
N - Primary sample
FD - Field duplicate sample
na - Sample not analyzed for this parameter
Bold value indicates detected value
Shaded value indicates value equal to, or greater than, standard or guidance
NY Part 375 = NYS Soil Cleanup Objective (SCO) in Title 6 of Official Compilation of New York Codes, Rules and Regulations (6 NYCRR) Subpart 375-6.8(a).

🟨	NYS Unrestricted Use SCO
🟩	NYS Protection of Groundwater SCO
🟦	NYS Residential Use SCO
🟪	NYS Restricted Residential SCO
🟧	NYS Commercial Use SCO
🟥	NYS Industrial Use SCO
⬜	NYS Protection of Ecological Resources SCO

Table A-1
Detected VOC Analytical Results from Shallow Soil Samples
Former Oak Materials Fluorglas Division - John Street

								Location ID:	JS-B-004	JS-B-004	JS-B-005	JS-B-005	JS-B-005	JS-B-006	JS-B-007	JS-B-007	JS-B-008	JS-B-008
								Sample Date:	08/17/2016	08/17/2016	07/21/2016	07/21/2016	08/23/2016	11/29/2016	11/30/2016	11/30/2016	12/01/2016	12/01/2016
								Sample Depth:	10 - 11 ft	10 - 12 ft	0 - 2 in	2 - 12 in	11 - 12 ft	18 - 19 ft	6 - 7 ft	17 - 18 ft	5 - 7 ft	5 - 7 ft
								Sample Type:	N	N	N	N	N	N	N	N	FD	N
Constituent	**Units**	**NY375 1UNRES**	**NY375 2RPGW**	**NY375 3RRES**	**NY375 4RRRES**	**NY375 5RCOMM**	**NY375 6RINDU**	**NY375 7PER**										
Volatile Organic Compounds (VOCs) by USEPA Method 8260																		
1,1,1-Trichloroethane	µg/kg	680	680	100000	100000	500000	1000000	-	1 U	na	1 U	1 U	1 U	**88000**	**700**	2 U	**60**	**59**
1,1,2-Trichloroethane	µg/kg	-	-	-	-	-	-	-	1 U	na	1 U	1 U	1 U	120 U	46 U	2 U	1 U	1 U
1,1-Dichloroethane	µg/kg	270	270	19000	26000	240000	480000	-	1 U	na	1 U	1 U	1 U	**1400**	46 U	**2 J**	**4 J**	**3 J**
1,1-Dichloroethene	µg/kg	330	330	100000	100000	500000	1000000	-	1 U	na	1 U	1 U	1 U	**2500**	46 U	2 U	**1 J**	**1 J**
1,2,4-Trimethylbenzene	µg/kg	3600	3600	47000	52000	190000	380000	-	1 U	na	1 U	1 U	1 U	**2100**	46 U	2 U	1 U	1 U
1,3,5-Trimethylbenzene	µg/kg	8400	8400	47000	52000	190000	380000	-	1 U	na	1 U	1 U	1 U	**510 J**	46 U	2 U	1 U	1 U
2-Butanone	µg/kg	120	120	100000	100000	500000	1000000	100000	5 U	na	**34**	**14**	4 U	500 U	180 U	7 U	4 U	4 U
Acetone	µg/kg	50	50	100000	100000	500000	1000000	2200	13 U	na	**540**	**200**	**12 J**	870 U	320 U	**17 J**	**18 J**	**14 J**
Benzene	µg/kg	60	60	2900	4800	44000	89000	70000	0.7 U	na	**1 J**	**0.7 J**	0.5 U	62 U	23 U	0.8 U	0.5 U	0.5 U
Carbon Disulfide	µg/kg	-	-	-	-	-	-	-	1 U	na	1 U	**1 J**	1 U	120 U	46 U	2 U	**1 J**	1 U
cis-1,2-Dichloroethene	µg/kg	250	250	59000	100000	500000	1000000	-	1 U	na	1 U	1 U	1 U	120 U	46 U	2 U	**19**	**13**
Ethylbenzene	µg/kg	1000	1000	30000	41000	390000	780000	-	1 U	na	**7**	**4 J**	1 U	120 U	46 U	2 U	1 U	1 U
Methyl Acetate	ug/kg	-	-	-	-	-	-	-	3 U	na	**3 J**	2 U	2 U	250 U	92 U	3 U	2 U	2 U
n-Butylbenzene	µg/kg	12000	12000	100000	100000	500000	1000000	-	1 U	na	1 U	1 U	1 U	**960**	46 U	2 U	1 U	1 U
p-Isopropyltoluene	µg/kg	-	-	-	-	-	-	-	1 U	na	**11**	**5**	1 U	**160 J**	46 U	2 U	1 U	1 U
sec-Butylbenzene	µg/kg	11000	11000	100000	100000	500000	1000000	-	1 U	na	1 U	1 U	1 U	**150 J**	46 U	2 U	1 U	1 U
Tetrachloroethene	µg/kg	1300	1300	5500	19000	150000	300000	2000	1 U	na	1 U	1 U	1 U	120 U	46 U	2 U	**2 J**	1 U
Toluene	µg/kg	700	700	100000	100000	500000	1000000	36000	1 U	na	**2 J**	**1 J**	1 U	**740**	46 U	2 U	1 U	1 U
trans-1,2-Dichloroethene	µg/kg	190	190	100000	100000	500000	1000000	-	1 U	na	1 U	1 U	1 U	120 U	46 U	2 U	**2 J**	**1 J**
Trichloroethene	µg/kg	470	470	10000	21000	200000	400000	2000	1 U	na	**3 J**	**20 J**	1 U	**54000**	**4500**	2 U	**3400**	**5100**
Vinyl Chloride	µg/kg	20	20	210	900	13000	27000	-	1 U	na	1 U	1 U	1 U	120 U	46 U	2 U	1 U	1 U

Notes and Abbreviations
µg/kg - microgram per kilogram
U - Compound not detected
J - Estimated value
N - Primary sample
FD - Field duplicate sample
na - Sample not analyzed for this parameter
Bold value indicates detected value
Shaded value indicates value equal to, or greater than, standard or guidance
NY Part 375 = NYS Soil Cleanup Objective (SCO) in Title 6 of Official Compilation of New York Codes, Rules and

🟨	NYS Unrestricted Use SCO
🟩	NYS Protection of Groundwater SCO
🟦	NYS Residential Use SCO
🟪	NYS Restricted Residential SCO
🟧	NYS Commercial Use SCO
🟥	NYS Industrial Use SCO
⬜	NYS Protection of Ecological Resources SCO

Table A-1
Detected VOC Analytical Results from Shallow Soil Samples
Former Oak Materials Fluorglas Division - John Street

								Location ID:	JS-B-008	JS-B-009	JS-B-010	JS-B-011	JS-B-012	JS-SS-001	JS-SS-001	JS-SS-002	JS-SS-002
								Sample Date:	12/01/2016	11/30/2016	11/29/2016	11/29/2016	11/30/2016	07/21/2016	07/21/2016	07/21/2016	07/21/2016
								Sample Depth:	18 - 19 ft	11 - 12 ft	15 - 17 ft	15 - 17 ft	12 - 14 ft	0 - 2 in	2 - 12 in	10 - 12 in	12 - 24 in
								Sample Type:	N	N	N	N	N	N	N	N	N
Constituent	**Units**	**NY375 1UNRES**	**NY375 2RPGW**	**NY375 3RRES**	**NY375 4RRRES**	**NY375 5RCOMM**	**NY375 6RINDU**	**NY375 7PER**									
Volatile Organic Compounds (VOCs) by USEPA Method 8260																	
1,1,1-Trichloroethane	µg/kg	680	680	100000	100000	500000	1000000	-	1 U	61 U	1 U	1 U	1 U	0.9 U	0.9 U	**2 J**	**4 J**
1,1,2-Trichloroethane	µg/kg	-	-	-	-	-	-	-	1 U	61 U	1 U	1 U	**5 J**	0.9 U	0.9 U	0.8 U	0.8 U
1,1-Dichloroethane	µg/kg	270	270	19000	26000	240000	480000	-	1 U	61 U	1 U	1 U	**4000**	0.9 U	0.9 U	0.8 U	0.8 U
1,1-Dichloroethene	µg/kg	330	330	100000	100000	500000	1000000	-	1 U	61 U	1 U	1 U	**2 J**	0.9 U	0.9 U	0.8 U	0.8 U
1,2,4-Trimethylbenzene	µg/kg	3600	3600	47000	52000	190000	380000	-	1 U	61 U	1 U	1 U	1 U	0.9 U	0.9 U	0.8 U	0.8 U
1,3,5-Trimethylbenzene	µg/kg	8400	8400	47000	52000	190000	380000	-	1 U	61 U	1 U	1 U	1 U	0.9 U	0.9 U	0.8 U	0.8 U
2-Butanone	µg/kg	120	120	100000	100000	500000	1000000	100000	5 U	240 U	5 U	6 U	6 U	**11**	**5 J**	**5 J**	3 U
Acetone	µg/kg	50	50	100000	100000	500000	1000000	2200	9 U	430 U	**20 J**	**13 J**	**14 J**	**170**	**47**	**39**	**33**
Benzene	µg/kg	60	60	2900	4800	44000	89000	70000	0.7 U	30 U	0.7 U	0.7 U	0.7 U	0.5 U	0.4 U	0.4 U	0.4 U
Carbon Disulfide	µg/kg	-	-	-	-	-	-	-	1 U	61 U	1 U	1 U	1 U	**6**	**1 J**	0.8 U	**2 J**
cis-1,2-Dichloroethene	µg/kg	250	250	59000	100000	500000	1000000	-	1 U	**630**	1 U	1 U	1 U	0.9 U	0.9 U	0.8 U	0.8 U
Ethylbenzene	µg/kg	1000	1000	30000	41000	390000	780000	-	1 U	61 U	1 U	1 U	1 U	0.9 U	0.9 U	0.8 U	0.8 U
Methyl Acetate	ug/kg	-	-	-	-	-	-	-	3 U	120 U	3 U	3 U	3 U	2 U	2 U	2 U	2 U
n-Butylbenzene	µg/kg	12000	12000	100000	100000	500000	1000000	-	1 U	61 U	1 U	1 U	1 U	0.9 U	0.9 U	0.8 U	0.8 U
p-Isopropyltoluene	µg/kg	-	-	-	-	-	-	-	1 U	61 U	1 U	1 U	1 U	**42**	**30**	0.8 U	0.8 U
sec-Butylbenzene	µg/kg	11000	11000	100000	100000	500000	1000000	-	1 U	61 U	1 U	1 U	1 U	0.9 U	0.9 U	0.8 U	0.8 U
Tetrachloroethene	µg/kg	1300	1300	5500	19000	150000	300000	2000	1 U	61 U	1 U	1 U	1 U	0.9 U	0.9 U	0.8 U	**1 J**
Toluene	µg/kg	700	700	100000	100000	500000	1000000	36000	1 U	61 U	1 U	1 U	1 U	0.9 U	0.9 U	0.8 U	0.8 U
trans-1,2-Dichloroethene	µg/kg	190	190	100000	100000	500000	1000000	-	1 U	61 U	1 U	1 U	1 U	0.9 U	0.9 U	0.8 U	0.8 U
Trichloroethene	µg/kg	470	470	10000	21000	200000	400000	2000	1 U	**18000**	1 U	1 U	**1 J**	**9**	**14**	**67**	**120**
Vinyl Chloride	µg/kg	20	20	210	900	13000	27000	-	1 U	61 U	1 U	1 U	**7 J**	0.9 U	0.9 U	0.8 U	0.8 U

Notes and Abbreviations
µg/kg - microgram per kilogram
U - Compound not detected
J - Estimated value
N - Primary sample
FD - Field duplicate sample
na - Sample not analyzed for this parameter
Bold value indicates detected value
Shaded value indicates value equal to, or greater than, standard or guidance
NY Part 375 = NYS Soil Cleanup Objective (SCO) in Title 6 of Official Compilation of New York Codes, Rules and

🟨	NYS Unrestricted Use SCO
🟩	NYS Protection of Groundwater SCO
🟦	NYS Residential Use SCO
🟪	NYS Restricted Residential SCO
🟧	NYS Commercial Use SCO
🟥	NYS Industrial Use SCO
⬜	NYS Protection of Ecological Resources SCO

Table A-2

Detected VOC Analytical Results from Shallow Groundwater Samples by Waterloo APS

Former Oak Materials Fluorglas Division - John Street

			Location ID:	JS-APS-001	JS-APS-002	JS-APS-003	JS-APS-005
			Sample Date:	08/09/2016	08/04/2016	08/03/2016	08/03/2016
			Sample Depth:	14.1 ft	7.4 ft	8.8 ft	10.3 ft
			Sample Type:	N	N	N	N
Constituent	**Units**	**NYSDEC TOGS111 GA GUIDANCE**	**NYSDEC TOGS111 GA STANDARD**				
Volatile Organic Compounds (VOCs) by USEPA Method 8260							
1,1,1-Trichloroethane	µg/l	-	5	**9**	**3**	**3**	0.5 U
1,1-Dichloroethane	µg/l	-	5	**0.8 J**	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	µg/l	-	5	**6**	**2**	0.5 U	0.5 U
Tetrachloroethene	µg/l	-	5	**0.6 J**	0.5 U	**1**	0.5 U
Trichloroethene	µg/l	-	5	**110**	**30**	**8**	0.5 U

Notes and Abbreviations

µg/L - micrograms per liter

U - Compound not detected

J - Estimated value

N - Primary sample

FD - Field duplicate sample

na - Sample not analyzed for this parameter

Bold value indicates detected value

Shaded value indicates value equal to, or greater than, standard or guidance

NYSDEC TOGS111 - Standards listed are from NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 val

🟨 Exceedance of NYS GA Guidance

🟩 Exceedance of NYS GA Standard

Table A-3

Detected VOC Analytical Results for Groundwater Samples from Shallow Monitoring Wells

Former Oak Materials Fluorglas Division - John Street

			Location ID:	JS-MW-001A	JS-MW-001A	JS-MW-002A	JS-MW-003A	JS-MW-004A	JS-MW-005A
			Sample Date:	01/09/2017	01/09/2017	01/04/2017	01/10/2017	01/10/2017	01/04/2017
			Sample Type:	FD	N	N	N	N	N
Constituent	**Units**	**NYSDEC TOGS111 GA GUIDANCE**	**NYSDEC TOGS111 GA STANDARD**						
Volatile Organic Compounds (VOCs) by USEPA Method 8260									
1,1,1-Trichloroethane	µg/l	-	5	**19**	**19**	**1**	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	µg/l	-	5	**2**	**1**	**0.6 J**	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	µg/l	-	5	**0.6 J**	**0.6 J**	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	µg/l	-	5	**8**	**8**	**4**	0.5 U	0.5 U	0.5 U
Tetrachloroethene	µg/l	-	5	**0.6 J**	**0.6 J**	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	µg/l	-	5	**130**	**130**	**21**	**2**	0.5 U	0.5 U
Vinyl Chloride	µg/l	-	2	0.5 U	0.5 U	**0.9 J**	0.5 U	0.5 U	0.5 U

Notes and Abbreviations

µg/L - micrograms per liter

U - Compound not detected

J - Estimated value

N - Primary sample

FD - Field duplicate sample

na - Sample not analyzed for this parameter

Bold value indicates detected value

Shaded value indicates value equal to, or greater than, standard or guidance

NYSDEC TOGS111 - Standards listed are from NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 values for Class G

🟨 Exceedance of NYS GA Guidance

🟩 Exceedance of NYS GA Standard

Table A-4
Analytical Results in IRM PDI Soil Samples for PFAS, TOC, pH, and VOCs
Former Oak Materials Fluorglas Division - John Street

									Location ID:	JS-B-001BR	JS-B-001BR	JS-B-003	JS-B-003BR	JS-B-003BR	JS-B-003BR	JS-B-003BR
									Sample Date:	5/15/2018	5/15/2018	5/16/2018	5/15/2018	5/15/2018	5/16/2018	5/16/2018
									Sample Depth (ft bgs):	14.1-14.7 ft	14.7-16.8 ft	48.8-49.6 ft	8.2-8.5 ft	8.5-9.5 ft	48.8-49.6 ft	141-142 ft
									Sample Type:	N	N	N	N	N	N	N
Constituent	**Units**	**NY375 1UNRES**	**NY375 2RPGW**	**NY375 3RRES**	**NY375 4RRRES**	**NY375 5RCOMM**	**NY375 6RINDU**	**NY375 7PER**	**USEPA Screen Value**							
Perfluorinated Alkyl Compounds (PFAS) by USEPA Method 537-1.1 modified																
Perfluorobutanesulfonic acid (PFBS)	ng/g	-	-	-	-	-	-	-	-	0.21 U	0.22 U	na	0.21 U	0.22 U	0.19 U	0.17 U
Perfluorobutanoic Acid	ng/g	-	-	-	-	-	-	-	-	0.22 U	0.23 U	na	0.23 U	0.23 U	0.21 U	0.18 U
Perfluorodecane Sulfonic Acid	ng/g	-	-	-	-	-	-	-	-	0.21 U	0.22 U	na	0.21 U	0.22 U	0.19 U	0.17 U
Perfluorodecanoic acid (PFDA)	ng/g	-	-	-	-	-	-	-	-	0.25 U	0.25 U	na	0.25 U	0.26 U	0.23 U	0.2 U
Perfluorododecanoic acid (PFDoA)	ng/g	-	-	-	-	-	-	-	-	0.32 U	0.33 U	na	0.33 U	0.34 U	0.3 U	0.26 U
Perfluoroheptane Sulfonate (PFHPS)	ng/g	-	-	-	-	-	-	-	-	0.18 U	0.18 U	na	0.18 U	0.18 U	0.16 U	0.14 U
Perfluoroheptanoic acid (PFHpA)	ng/g	-	-	-	-	-	-	-	-	0.27 U	0.28 U	na	0.28 U	0.28 U	0.25 U	0.22 U
Perfluorohexanesulfonic acid (PFHxS)	ng/g	-	-	-	-	-	-	-	-	0.21 U	0.22 U	na	0.21 U	0.22 U	0.19 U	0.18 U
Perfluorohexanoic acid (PFHxA)	ng/g	-	-	-	-	-	-	-	-	0.26 U	0.27 U	na	0.26 U	0.27 U	0.24 U	0.21 U
Perfluorononanoic acid (PFNA)	ng/g	-	-	-	-	-	-	-	-	0.3 J	0.43 J	na	0.31 J	0.24 J	0.21 U	0.18 U
Perfluorooctane Sulfonamide (FOSA)	ng/g	-	-	-	-	-	-	-	-	0.16 U	0.24 J	na	0.17 U	0.17 U	0.15 U	0.13 U
Perfluorooctanesulfonic acid (PFOS)	ng/g	-	-	-	-	-	-	-	6270	0.21 U	0.22 U	na	0.21 U	0.22 U	0.19 U	0.17 U
Perfluorooctanoic acid (PFOA)	ng/g	-	-	-	-	-	-	-	15600	3.1 U	0.66 U	na	0.46 U	0.35 U	3.3 U	0.18 U
Perfluoropentanoic Acid (PFPeA)	ng/g	-	-	-	-	-	-	-	-	0.24 U	0.24 U	na	0.24 U	0.25 U	0.22 U	0.19 U
Perfluorotetradecanoic acid (PFTA)	ng/g	-	-	-	-	-	-	-	-	0.47 U	0.48 U	na	0.47 U	0.49 U	0.43 U	0.38 U
Perfluorotridecanoic Acid (PFTriA)	ng/g	-	-	-	-	-	-	-	-	0.19 U	0.21 J	na	0.19 J	0.23 J	0.17 U	0.2 J
Perfluoroundecanoic Acid (PFUnA)	ng/g	-	-	-	-	-	-	-	-	0.31 U	0.31 U	na	0.31 U	0.32 U	0.28 U	0.25 U
SODIUM 1H,1H,2H,2H-PERFLUORODECANE SULFONATE (8:2)	ng/g	-	-	-	-	-	-	-	-	0.27 U	0.28 U	na	0.28 U	0.28 U	0.25 U	0.22 U
SODIUM 1H,1H,2H,2H-PERFLUOROOCTANE SULFONATE (6:2)	ng/g	-	-	-	-	-	-	-	-	0.21 U	0.22 U	na	0.21 U	0.22 U	0.19 U	0.17 U
NEtFOSAA	ng/g	-	-	-	-	-	-	-	-	0.14 U	0.21 J	na	0.15 J	0.14 U	0.13 U	0.11 U
NMeFOSAA	ng/g	-	-	-	-	-	-	-	-	0.18 J	0.11 U	na	0.11 U	0.11 U	0.095 U	0.13 J
Total Organic Carbon by Lloyd Kahn Method																
Total Organic Carbon	mg/kg	-	-	-	-	-	-	-	-	4220	2100	1590	1870	3780	na	na
pH by Standard Method 9045D																
pH	pH units	-	-	-	-	-	-	-	-	7.6	8.1	7	7.9	8.1	na	na
Volatile Organic Compounds (VOCs) by USEPA Method 8260																
1,1,1-Trichloroethane (TCA)	ug/kg	680	680	100000	100000	500000	1000000	-	-	68 U	6 UJ	72 UJ	41 J	250 U	na	na
1,1,2,2-Tetrachloroethane	ug/kg	-	-	-	-	-	-	-	-	68 UJ	6 UJ	72 UJ	88 UJ	250 UJ	na	na
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/kg	-	-	-	-	-	-	-	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
1,1,2-Trichloroethane	ug/kg	-	-	-	-	-	-	-	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
1,1-Dichloroethane	ug/kg	270	270	19000	26000	240000	480000	-	-	37 J	4.1 J	2500 J	59 J	410	na	na
1,1-Dichloroethene	ug/kg	330	330	100000	100000	500000	1000000	-	-	30 J	6 U	290 J	68 J	490	na	na
1,2,4-Trichlorobenzene	ug/kg	-	-	-	-	-	-	-	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
1,2-Dibromo-3-Chloropropane	ug/kg	-	-	-	-	-	-	-	-	68 UJ	6 UJ	72 UJ	88 UJ	250 UJ	na	na
1,2-Dibromoethane (Ethylene Dibromide)	ug/kg	-	-	-	-	-	-	-	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
1,2-Dichlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	-	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
1,2-Dichloroethane	ug/kg	20	20	2300	3100	30000	60000	10000	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
1,2-Dichloropropane	ug/kg	-	-	-	-	-	-	-	-	68 U	6 U	72 UJ	88 U	250 U	na	na
1,3-Dichlorobenzene	ug/kg	2400	2400	17000	49000	280000	560000	-	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
1,4-Dichlorobenzene	ug/kg	1800	1800	9800	13000	130000	250000	20000	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
2-Hexanone	ug/kg	-	-	-	-	-	-	-	-	340 U	30 UJ	360 UJ	440 U	1200 U	na	na
Acetone	ug/kg	50	50	100000	100000	500000	1000000	2200	-	340 U	30 U	360 UJ	440 U	1200 U	na	na
Benzene	ug/kg	60	60	2900	4800	44000	89000	70000	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
Bromodichloromethane	ug/kg	-	-	-	-	-	-	-	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
Bromoform	ug/kg	-	-	-	-	-	-	-	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
Bromomethane	ug/kg	-	-	-	-	-	-	-	-	68 U	6 U	72 UJ	88 U	250 U	na	na
Carbon Disulfide	ug/kg	-	-	-	-	-	-	-	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
Carbon Tetrachloride	ug/kg	760	760	1400	2400	22000	44000	-	-	68 U	6 U	72 UJ	88 U	250 U	na	na
Chlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	40000	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
Chloroethane	ug/kg	-	-	-	-	-	-	-	-	68 U	6 U	72 UJ	88 U	250 U	na	na
Chloroform	ug/kg	370	370	10000	49000	350000	700000	12000	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
Chloromethane	ug/kg	-	-	-	-	-	-	-	-	68 U	6 U	72 UJ	88 U	250 U	na	na
Cis-1,2-Dichloroethylene	ug/kg	250	250	59000	100000	500000	1000000	-	-	54 J	6 UJ	72 UJ	27 J	100 J	na	na
Cis-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
Cyclohexane	ug/kg	-	-	-	-	-	-	-	-	68 U	6 U	72 UJ	88 U	250 U	na	na
Dibromochloromethane	ug/kg	-	-	-	-	-	-	-	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
Dichlorodifluoromethane	ug/kg	-	-	-	-	-	-	-	-	68 U	6 U	72 UJ	88 U	250 U	na	na
Ethylbenzene	ug/kg	1000	1000	30000	41000	390000	780000	-	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
Isopropylbenzene (Cumene)	ug/kg	-	-	-	-	-	-	-	-	68 U	6 U	72 UJ	88 U	250 U	na	na
Methyl Acetate	ug/kg	-	-	-	-	-	-	-	-	340 U	30 U	360 UJ	440 U	1200 U	na	na
Methyl Ethyl Ketone (2-Butanone)	ug/kg	120	120	100000	100000	500000	1000000	100000	-	340 U	30 UJ	360 UJ	440 U	1200 U	na	na
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	ug/kg	-	-	-	-	-	-	-	-	340 U	30 UJ	360 UJ	440 U	1200 U	na	na
Methylcyclohexane	ug/kg	-	-	-	-	-	-	-	-	68 U	6 U	72 UJ	88 U	250 U	na	na
Methylene Chloride	ug/kg	50	50	51000	100000	500000	1000000	12000	-	68 U	6 U	72 UJ	88 U	250 U	na	na
Styrene	ug/kg	-	-	-	-	-	-	-	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
Tert-Butyl Methyl Ether	ug/kg	930	930	62000	100000	500000	1000000	-	-	68 U	6 U	72 UJ	88 U	250 U	na	na
Tetrachloroethylene (PCE)	ug/kg	1300	1300	5500	19000	150000	300000	2000	-	40 J	6 UJ	72 UJ	170	170 J	na	na
Toluene	ug/kg	700	700	100000	100000	500000	1000000	36000	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
Trans-1,2-Dichloroethene	ug/kg	190	190	100000	100000	500000	1000000	-	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
Trans-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	68 U	6 UJ	72 UJ	88 U	250 U	na	na
Trichloroethylene (TCE)	ug/kg	470	470	10000	21000	200000	400000	2000	-	1400	6 UJ	440 J	5500	15000	na	na
Trichlorofluoromethane	ug/kg	-	-	-	-	-	-	-	-	68 U	6 U	72 UJ	88 U	250 U	na	na
Vinyl Chloride	ug/kg	20	20	210	900	13000	27000	-	-	68 U	6 U	72 UJ	88 U	250 U	na	na
Xylenes, Total	ug/kg	260	1600	100000	100000	500000	1000000	260	-	140 U	12 UJ	140 UJ	180 U	500 U	na	na

Notes and Abbreviations

µg/kg - microgram per kilogram
mg/kg - milligrams per kilogram
U - Compound not detected
J - Estimated value
UJ - Estimated Non-Detect
N - Primary sample
FD - Field duplicate sample
ft bgs - Feet below ground surface
na - Sample not analyzed for this parameter
IRM PDI - Interim Remedial Measure Pre-Design Investigation
Shaded value indicates value equal to, or greater than, standard or guidance.
NY Part 375 = NYS Soil Cleanup Objective (SCO) in Title 6 of Official Compilation of New York Codes, Rules and Regulations (6 NYCRR) Subpart 375-
USEPA Screening Values for PFOA and PFOS developed by USEPA based on the Health Advisory for PFOA and PFOS of 70 nanograms per liter.

🟨	NYS Unrestricted Use SCO
🟩	NYS Protection of Groundwater SCO
🟦	NYS Residential Use SCO
🟪	NYS Restricted Residential SCO
🟧	NYS Commercial Use SCO
🟥	NYS Industrial Use SCO
⬜	NYS Protection of Ecological Resources SCO

Table A-4
Analytical Results in IRM PDI Soil Samples for PFAS, TOC, pH, and VOCs
Former Oak Materials Fluorglas Division - John Street

									Location ID:	JS-B-014	JS-B-015	JS-B-015	JS-B-015	JS-B-015	JS-B-016	JS-B-018
									Sample Date:	4/5/2018	4/10/2018	4/10/2018	4/10/2018	4/10/2018	4/5/2018	4/4/2018
									Sample Depth (ft bgs):	12-13 ft	5.5-7.5 ft	6-7 ft	15-17 ft	15-17 ft	16-18 ft	19-20 ft
									Sample Type:	N	N	N	N	FD	N	N
Constituent	Units	NY375 1UNRES	NY375 2RPGW	NY375 3RRES	NY375 4RRRES	NY375 5RCOMM	NY375 6RINDU	NY375 7PER	USEPA Screen Value							
Perfluorinated Alkyl Compounds (PFAS) by USEPA Method 537-1.1 modified																
Perfluorobutanesulfonic acid (PFBS)	ng/g	-	-	-	-	-	-	-	-	0.22 U	0.17 U	na	0.22 U	0.22 U	0.2 U	0.18 U
Perfluorobutanoic Acid	ng/g	-	-	-	-	-	-	-	-	0.23 U	0.18 U	na	0.23 U	0.23 U	0.21 U	0.19 U
Perfluorodecane Sulfonic Acid	ng/g	-	-	-	-	-	-	-	-	0.22 U	0.17 U	na	0.22 U	0.22 U	0.2 U	0.18 U
Perfluorodecanoic acid (PFDA)	ng/g	-	-	-	-	-	-	-	-	0.26 U	0.29 J	na	0.25 U	0.26 U	0.23 U	0.21 U
Perfluorododecanoic acid (PFDoA)	ng/g	-	-	-	-	-	-	-	-	0.33 U	0.26 U	na	0.33 U	0.34 U	0.3 U	0.28 U
Perfluoroheptane Sulfonate (PFHPS)	ng/g	-	-	-	-	-	-	-	-	0.18 U	0.14 U	na	0.18 U	0.18 U	0.16 U	0.15 U
Perfluoroheptanoic acid (PFHpA)	ng/g	-	-	-	-	-	-	-	-	0.28 U	0.22 U	na	0.28 U	0.28 U	0.25 U	0.24 U
Perfluorohexanesulfonic acid (PFHxS)	ng/g	-	-	-	-	-	-	-	-	0.22 U	0.17 J	na	0.22 U	0.22 U	0.29 J	0.18 U
Perfluorohexanoic acid (PFHxA)	ng/g	-	-	-	-	-	-	-	-	0.27 U	0.21 U	na	0.26 U	0.27 U	0.24 U	0.22 U
Perfluorononanoic acid (PFNA)	ng/g	-	-	-	-	-	-	-	-	0.25 J	0.3 U	na	0.3 U	0.29 U	0.23 J	0.19 U
Perfluorooctane Sulfonamide (FOSA)	ng/g	-	-	-	-	-	-	-	-	0.17 U	0.13 U	na	0.17 U	0.17 U	0.15 U	0.14 U
Perfluorooctanesulfonic acid (PFOS)	ng/g	-	-	-	-	-	-	-	6270	0.22 U	0.17 U	na	0.22 U	0.22 U	0.2 U	0.18 U
Perfluorooctanoic acid (PFOA)	ng/g	-	-	-	-	-	-	-	15600	3.6	4.5	na	1.3	1.5	1.7	0.27 J
Perfluoropentanoic Acid (PFPeA)	ng/g	-	-	-	-	-	-	-	-	0.24 U	0.19 U	na	0.24 U	0.25 U	0.22 U	0.2 U
Perfluorotetradecanoic acid (PFTA)	ng/g	-	-	-	-	-	-	-	-	0.48 U	0.38 U	na	0.48 U	0.49 U	0.43 U	0.4 U
Perfluorotridecanoic Acid (PFTriA)	ng/g	-	-	-	-	-	-	-	-	0.19 U	0.15 J	na	0.19 U	0.22 J	0.18 J	0.16 U
Perfluoroundecanoic Acid (PFUnA)	ng/g	-	-	-	-	-	-	-	-	0.34 J	0.31 U	na	0.39 U	0.32 U	0.29 U	0.27 U
SODIUM 1H,1H,2H,2H-PERFLUORODECANE SULFONATE (8:2)	ng/g	-	-	-	-	-	-	-	-	0.28 U	0.22 U	na	0.28 U	0.28 U	0.25 U	0.24 U
SODIUM 1H,1H,2H,2H-PERFLUOROOCTANE SULFONATE (6:2)	ng/g	-	-	-	-	-	-	-	-	0.22 U	0.17 U	na	0.22 U	0.22 U	0.2 U	0.18 U
NEtFOSAA	ng/g	-	-	-	-	-	-	-	-	0.14 U	0.11 U	na	0.14 U	0.14 U	0.13 U	0.12 U
NMeFOSAA	ng/g	-	-	-	-	-	-	-	-	0.11 U	0.085 U	na	0.11 U	0.14 J	0.096 U	0.09 U
Total Organic Carbon by Lloyd Kahn Method																
Total Organic Carbon	mg/kg	-	-	-	-	-	-	-	-	2040	20000	na	2070	2380	2190	2270
pH by Standard Method 9045D																
pH	pH units	-	-	-	-	-	-	-	-	8.4	7.8	na	8.5	8.5	8.3	9.6
Volatile Organic Compounds (VOCs) by USEPA Method 8260																
1,1,1-Trichloroethane (TCA)	ug/kg	680	680	100000	100000	500000	1000000	-	-	3.9 J	na	550	13	5.3 J	5.6 U	0.75 J
1,1,2,2-Tetrachloroethane	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
1,1,2-Trichloroethane	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	0.82 J
1,1-Dichloroethane	ug/kg	270	270	19000	26000	240000	480000	-	-	11	na	430 U	38	14	13	110
1,1-Dichloroethene	ug/kg	330	330	100000	100000	500000	1000000	-	-	12	na	430 U	53	12	1.5 J	63
1,2,4-Trichlorobenzene	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
1,2-Dibromo-3-Chloropropane	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
1,2-Dibromoethane (Ethylene Dibromide)	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
1,2-Dichlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
1,2-Dichloroethane	ug/kg	20	20	2300	3100	30000	60000	10000	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	1.8 J
1,2-Dichloropropane	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
1,3-Dichlorobenzene	ug/kg	2400	2400	17000	49000	280000	560000	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
1,4-Dichlorobenzene	ug/kg	1800	1800	9800	13000	130000	250000	20000	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
2-Hexanone	ug/kg	-	-	-	-	-	-	-	-	25 U	na	2200 U	30 U	31 U	28 U	23 U
Acetone	ug/kg	50	50	100000	100000	500000	1000000	2200	-	22 J	na	2200 U	8.9 J	13 J	12 J	26
Benzene	ug/kg	60	60	2900	4800	44000	89000	70000	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Bromodichloromethane	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Bromoform	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Bromomethane	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Carbon Disulfide	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 UJ	6 U	6.2 U	5.6 U	4.5 U
Carbon Tetrachloride	ug/kg	760	760	1400	2400	22000	44000	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Chlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	40000	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Chloroethane	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Chloroform	ug/kg	370	370	10000	49000	350000	700000	12000	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Chloromethane	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Cis-1,2-Dichloroethylene	ug/kg	250	250	59000	100000	500000	1000000	-	-	5.8	na	430 U	17	3.7 J	0.75 J	26
Cis-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Cyclohexane	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Dibromochloromethane	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 UJ	6 U	6.2 U	5.6 U	4.5 U
Dichlorodifluoromethane	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Ethylbenzene	ug/kg	1000	1000	30000	41000	390000	780000	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Isopropylbenzene (Cumene)	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Methyl Acetate	ug/kg	-	-	-	-	-	-	-	-	25 U	na	2200 U	30 U	31 U	28 U	23 U
Methyl Ethyl Ketone (2-Butanone)	ug/kg	120	120	100000	100000	500000	1000000	100000	-	25 U	na	2200 U	30 U	31 U	28 U	23 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	ug/kg	-	-	-	-	-	-	-	-	25 U	na	2200 U	30 U	31 U	28 U	23 U
Methylcyclohexane	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Methylene Chloride	ug/kg	50	50	51000	100000	500000	1000000	12000	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Styrene	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Tert-Butyl Methyl Ether	ug/kg	930	930	62000	100000	500000	1000000	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Tetrachloroethylene (PCE)	ug/kg	1300	1300	5500	19000	150000	300000	2000	-	6	na	430 U	13	1.3 J	5.6 U	4.5 U
Toluene	ug/kg	700	700	100000	100000	500000	1000000	36000	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	5.3
Trans-1,2-Dichloroethene	ug/kg	190	190	100000	100000	500000	1000000	-	-	5.1 U	na	430 U	1.2 J	6.2 U	5.6 U	0.62 J
Trans-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Trichloroethylene (TCE)	ug/kg	470	470	10000	21000	200000	400000	2000	-	130	na	6400	1700 J	80 J	2.2 J	82000
Trichlorofluoromethane	ug/kg	-	-	-	-	-	-	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	4.5 U
Vinyl Chloride	ug/kg	20	20	210	900	13000	27000	-	-	5.1 U	na	430 U	6 U	6.2 U	5.6 U	2.4 J
Xylenes, Total	ug/kg	260	1600	100000	100000	500000	1000000	260	-	10 U	na	870 U	12 U	12 U	11 U	9.1 U

Notes and Abbreviations
µg/kg - microgram per kilogram
mg/kg - milligrams per kilogram
U - Compound not detected
J - Estimated value
UJ - Estimated Non-Detect
N - Primary sample
FD - Field duplicate sample
ft bgs - Feet below ground surface
na - Sample not analyzed for this parameter
IRM PDI - Interim Remedial Measure Pre-Design Investigation
Shaded value indicates value equal to, or greater than, standard or guidance.
NY Part 375 = NYS Soil Cleanup Objective (SCO) in Title 6 of Official Compilation of New York Codes, Rules and Regulations (6 NYC
USEPA Screening Values for PFOA and PFOS developed by USEPA based on the Health Advisory for PFOA and PFOS of 70 nanogra

🟨	NYS Unrestricted Use SCO
🟩	NYS Protection of Groundwater SCO
🟦	NYS Residential Use SCO
🟪	NYS Restricted Residential SCO
🟧	NYS Commercial Use SCO
🟥	NYS Industrial Use SCO
⬜	NYS Protection of Ecological Resources SCO

Table A-4
Analytical Results in IRM PDI Soil Samples for PFAS, TOC, pH, and VOCs
Former Oak Materials Fluorglas Division - John Street

									Location ID:	**JS-B-019**	**JS-B-019**	**JS-B-022**	**JS-B-023**	**JS-B-025**	**JS-B-026**	**JS-B-027**
									Sample Date:	**4/4/2018**	**4/4/2018**	**4/9/2018**	**4/6/2018**	**4/9/2018**	**4/6/2018**	**4/6/2018**
									Sample Depth (ft bgs):	**16-16.5 ft**	**16-17 ft**	**14.7-16.7 ft**	**16-18 ft**	**6-8 ft**	**14-16 ft**	**4-6 ft**
									Sample Type:	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Constituent	Units	**NY375 1UNRES**	**NY375 2RPGW**	**NY375 3RRES**	**NY375 4RRRES**	**NY375 5RCOMM**	**NY375 6RINDU**	**NY375 7PER**	**USEPA Screen Value**							
Perfluorinated Alkyl Compounds (PFAS) by USEPA Method 537-1.1 modified																
Perfluorobutanesulfonic acid (PFBS)	ng/g	-	-	-	-	-	-	-	-	na	0.2 U	0.22 UJ	0.24 U	0.2 U	0.21 U	0.18 U
Perfluorobutanoic Acid	ng/g	-	-	-	-	-	-	-	-	na	0.22 U	0.24 UJ	0.25 U	0.21 U	0.22 U	0.19 U
Perfluorodecane Sulfonic Acid	ng/g	-	-	-	-	-	-	-	-	na	0.2 U	0.22 UJ	0.24 U	0.2 U	0.21 U	0.18 U
Perfluorodecanoic acid (PFDA)	ng/g	-	-	-	-	-	-	-	-	na	0.24 U	0.26 UJ	0.28 U	0.38 J	0.25 U	0.46 J
Perfluorododecanoic acid (PFDoA)	ng/g	-	-	-	-	-	-	-	-	na	0.31 U	0.34 UJ	0.36 U	0.3 U	0.32 U	0.27 U
Perfluoroheptane Sulfonate (PFHPS)	ng/g	-	-	-	-	-	-	-	-	na	0.17 U	0.18 UJ	0.2 U	0.17 U	0.18 U	0.15 U
Perfluoroheptanoic acid (PFHpA)	ng/g	-	-	-	-	-	-	-	-	na	0.26 U	0.29 UJ	0.31 U	0.26 U	0.27 U	0.23 U
Perfluorohexanesulfonic acid (PFHxS)	ng/g	-	-	-	-	-	-	-	-	na	0.2 U	0.22 UJ	0.24 U	0.2 U	0.21 U	0.18 U
Perfluorohexanoic acid (PFHxA)	ng/g	-	-	-	-	-	-	-	-	na	0.25 U	0.27 UJ	0.29 U	0.25 U	0.26 U	0.22 U
Perfluorononanoic acid (PFNA)	ng/g	-	-	-	-	-	-	-	-	na	0.22 U	0.29 UJ	0.26 J	0.36 J	0.22 U	0.34 J
Perfluorooctane Sulfonamide (FOSA)	ng/g	-	-	-	-	-	-	-	-	na	0.16 U	0.17 UJ	0.18 U	0.15 U	0.16 U	0.14 U
Perfluorooctanesulfonic acid (PFOS)	ng/g	-	-	-	-	-	-	-	6270	na	0.2 U	0.22 UJ	0.24 U	0.2 U	0.21 U	0.18 U
Perfluorooctanoic acid (PFOA)	ng/g	-	-	-	-	-	-	-	15600	na	21	8.1 J	0.87 J	10	7.7	7.4
Perfluoropentanoic Acid (PFPeA)	ng/g	-	-	-	-	-	-	-	-	na	0.23 U	0.25 UJ	0.26 U	0.22 U	0.24 U	0.2 U
Perfluorotetradecanoic acid (PFTA)	ng/g	-	-	-	-	-	-	-	-	na	0.45 U	0.49 UJ	0.52 U	0.44 U	0.47 U	0.39 U
Perfluorotridecanoic Acid (PFTriA)	ng/g	-	-	-	-	-	-	-	-	na	0.18 U	0.2 UJ	0.21 U	0.18 U	0.19 U	0.28 J
Perfluoroundecanoic Acid (PFUnA)	ng/g	-	-	-	-	-	-	-	-	na	0.3 U	0.35 UJ	0.35 U	0.29 U	0.32 J	0.26 U
SODIUM 1H,1H,2H,2H-PERFLUORODECANE SULFONATE (8:2)	ng/g	-	-	-	-	-	-	-	-	na	0.26 U	0.29 UJ	0.31 U	0.26 U	0.27 U	0.23 U
SODIUM 1H,1H,2H,2H-PERFLUOROOCTANE SULFONATE (6:2)	ng/g	-	-	-	-	-	-	-	-	na	0.2 U	0.22 UJ	0.24 U	0.2 U	0.21 U	0.18 U
NEtFOSAA	ng/g	-	-	-	-	-	-	-	-	na	0.13 U	0.15 UJ	0.16 U	0.13 U	0.14 U	0.12 U
NMeFOSAA	ng/g	-	-	-	-	-	-	-	-	na	0.1 U	0.11 UJ	0.12 U	0.098 U	0.11 U	0.087 U
Total Organic Carbon by Lloyd Kahn Method																
Total Organic Carbon	mg/kg	-	-	-	-	-	-	-	-	na	1790	2290	2450	24700	2310	3790
pH by Standard Method 9045D																
pH	pH units	-	-	-	-	-	-	-	-	na	8.2	8.5	8.6	8.2	8.4	8.3
Volatile Organic Compounds (VOCs) by USEPA Method 8260																
1,1,1-Trichloroethane (TCA)	ug/kg	680	680	100000	100000	500000	1000000	-	-	16	na	2.2 J	5.1 U	5.7	7.3 U	2.6 J
1,1,2,2-Tetrachloroethane	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
1,1,2-Trichloroethane	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
1,1-Dichloroethane	ug/kg	270	270	19000	26000	240000	480000	-	-	26	na	18	0.71 J	3.9 U	6.1 J	3.9 U
1,1-Dichloroethene	ug/kg	330	330	100000	100000	500000	1000000	-	-	7.7	na	20	5.1 U	3.9 U	7.3 U	3.9 U
1,2,4-Trichlorobenzene	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
1,2-Dibromo-3-Chloropropane	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
1,2-Dibromoethane (Ethylene Dibromide)	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
1,2-Dichlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
1,2-Dichloroethane	ug/kg	20	20	2300	3100	30000	60000	10000	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
1,2-Dichloropropane	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
1,3-Dichlorobenzene	ug/kg	2400	2400	17000	49000	280000	560000	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
1,4-Dichlorobenzene	ug/kg	1800	1800	9800	13000	130000	250000	20000	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
2-Hexanone	ug/kg	-	-	-	-	-	-	-	-	22 U	na	34 U	25 U	19 U	36 U	20 U
Acetone	ug/kg	50	50	100000	100000	500000	1000000	2200	-	18 J	na	31 J	17 J	16 J	23 J	13 J
Benzene	ug/kg	60	60	2900	4800	44000	89000	70000	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Bromodichloromethane	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Bromoform	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Bromomethane	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Carbon Disulfide	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Carbon Tetrachloride	ug/kg	760	760	1400	2400	22000	44000	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Chlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	40000	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Chloroethane	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Chloroform	ug/kg	370	370	10000	49000	350000	700000	12000	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Chloromethane	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Cis-1,2-Dichloroethylene	ug/kg	250	250	59000	100000	500000	1000000	-	-	3.2 J	na	8.3	5.1 U	1.7 J	3.2 J	3.9 U
Cis-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Cyclohexane	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Dibromochloromethane	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Dichlorodifluoromethane	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Ethylbenzene	ug/kg	1000	1000	30000	41000	390000	780000	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Isopropylbenzene (Cumene)	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Methyl Acetate	ug/kg	-	-	-	-	-	-	-	-	22 U	na	34 U	25 U	19 U	36 U	20 U
Methyl Ethyl Ketone (2-Butanone)	ug/kg	120	120	100000	100000	500000	1000000	100000	-	22 U	na	34 U	25 U	19 U	36 U	20 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	ug/kg	-	-	-	-	-	-	-	-	22 U	na	34 U	25 U	19 U	36 U	20 U
Methylcyclohexane	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Methylene Chloride	ug/kg	50	50	51000	100000	500000	1000000	12000	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Styrene	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Tert-Butyl Methyl Ether	ug/kg	930	930	62000	100000	500000	1000000	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Tetrachloroethylene (PCE)	ug/kg	1300	1300	5500	19000	150000	300000	2000	-	0.81 J	na	6.9 U	5.1 U	1.3 J	7.3 U	3.9 U
Toluene	ug/kg	700	700	100000	100000	500000	1000000	36000	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Trans-1,2-Dichloroethene	ug/kg	190	190	100000	100000	500000	1000000	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Trans-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Trichloroethylene (TCE)	ug/kg	470	470	10000	21000	200000	400000	2000	-	92	na	160	5.1 U	2200	11	8
Trichlorofluoromethane	ug/kg	-	-	-	-	-	-	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Vinyl Chloride	ug/kg	20	20	210	900	13000	27000	-	-	4.5 U	na	6.9 U	5.1 U	3.9 U	7.3 U	3.9 U
Xylenes, Total	ug/kg	260	1600	100000	100000	500000	1000000	260	-	9 U	na	14 U	10 U	7.7 U	15 U	7.8 U

Notes and Abbreviations

µg/kg - microgram per kilogram
mg/kg - milligrams per kilogram
U - Compound not detected
J - Estimated value
UJ - Estimated Non-Detect
N - Primary sample
FD - Field duplicate sample
ft bgs - Feet below ground surface
na - Sample not analyzed for this parameter
IRM PDI - Interim Remedial Measure Pre-Design Investigation
Shaded value indicates value equal to, or greater than, standard or guidance.
NY Part 375 = NYS Soil Cleanup Objective (SCO) in Title 6 of Official Compilation of New York Codes, Rules and Regulations (6 NYC
USEPA Screening Values for PFOA and PFOS developed by USEPA based on the Health Advisory for PFOA and PFOS of 70 nanogra

🟨	NYS Unrestricted Use SCO
🟩	NYS Protection of Groundwater SCO
🟦	NYS Residential Use SCO
🟪	NYS Restricted Residential SCO
🟧	NYS Commercial Use SCO
🟥	NYS Industrial Use SCO
⬜	NYS Protection of Ecological Resources SCO

Table A-4
Analytical Results in IRM PDI Soil Samples for PFAS, TOC, pH, and VOCs
Former Oak Materials Fluorglas Division - John Street

									Location ID:	JS-B-028	JS-B-029	JS-B-030	JS-B-030	JS-B-031	JS-B-032	JS-B-033
									Sample Date:	4/10/2018	4/10/2018	4/12/2018	4/12/2018	4/11/2018	4/11/2018	4/11/2018
									Sample Depth (ft bgs):	5-7 ft	16-18 ft	16-18 ft	16-18 ft	15-17 ft	9-11 ft	14-16 ft
									Sample Type:	N	N	N	FD	N	N	N
Constituent	**Units**	**NY375 1UNRES**	**NY375 2RPGW**	**NY375 3RRES**	**NY375 4RRRES**	**NY375 5RCOMM**	**NY375 6RINDU**	**NY375 7PER**	**USEPA Screen Value**							
Perfluorinated Alkyl Compounds (PFAS) by USEPA Method 537-1.1 modified																
Perfluorobutanesulfonic acid (PFBS)	ng/g	-	-	-	-	-	-	-	-	0.2 U	0.21 U	0.23 U	0.24 U	0.21 U	0.22 U	0.21 U
Perfluorobutanoic Acid	ng/g	-	-	-	-	-	-	-	-	0.21 U	0.23 U	0.24 U	0.25 U	0.22 U	0.23 U	0.22 U
Perfluorodecane Sulfonic Acid	ng/g	-	-	-	-	-	-	-	-	0.2 U	0.21 U	0.23 U	0.24 U	0.21 U	0.22 U	0.21 U
Perfluorodecanoic acid (PFDA)	ng/g	-	-	-	-	-	-	-	-	0.67 J	0.3 J	0.27 U	0.28 U	0.25 U	0.27 J	0.24 U
Perfluorododecanoic acid (PFDoA)	ng/g	-	-	-	-	-	-	-	-	0.3 U	0.32 U	0.35 U	0.36 U	0.32 U	0.33 U	0.31 U
Perfluoroheptane Sulfonate (PFHPS)	ng/g	-	-	-	-	-	-	-	-	0.17 U	0.18 U	0.19 U	0.2 U	0.18 U	0.18 U	0.17 U
Perfluoroheptanoic acid (PFHpA)	ng/g	-	-	-	-	-	-	-	-	0.26 U	0.28 U	0.29 U	0.31 U	0.27 U	0.28 U	0.27 U
Perfluorohexanesulfonic acid (PFHxS)	ng/g	-	-	-	-	-	-	-	-	0.2 U	0.23 J	0.23 U	0.24 J	0.21 U	0.22 U	0.21 U
Perfluorohexanoic acid (PFHxA)	ng/g	-	-	-	-	-	-	-	-	0.25 U	0.26 U	0.28 U	0.29 U	0.26 U	0.27 U	0.26 U
Perfluorononanoic acid (PFNA)	ng/g	-	-	-	-	-	-	-	-	0.45 U	0.25 U	0.24 U	0.26 U	0.3 U	0.33 U	0.27 U
Perfluorooctane Sulfonamide (FOSA)	ng/g	-	-	-	-	-	-	-	-	0.15 U	0.16 U	0.18 U	0.18 U	0.16 U	0.17 U	0.16 U
Perfluorooctanesulfonic acid (PFOS)	ng/g	-	-	-	-	-	-	-	6270	0.2 U	0.21 U	0.23 U	0.24 U	0.21 U	0.22 U	0.21 U
Perfluorooctanoic acid (PFOA)	ng/g	-	-	-	-	-	-	-	15600	7	1.2	0.24 U	0.25 U	0.22 U	0.75 J	0.34 J
Perfluoropentanoic Acid (PFPeA)	ng/g	-	-	-	-	-	-	-	-	0.22 U	0.24 U	0.25 U	0.26 U	0.24 U	0.24 U	0.23 U
Perfluorotetradecanoic acid (PFTA)	ng/g	-	-	-	-	-	-	-	-	0.44 U	0.47 U	0.5 U	0.52 U	0.47 U	0.48 U	0.46 U
Perfluorotridecanoic Acid (PFTriA)	ng/g	-	-	-	-	-	-	-	-	0.18 U	0.19 U	0.2 U	0.24 J	0.19 U	0.19 U	0.22 J
Perfluoroundecanoic Acid (PFUnA)	ng/g	-	-	-	-	-	-	-	-	0.33 U	0.31 U	0.4 U	0.35 U	0.38 U	0.34 U	0.31 U
SODIUM 1H,1H,2H,2H-PERFLUORODECANE SULFONATE (8:2)	ng/g	-	-	-	-	-	-	-	-	0.26 U	0.28 U	0.29 U	0.31 U	0.27 U	0.28 U	0.27 U
SODIUM 1H,1H,2H,2H-PERFLUOROOCTANE SULFONATE (6:2)	ng/g	-	-	-	-	-	-	-	-	0.2 U	0.21 U	0.23 U	0.24 U	0.21 U	0.22 U	0.21 U
NEtFOSAA	ng/g	-	-	-	-	-	-	-	-	0.13 U	0.14 U	0.15 U	0.16 U	0.14 U	0.14 U	0.14 U
NMeFOSAA	ng/g	-	-	-	-	-	-	-	-	0.098 U	0.11 U	0.12 U	0.12 U	0.11 U	0.11 U	0.11 U
Total Organic Carbon by Lloyd Kahn Method																
Total Organic Carbon	mg/kg	-	-	-	-	-	-	-	-	3910	2440	2350	2350	2800	2130	3080
pH by Standard Method 9045D																
pH	pH units	-	-	-	-	-	-	-	-	8.1	8.6	8.3	8.6	8.7	8.6	8.5
Volatile Organic Compounds (VOCs) by USEPA Method 8260																
1,1,1-Trichloroethane (TCA)	ug/kg	680	680	100000	100000	500000	1000000	-	-	5.1 J	5.8 U	12000 U	18000 U	6.3 U	730 U	na
1,1,2,2-Tetrachloroethane	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 UJ	12000 U	18000 U	6.3 U	730 U	na
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 UJ	18000 UJ	6.3 U	730 UJ	na
1,1,2-Trichloroethane	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
1,1-Dichloroethane	ug/kg	270	270	19000	26000	240000	480000	-	-	6.1 U	22	12000 U	18000 U	120	630 J	na
1,1-Dichloroethene	ug/kg	330	330	100000	100000	500000	1000000	-	-	6.1 U	5.6 J	12000 U	18000 U	6.3 U	350 J	na
1,2,4-Trichlorobenzene	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 UJ	12000 U	18000 U	6.3 U	730 U	na
1,2-Dibromo-3-Chloropropane	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
1,2-Dibromoethane (Ethylene Dibromide)	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
1,2-Dichlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
1,2-Dichloroethane	ug/kg	20	20	2300	3100	30000	60000	10000	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
1,2-Dichloropropane	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
1,3-Dichlorobenzene	ug/kg	2400	2400	17000	49000	280000	560000	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
1,4-Dichlorobenzene	ug/kg	1800	1800	9800	13000	130000	250000	20000	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
2-Hexanone	ug/kg	-	-	-	-	-	-	-	-	30 U	29 U	61000 U	89000 U	31 U	3700 U	na
Acetone	ug/kg	50	50	100000	100000	500000	1000000	2200	-	30 U	16 J	61000 U	89000 U	17 J	3700 U	na
Benzene	ug/kg	60	60	2900	4800	44000	89000	70000	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Bromodichloromethane	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Bromoform	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Bromomethane	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Carbon Disulfide	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Carbon Tetrachloride	ug/kg	760	760	1400	2400	22000	44000	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Chlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	40000	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Chloroethane	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Chloroform	ug/kg	370	370	10000	49000	350000	700000	12000	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Chloromethane	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Cis-1,2-Dichloroethylene	ug/kg	250	250	59000	100000	500000	1000000	-	-	0.83 J	2.5 J	12000 U	18000 U	6.3 U	1000	na
Cis-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Cyclohexane	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Dibromochloromethane	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Dichlorodifluoromethane	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Ethylbenzene	ug/kg	1000	1000	30000	41000	390000	780000	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Isopropylbenzene (Cumene)	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Methyl Acetate	ug/kg	-	-	-	-	-	-	-	-	30 U	29 U	61000 U	89000 U	31 U	3700 U	na
Methyl Ethyl Ketone (2-Butanone)	ug/kg	120	120	100000	100000	500000	1000000	100000	-	30 U	29 UJ	61000 U	89000 U	31 U	3700 U	na
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	ug/kg	-	-	-	-	-	-	-	-	30 U	29 U	61000 U	89000 U	31 U	3700 U	na
Methylcyclohexane	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Methylene Chloride	ug/kg	50	50	51000	100000	500000	1000000	12000	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Styrene	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Tert-Butyl Methyl Ether	ug/kg	930	930	62000	100000	500000	1000000	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Tetrachloroethylene (PCE)	ug/kg	1300	1300	5500	19000	150000	300000	2000	-	2.9 J	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Toluene	ug/kg	700	700	100000	100000	500000	1000000	36000	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Trans-1,2-Dichloroethene	ug/kg	190	190	100000	100000	500000	1000000	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Trans-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Trichloroethylene (TCE)	ug/kg	470	470	10000	21000	200000	400000	2000	-	95	1.4 J	490000	590000	1.7 J	43000	na
Trichlorofluoromethane	ug/kg	-	-	-	-	-	-	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Vinyl Chloride	ug/kg	20	20	210	900	13000	27000	-	-	6.1 U	5.8 U	12000 U	18000 U	6.3 U	730 U	na
Xylenes, Total	ug/kg	260	1600	100000	100000	500000	1000000	260	-	12 U	12 U	25000 U	36000 U	13 U	1500 U	na

Notes and Abbreviations

µg/kg - microgram per kilogram
mg/kg - milligrams per kilogram
U - Compound not detected
J - Estimated value
UJ - Estimated Non-Detect
N - Primary sample
FD - Field duplicate sample
ft bgs - Feet below ground surface
na - Sample not analyzed for this parameter
IRM PDI - Interim Remedial Measure Pre-Design Investigation
Shaded value indicates value equal to, or greater than, standard or guidance.
NY Part 375 = NYS Soil Cleanup Objective (SCO) in Title 6 of Official Compilation of New York Codes, Rules and Regulations (6 NY
USEPA Screening Values for PFOA and PFOS developed by USEPA based on the Health Advisory for PFOA and PFOS of 70 nanogra

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Table A-4
Analytical Results in IRM PDI Soil Samples for PFAS, TOC, pH, and VOCs
Former Oak Materials Fluorglas Division - John Street

									Location ID:	**JS-B-033**	**JS-B-033**	**JS-B-034**	**JS-B-034**	**JS-B-035**	**JS-B-036**	**JS-B-036**
									Sample Date:	**4/11/2018**	**4/11/2018**	**4/12/2018**	**4/12/2018**	**4/12/2018**	**4/18/2018**	**4/18/2018**
									Sample Depth (ft bgs):	**14-16 ft**	**15-16 ft**	**14-16 ft**	**14-16 ft**	**16-18 ft**	**14-15 ft**	**17-19 ft**
									Sample Type:	**SP**	**N**	**N**	**SP**	**N**	**N**	**N**
Constituent	Units	**NY375 1UNRES**	**NY375 2RPGW**	**NY375 3RRES**	**NY375 4RRRES**	**NY375 5RCOMM**	**NY375 6RINDU**	**NY375 7PER**	**USEPA Screen Value**							
Perfluorinated Alkyl Compounds (PFAS) by USEPA Method 537-1.1 modified																
Perfluorobutanesulfonic acid (PFBS)	ng/g	-	-	-	-	-	-	-	-	0.27 U	na	0.23 U	0.29 U	0.23 U	0.24 UJ	0.24 U
Perfluorobutanoic Acid	ng/g	-	-	-	-	-	-	-	-	0.27 U	na	0.24 U	0.29 U	0.25 U	0.25 UJ	0.25 U
Perfluorodecane Sulfonic Acid	ng/g	-	-	-	-	-	-	-	-	0.41 U	na	0.23 U	0.44 U	0.23 U	0.24 U	0.24 U
Perfluorodecanoic acid (PFDA)	ng/g	-	-	-	-	-	-	-	-	0.27 U	na	0.27 U	0.29 U	0.31 J	0.32 J	0.33 J
Perfluorododecanoic acid (PFDoA)	ng/g	-	-	-	-	-	-	-	-	0.27 U	na	0.35 U	0.29 U	0.35 U	0.36 U	0.36 U
Perfluoroheptane Sulfonate (PFHPS)	ng/g	-	-	-	-	-	-	-	-	0.27 U	na	0.19 U	0.29 U	0.19 U	0.2 U	0.2 U
Perfluoroheptanoic acid (PFHpA)	ng/g	-	-	-	-	-	-	-	-	0.27 U	na	0.3 U	0.29 U	0.3 U	0.3 U	0.3 U
Perfluorohexanesulfonic acid (PFHxS)	ng/g	-	-	-	-	-	-	-	-	0.27 U	na	0.23 U	0.29 U	0.23 U	0.24 U	0.24 U
Perfluorohexanoic acid (PFHxA)	ng/g	-	-	-	-	-	-	-	-	0.27 U	na	0.28 U	0.29 U	0.29 U	0.29 UJ	0.29 U
Perfluorononanoic acid (PFNA)	ng/g	-	-	-	-	-	-	-	-	0.27 U	na	0.28 U	0.29 U	0.31 U	0.39 U	0.25 U
Perfluorooctane Sulfonamide (FOSA)	ng/g	-	-	-	-	-	-	-	-	0.27 UJ	na	0.18 U	0.29 UJ	0.18 U	0.18 U	0.18 U
Perfluorooctanesulfonic acid (PFOS)	ng/g	-	-	-	-	-	-	-	6270	0.41 U	na	0.23 U	0.44 U	0.23 U	0.24 U	0.24 U
Perfluorooctanoic acid (PFOA)	ng/g	-	-	-	-	-	-	-	15600	0.65 J	na	0.71 J	0.56 J	0.25 U	0.25 U	0.25 U
Perfluoropentanoic Acid (PFPeA)	ng/g	-	-	-	-	-	-	-	-	0.27 UJ	na	0.26 U	0.29 UJ	0.26 U	0.26 U	0.26 U
Perfluorotetradecanoic acid (PFTA)	ng/g	-	-	-	-	-	-	-	-	0.27 U	na	0.51 U	0.29 U	0.51 U	0.52 U	0.52 U
Perfluorotridecanoic Acid (PFTriA)	ng/g	-	-	-	-	-	-	-	-	0.27 U	na	0.2 U	0.29 U	0.21 U	0.21 U	0.21 U
Perfluoroundecanoic Acid (PFUnA)	ng/g	-	-	-	-	-	-	-	-	0.27 U	na	0.38 U	0.29 U	0.37 U	0.35 U	0.37 J
SODIUM 1H,1H,2H,2H-PERFLUORODECANE SULFONATE (8:2)	ng/g	-	-	-	-	-	-	-	-	0.82 U	na	0.3 U	0.88 U	0.3 U	0.3 UJ	0.3 U
SODIUM 1H,1H,2H,2H-PERFLUOROOCTANE SULFONATE (6:2)	ng/g	-	-	-	-	-	-	-	-	0.82 U	na	0.23 U	0.88 UJ	0.23 U	0.24 U	0.24 U
NEtFOSAA	ng/g	-	-	-	-	-	-	-	-	0.68 U	na	0.15 U	0.73 U	0.15 U	0.15 U	0.15 U
NMeFOSAA	ng/g	-	-	-	-	-	-	-	-	0.68 U	na	0.12 U	0.73 U	0.12 U	0.12 UJ	0.14 J
Total Organic Carbon by Lloyd Kahn Method																
Total Organic Carbon	mg/kg	-	-	-	-	-	-	-	-	na	na	2470	na	2840	na	na
pH by Standard Method 9045D																
pH	pH units	-	-	-	-	-	-	-	-	na	na	8.7	na	8.6	na	na
Volatile Organic Compounds (VOCs) by USEPA Method 8260																
1,1,1-Trichloroethane (TCA)	ug/kg	680	680	100000	100000	500000	1000000	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
1,1,2,2-Tetrachloroethane	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
1,1,2-Trichloroethane	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
1,1-Dichloroethane	ug/kg	270	270	19000	26000	240000	480000	-	-	na	15000 U	26	na	8700 U	5.6 U	na
1,1-Dichloroethene	ug/kg	330	330	100000	100000	500000	1000000	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
1,2,4-Trichlorobenzene	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
1,2-Dibromo-3-Chloropropane	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
1,2-Dibromoethane (Ethylene Dibromide)	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
1,2-Dichlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
1,2-Dichloroethane	ug/kg	20	20	2300	3100	30000	60000	10000	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
1,2-Dichloropropane	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
1,3-Dichlorobenzene	ug/kg	2400	2400	17000	49000	280000	560000	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
1,4-Dichlorobenzene	ug/kg	1800	1800	9800	13000	130000	250000	20000	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
2-Hexanone	ug/kg	-	-	-	-	-	-	-	-	na	77000 U	28 U	na	44000 U	28 U	na
Acetone	ug/kg	50	50	100000	100000	500000	1000000	2200	-	na	77000 U	12 J	na	44000 U	22 J	na
Benzene	ug/kg	60	60	2900	4800	44000	89000	70000	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Bromodichloromethane	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Bromoform	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Bromomethane	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Carbon Disulfide	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Carbon Tetrachloride	ug/kg	760	760	1400	2400	22000	44000	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Chlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	40000	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Chloroethane	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Chloroform	ug/kg	370	370	10000	49000	350000	700000	12000	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Chloromethane	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Cis-1,2-Dichloroethylene	ug/kg	250	250	59000	100000	500000	1000000	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Cis-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Cyclohexane	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Dibromochloromethane	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Dichlorodifluoromethane	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Ethylbenzene	ug/kg	1000	1000	30000	41000	390000	780000	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Isopropylbenzene (Cumene)	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Methyl Acetate	ug/kg	-	-	-	-	-	-	-	-	na	77000 U	28 U	na	44000 U	28 U	na
Methyl Ethyl Ketone (2-Butanone)	ug/kg	120	120	100000	100000	500000	1000000	100000	-	na	77000 U	28 U	na	44000 U	28 U	na
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	ug/kg	-	-	-	-	-	-	-	-	na	77000 U	28 U	na	44000 U	28 U	na
Methylcyclohexane	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Methylene Chloride	ug/kg	50	50	51000	100000	500000	1000000	12000	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Styrene	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Tert-Butyl Methyl Ether	ug/kg	930	930	62000	100000	500000	1000000	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Tetrachloroethylene (PCE)	ug/kg	1300	1300	5500	19000	150000	300000	2000	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Toluene	ug/kg	700	700	100000	100000	500000	1000000	36000	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Trans-1,2-Dichloroethene	ug/kg	190	190	100000	100000	500000	1000000	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Trans-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Trichloroethylene (TCE)	ug/kg	470	470	10000	21000	200000	400000	2000	-	na	🟥 420000	5.6 U	na	🟥 450000	🟩 1600	na
Trichlorofluoromethane	ug/kg	-	-	-	-	-	-	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Vinyl Chloride	ug/kg	20	20	210	900	13000	27000	-	-	na	15000 U	5.6 U	na	8700 U	5.6 U	na
Xylenes, Total	ug/kg	260	1600	100000	100000	500000	1000000	260	-	na	31000 U	11 U	na	17000 U	11 U	na

Notes and Abbreviations

µg/kg - microgram per kilogram
mg/kg - milligrams per kilogram
U - Compound not detected
J - Estimated value
UJ - Estimated Non-Detect
N - Primary sample
FD - Field duplicate sample
ft bgs - Feet below ground surface
na - Sample not analyzed for this parameter
IRM PDI - Interim Remedial Measure Pre-Design Investigation
Shaded value indicates value equal to, or greater than, standard or guidance.
NY Part 375 = NYS Soil Cleanup Objective (SCO) in Title 6 of Official Compilation of New York Codes, Rules and Regulations (6 NY
USEPA Screening Values for PFOA and PFOS developed by USEPA based on the Health Advisory for PFOA and PFOS of 70 nanogra

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🟪	NYS Restricted Residential SCO
🟧	NYS Commercial Use SCO
🟥	NYS Industrial Use SCO
⬜	NYS Protection of Ecological Resources SCO

Table A-4
Analytical Results in IRM PDI Soil Samples for PFAS, TOC, pH, and VOCs
Former Oak Materials Fluorglas Division - John Street

									Location ID:	JS-B-036	JS-B-036	JS-B-037	JS-B-037	JS-B-038	JS-B-038	JS-B-039
									Sample Date:	4/18/2018	4/18/2018	4/17/2018	4/17/2018	4/17/2018	4/17/2018	4/20/2018
									Sample Depth (ft bgs):	18-19 ft	19-20 ft	15-16 ft	15-17 ft	14-15 ft	14-16 ft	12-13 ft
									Sample Type:	N	N	N	N	N	N	N
Constituent	Units	NY375 1UNRES	NY375 2RPGW	NY375 3RRES	NY375 4RRRES	NY375 5RCOMM	NY375 6RINDU	NY375 7PER	USEPA Screen Value							
Perfluorinated Alkyl Compounds (PFAS) by USEPA Method 537-1.1 modified																
Perfluorobutanesulfonic acid (PFBS)	ng/g	-	-	-	-	-	-	-	-	na	0.24 U	na	0.26 U	na	0.22 U	0.21 U
Perfluorobutanoic Acid	ng/g	-	-	-	-	-	-	-	-	na	0.25 U	na	0.27 U	na	0.24 U	0.22 U
Perfluorodecane Sulfonic Acid	ng/g	-	-	-	-	-	-	-	-	na	0.24 U	na	0.26 U	na	0.22 U	0.21 U
Perfluorodecanoic acid (PFDA)	ng/g	-	-	-	-	-	-	-	-	na	0.28 U	na	0.3 U	na	0.26 U	0.3 J
Perfluorododecanoic acid (PFDoA)	ng/g	-	-	-	-	-	-	-	-	na	0.37 U	na	0.39 U	na	0.34 U	0.32 U
Perfluoroheptane Sulfonate (PFHPS)	ng/g	-	-	-	-	-	-	-	-	na	0.2 U	na	0.21 U	na	0.18 U	0.18 U
Perfluoroheptanoic acid (PFHpA)	ng/g	-	-	-	-	-	-	-	-	na	0.31 U	na	0.33 U	na	0.29 U	0.42 J
Perfluorohexanesulfonic acid (PFHxS)	ng/g	-	-	-	-	-	-	-	-	na	0.24 U	na	0.26 U	na	0.22 U	0.25 J
Perfluorohexanoic acid (PFHxA)	ng/g	-	-	-	-	-	-	-	-	na	0.3 U	na	0.32 U	na	0.27 U	0.26 U
Perfluorononanoic acid (PFNA)	ng/g	-	-	-	-	-	-	-	-	na	0.25 U	na	0.27 U	na	0.37 U	0.22 U
Perfluorooctane Sulfonamide (FOSA)	ng/g	-	-	-	-	-	-	-	-	na	0.19 U	na	0.2 U	na	0.17 U	0.16 U
Perfluorooctanesulfonic acid (PFOS)	ng/g	-	-	-	-	-	-	-	6270	na	0.24 U	na	0.26 U	na	0.22 U	0.21 U
Perfluorooctanoic acid (PFOA)	ng/g	-	-	-	-	-	-	-	15600	na	0.25 U	na	0.27 U	na	0.24 U	1.7
Perfluoropentanoic Acid (PFPeA)	ng/g	-	-	-	-	-	-	-	-	na	0.27 U	na	0.29 U	na	0.25 U	0.24 U
Perfluorotetradecanoic acid (PFTA)	ng/g	-	-	-	-	-	-	-	-	na	0.53 U	na	0.57 U	na	0.49 U	0.47 U
Perfluorotridecanoic Acid (PFTriA)	ng/g	-	-	-	-	-	-	-	-	na	0.21 U	na	0.24 U	na	0.21 U	0.19 U
Perfluoroundecanoic Acid (PFUnA)	ng/g	-	-	-	-	-	-	-	-	na	0.35 U	na	0.38 U	na	0.33 U	0.39 U
SODIUM 1H,1H,2H,2H-PERFLUORODECANE SULFONATE (8:2)	ng/g	-	-	-	-	-	-	-	-	na	0.31 U	na	0.33 U	na	0.29 U	0.27 U
SODIUM 1H,1H,2H,2H-PERFLUOROOCTANE SULFONATE (6:2)	ng/g	-	-	-	-	-	-	-	-	na	0.24 U	na	0.26 U	na	0.22 U	0.21 U
NEtFOSAA	ng/g	-	-	-	-	-	-	-	-	na	0.16 U	na	0.17 U	na	0.15 U	0.14 U
NMeFOSAA	ng/g	-	-	-	-	-	-	-	-	na	0.12 U	na	0.13 U	na	0.11 U	0.3 U
Total Organic Carbon by Lloyd Kahn Method																
Total Organic Carbon	mg/kg	-	-	-	-	-	-	-	-	1970	na	na	2400	na	2240	2060
pH by Standard Method 9045D																
pH	pH units	-	-	-	-	-	-	-	-	8.3	na	na	8.3	na	8	7.8
Volatile Organic Compounds (VOCs) by USEPA Method 8260																
1,1,1-Trichloroethane (TCA)	ug/kg	680	680	100000	100000	500000	1000000	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
1,1,2,2-Tetrachloroethane	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
1,1,2-Trichloroethane	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
1,1-Dichloroethane	ug/kg	270	270	19000	26000	240000	480000	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
1,1-Dichloroethene	ug/kg	330	330	100000	100000	500000	1000000	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
1,2,4-Trichlorobenzene	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
1,2-Dibromo-3-Chloropropane	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
1,2-Dibromoethane (Ethylene Dibromide)	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
1,2-Dichlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
1,2-Dichloroethane	ug/kg	20	20	2300	3100	30000	60000	10000	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
1,2-Dichloropropane	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
1,3-Dichlorobenzene	ug/kg	2400	2400	17000	49000	280000	560000	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
1,4-Dichlorobenzene	ug/kg	1800	1800	9800	13000	130000	250000	20000	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
2-Hexanone	ug/kg	-	-	-	-	-	-	-	-	5600 U	19000 U	84000 U	na	85000 U	na	180000 U
Acetone	ug/kg	50	50	100000	100000	500000	1000000	2200	-	5600 U	19000 U	84000 U	na	85000 U	na	180000 U
Benzene	ug/kg	60	60	2900	4800	44000	89000	70000	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Bromodichloromethane	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Bromoform	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Bromomethane	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Carbon Disulfide	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Carbon Tetrachloride	ug/kg	760	760	1400	2400	22000	44000	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Chlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	40000	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Chloroethane	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Chloroform	ug/kg	370	370	10000	49000	350000	700000	12000	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Chloromethane	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Cis-1,2-Dichloroethylene	ug/kg	250	250	59000	100000	500000	1000000	-	-	1100 U	3800 U	17000 U	na	🟩 6400 J	na	35000 U
Cis-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Cyclohexane	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Dibromochloromethane	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Dichlorodifluoromethane	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Ethylbenzene	ug/kg	1000	1000	30000	41000	390000	780000	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Isopropylbenzene (Cumene)	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Methyl Acetate	ug/kg	-	-	-	-	-	-	-	-	5600 U	19000 U	84000 U	na	85000 U	na	180000 U
Methyl Ethyl Ketone (2-Butanone)	ug/kg	120	120	100000	100000	500000	1000000	100000	-	5600 U	19000 U	84000 U	na	85000 U	na	180000 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	ug/kg	-	-	-	-	-	-	-	-	5600 U	19000 U	84000 U	na	85000 U	na	180000 U
Methylcyclohexane	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Methylene Chloride	ug/kg	50	50	51000	100000	500000	1000000	12000	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Styrene	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Tert-Butyl Methyl Ether	ug/kg	930	930	62000	100000	500000	1000000	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Tetrachloroethylene (PCE)	ug/kg	1300	1300	5500	19000	150000	300000	2000	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Toluene	ug/kg	700	700	100000	100000	500000	1000000	36000	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Trans-1,2-Dichloroethene	ug/kg	190	190	100000	100000	500000	1000000	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Trans-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Trichloroethylene (TCE)	ug/kg	470	470	10000	21000	200000	400000	2000	-	🟧 370000	🟧 220000	🟥 680000	na	🟥 950000	na	🟥 830000
Trichlorofluoromethane	ug/kg	-	-	-	-	-	-	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Vinyl Chloride	ug/kg	20	20	210	900	13000	27000	-	-	1100 U	3800 U	17000 U	na	17000 U	na	35000 U
Xylenes, Total	ug/kg	260	1600	100000	100000	500000	1000000	260	-	2300 U	7600 U	34000 U	na	34000 U	na	71000 U

Notes and Abbreviations

µg/kg - microgram per kilogram
mg/kg - milligrams per kilogram
U - Compound not detected
J - Estimated value
UJ - Estimated Non-Detect
N - Primary sample
FD - Field duplicate sample
ft bgs - Feet below ground surface
na - Sample not analyzed for this parameter
IRM PDI - Interim Remedial Measure Pre-Design Investigation
Shaded value indicates value equal to, or greater than, standard or guidance.
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USEPA Screening Values for PFOA and PFOS developed by USEPA based on the Health Advisory for PFOA and PFOS of 70 nanogr

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⬜	NYS Protection of Ecological Resources SCO

Table A-4
Analytical Results in IRM PDI Soil Samples for PFAS, TOC, pH, and VOCs
Former Oak Materials Fluorglas Division - John Street

									Location ID:	**JS-B-039**	**JS-B-039**	**JS-B-039**	**JS-B-039**	**JS-B-041**	**JS-B-043**	**JS-B-044**
									Sample Date:	**4/20/2018**	**4/20/2018**	**4/20/2018**	**4/20/2018**	**4/18/2018**	**4/18/2018**	**4/19/2018**
									Sample Depth (ft bgs):	**13-14 ft**	**13-15 ft**	**19-20 ft**	**19-20 ft**	**16-18 ft**	**10-12 ft**	**17-19 ft**
									Sample Type:	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Constituent	Units	**NY375 1UNRES**	**NY375 2RPGW**	**NY375 3RRES**	**NY375 4RRRES**	**NY375 5RCOMM**	**NY375 6RINDU**	**NY375 7PER**	**USEPA Screen Value**							
Perfluorinated Alkyl Compounds (PFAS) by USEPA Method 537-1.1 modified																
Perfluorobutanesulfonic acid (PFBS)	ng/g	-	-	-	-	-	-	-	-	na	0.21 U	na	0.21 U	0.23 U	0.21 U	0.2 U
Perfluorobutanoic Acid	ng/g	-	-	-	-	-	-	-	-	na	0.22 U	na	0.23 U	0.25 U	0.23 U	0.21 U
Perfluorodecane Sulfonic Acid	ng/g	-	-	-	-	-	-	-	-	na	0.21 U	na	0.21 U	0.23 U	0.21 U	0.2 U
Perfluorodecanoic acid (PFDA)	ng/g	-	-	-	-	-	-	-	-	na	0.3 J	na	0.29 J	0.28 U	0.29 J	0.24 U
Perfluorododecanoic acid (PFDoA)	ng/g	-	-	-	-	-	-	-	-	na	0.32 U	na	0.33 U	0.36 U	0.32 U	0.31 U
Perfluoroheptane Sulfonate (PFHPS)	ng/g	-	-	-	-	-	-	-	-	na	0.17 U	na	0.18 U	0.19 U	0.18 U	0.17 U
Perfluoroheptanoic acid (PFHpA)	ng/g	-	-	-	-	-	-	-	-	na	0.38 J	na	0.36 J	0.3 U	0.32 J	0.41 J
Perfluorohexanesulfonic acid (PFHxS)	ng/g	-	-	-	-	-	-	-	-	na	0.21 U	na	0.21 U	0.23 U	0.21 U	0.27 J
Perfluorohexanoic acid (PFHxA)	ng/g	-	-	-	-	-	-	-	-	na	0.26 U	na	0.26 U	0.29 U	0.26 U	0.25 U
Perfluorononanoic acid (PFNA)	ng/g	-	-	-	-	-	-	-	-	na	0.28 U	na	0.27 U	0.29 U	0.33 J	0.21 U
Perfluorooctane Sulfonamide (FOSA)	ng/g	-	-	-	-	-	-	-	-	na	0.16 U	na	0.17 U	0.18 U	0.16 U	0.16 U
Perfluorooctanesulfonic acid (PFOS)	ng/g	-	-	-	-	-	-	-	6270	na	0.21 U	na	0.21 U	0.23 U	0.21 U	0.2 U
Perfluorooctanoic acid (PFOA)	ng/g	-	-	-	-	-	-	-	15600	na	0.81 J	na	0.33 J	0.25 U	0.93 J	2.4 J
Perfluoropentanoic Acid (PFPeA)	ng/g	-	-	-	-	-	-	-	-	na	0.23 U	na	0.24 U	0.26 U	0.24 U	0.23 U
Perfluorotetradecanoic acid (PFTA)	ng/g	-	-	-	-	-	-	-	-	na	0.46 U	na	0.47 U	0.52 U	0.47 U	0.45 U
Perfluorotridecanoic Acid (PFTriA)	ng/g	-	-	-	-	-	-	-	-	na	0.2 U	na	0.19 U	0.21 U	0.21 U	0.28 U
Perfluoroundecanoic Acid (PFUnA)	ng/g	-	-	-	-	-	-	-	-	na	0.38 U	na	0.37 U	0.37 J	0.33 U	0.34 U
SODIUM 1H,1H,2H,2H-PERFLUORODECANE SULFONATE (8:2)	ng/g	-	-	-	-	-	-	-	-	na	0.27 U	na	0.28 U	0.3 U	0.27 U	0.26 U
SODIUM 1H,1H,2H,2H-PERFLUOROOCTANE SULFONATE (6:2)	ng/g	-	-	-	-	-	-	-	-	na	0.21 U	na	0.21 U	0.23 U	0.21 U	0.2 U
NEtFOSAA	ng/g	-	-	-	-	-	-	-	-	na	0.14 U	na	0.14 U	0.15 U	0.14 U	0.13 U
NMeFOSAA	ng/g	-	-	-	-	-	-	-	-	na	0.11 U	na	0.11 U	0.14 J	0.52 U	0.099 U
Total Organic Carbon by Lloyd Kahn Method																
Total Organic Carbon	mg/kg	-	-	-	-	-	-	-	-	na	2700	2240	na	2100	2210	2060
pH by Standard Method 9045D																
pH	pH units	-	-	-	-	-	-	-	-	na	7.6	8.1	na	8.5	8	8
Volatile Organic Compounds (VOCs) by USEPA Method 8260																
1,1,1-Trichloroethane (TCA)	ug/kg	680	680	100000	100000	500000	1000000	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
1,1,2,2-Tetrachloroethane	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
1,1,2-Trichloroethane	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
1,1-Dichloroethane	ug/kg	270	270	19000	26000	240000	480000	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
1,1-Dichloroethene	ug/kg	330	330	100000	100000	500000	1000000	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
1,2,4-Trichlorobenzene	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
1,2-Dibromo-3-Chloropropane	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
1,2-Dibromoethane (Ethylene Dibromide)	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
1,2-Dichlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
1,2-Dichloroethane	ug/kg	20	20	2300	3100	30000	60000	10000	-	17000 U	na	6500 U	na	6.3 U	600 U	na
1,2-Dichloropropane	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
1,3-Dichlorobenzene	ug/kg	2400	2400	17000	49000	280000	560000	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
1,4-Dichlorobenzene	ug/kg	1800	1800	9800	13000	130000	250000	20000	-	17000 U	na	6500 U	na	6.3 U	600 U	na
2-Hexanone	ug/kg	-	-	-	-	-	-	-	-	84000 U	na	32000 U	na	32 U	3000 U	na
Acetone	ug/kg	50	50	100000	100000	500000	1000000	2200	-	84000 U	na	32000 U	na	31 J	3000 U	na
Benzene	ug/kg	60	60	2900	4800	44000	89000	70000	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Bromodichloromethane	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Bromoform	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Bromomethane	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Carbon Disulfide	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Carbon Tetrachloride	ug/kg	760	760	1400	2400	22000	44000	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Chlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	40000	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Chloroethane	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Chloroform	ug/kg	370	370	10000	49000	350000	700000	12000	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Chloromethane	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Cis-1,2-Dichloroethylene	ug/kg	250	250	59000	100000	500000	1000000	-	-	17000 U	na	6500 U	na	6.3 U	950	na
Cis-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Cyclohexane	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Dibromochloromethane	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 UJ	600 U	na
Dichlorodifluoromethane	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Ethylbenzene	ug/kg	1000	1000	30000	41000	390000	780000	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Isopropylbenzene (Cumene)	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Methyl Acetate	ug/kg	-	-	-	-	-	-	-	-	84000 U	na	32000 U	na	32 U	3000 U	na
Methyl Ethyl Ketone (2-Butanone)	ug/kg	120	120	100000	100000	500000	1000000	100000	-	84000 U	na	32000 U	na	32 U	3000 U	na
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	ug/kg	-	-	-	-	-	-	-	-	84000 U	na	32000 U	na	32 U	3000 U	na
Methylcyclohexane	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Methylene Chloride	ug/kg	50	50	51000	100000	500000	1000000	12000	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Styrene	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Tert-Butyl Methyl Ether	ug/kg	930	930	62000	100000	500000	1000000	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Tetrachloroethylene (PCE)	ug/kg	1300	1300	5500	19000	150000	300000	2000	-	17000 U	na	6500 U	na	6.3 UJ	21000	na
Toluene	ug/kg	700	700	100000	100000	500000	1000000	36000	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Trans-1,2-Dichloroethene	ug/kg	190	190	100000	100000	500000	1000000	-	-	17000 U	na	6500 U	na	6.3 UJ	600 U	na
Trans-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Trichloroethylene (TCE)	ug/kg	470	470	10000	21000	200000	400000	2000	-	1300000	na	190000	na	6.3 U	14000	na
Trichlorofluoromethane	ug/kg	-	-	-	-	-	-	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Vinyl Chloride	ug/kg	20	20	210	900	13000	27000	-	-	17000 U	na	6500 U	na	6.3 U	600 U	na
Xylenes, Total	ug/kg	260	1600	100000	100000	500000	1000000	260	-	34000 U	na	13000 U	na	13 UJ	1200 U	na

Notes and Abbreviations
µg/kg - microgram per kilogram
mg/kg - milligrams per kilogram
U - Compound not detected
J - Estimated value
UJ - Estimated Non-Detect
N - Primary sample
FD - Field duplicate sample
ft bgs - Feet below ground surface
na - Sample not analyzed for this parameter
IRM PDI - Interim Remedial Measure Pre-Design Investigation
Shaded value indicates value equal to, or greater than, standard or guidance.
NY Part 375 = NYS Soil Cleanup Objective (SCO) in Title 6 of Official Compilation of New York Codes, Rules and Regulations (6 NYC
USEPA Screening Values for PFOA and PFOS developed by USEPA based on the Health Advisory for PFOA and PFOS of 70 nanogra

🟨	NYS Unrestricted Use SCO
🟩	NYS Protection of Groundwater SCO
🟦	NYS Residential Use SCO
🟪	NYS Restricted Residential SCO
🟧	NYS Commercial Use SCO
🟥	NYS Industrial Use SCO
⬜	NYS Protection of Ecological Resources SCO

Table A-4
Analytical Results in IRM PDI Soil Samples for PFAS, TOC, pH, and VOCs
Former Oak Materials Fluorglas Division - John Street

									Location ID:	**JS-B-044**	**JS-B-044**	**JS-B-046**	**JS-B-047**	**JS-B-047**	**JS-B-048**	**JS-B-048**
									Sample Date:	**4/19/2018**	**4/30/2018**	**4/19/2018**	**4/19/2018**	**4/19/2018**	**4/23/2018**	**4/23/2018**
									Sample Depth (ft bgs):	**18-19 ft**	**18-19 ft**	**12-14 ft**	**4-6 ft**	**10-12 ft**	**10-11 ft**	**10-12 ft**
									Sample Type:	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Constituent	Units	**NY375 1UNRES**	**NY375 2RPGW**	**NY375 3RRES**	**NY375 4RRRES**	**NY375 5RCOMM**	**NY375 6RINDU**	**NY375 7PER**	**USEPA Screen Value**							
Perfluorinated Alkyl Compounds (PFAS) by USEPA Method 537-1.1 modified																
Perfluorobutanesulfonic acid (PFBS)	ng/g	-	-	-	-	-	-	-	-	na	na	0.21 U	0.17 U	0.22 U	na	0.22 U
Perfluorobutanoic Acid	ng/g	-	-	-	-	-	-	-	-	na	na	0.22 U	0.18 U	0.23 U	na	0.23 U
Perfluorodecane Sulfonic Acid	ng/g	-	-	-	-	-	-	-	-	na	na	0.21 U	0.17 U	0.22 U	na	0.22 U
Perfluorodecanoic acid (PFDA)	ng/g	-	-	-	-	-	-	-	-	na	na	0.27 J	0.24 J	0.27 J	na	0.26 U
Perfluorododecanoic acid (PFDoA)	ng/g	-	-	-	-	-	-	-	-	na	na	0.31 U	0.26 U	0.33 U	na	0.34 U
Perfluoroheptane Sulfonate (PFHPS)	ng/g	-	-	-	-	-	-	-	-	na	na	0.17 U	0.14 U	0.18 U	na	0.18 U
Perfluoroheptanoic acid (PFHpA)	ng/g	-	-	-	-	-	-	-	-	na	na	0.31 J	0.34 J	0.28 U	na	0.34 J
Perfluorohexanesulfonic acid (PFHxS)	ng/g	-	-	-	-	-	-	-	-	na	na	0.21 U	0.17 U	0.22 U	na	0.22 U
Perfluorohexanoic acid (PFHxA)	ng/g	-	-	-	-	-	-	-	-	na	na	0.25 U	0.21 U	0.27 U	na	0.27 U
Perfluorononanoic acid (PFNA)	ng/g	-	-	-	-	-	-	-	-	na	na	0.29 J	0.19 J	0.23 U	na	0.25 J
Perfluorooctane Sulfonamide (FOSA)	ng/g	-	-	-	-	-	-	-	-	na	na	0.16 U	0.13 U	0.17 U	na	0.17 U
Perfluorooctanesulfonic acid (PFOS)	ng/g	-	-	-	-	-	-	-	6270	na	na	0.21 U	0.17 U	0.22 U	na	0.22 U
Perfluorooctanoic acid (PFOA)	ng/g	-	-	-	-	-	-	-	15600	na	na	0.94 J	9.3	1.3 J	na	1.2 J
Perfluoropentanoic Acid (PFPeA)	ng/g	-	-	-	-	-	-	-	-	na	na	0.23 U	0.19 U	0.24 U	na	0.25 U
Perfluorotetradecanoic acid (PFTA)	ng/g	-	-	-	-	-	-	-	-	na	na	0.46 U	0.38 U	0.48 U	na	0.49 U
Perfluorotridecanoic Acid (PFTriA)	ng/g	-	-	-	-	-	-	-	-	na	na	0.21 U	0.15 U	0.19 U	na	0.2 U
Perfluoroundecanoic Acid (PFUnA)	ng/g	-	-	-	-	-	-	-	-	na	na	0.35 U	0.31 U	0.33 U	na	0.32 U
SODIUM 1H,1H,2H,2H-PERFLUORODECANE SULFONATE (8:2)	ng/g	-	-	-	-	-	-	-	-	na	na	0.27 U	0.22 U	0.28 U	na	0.29 U
SODIUM 1H,1H,2H,2H-PERFLUOROOCTANE SULFONATE (6:2)	ng/g	-	-	-	-	-	-	-	-	na	na	0.21 U	0.17 U	0.22 U	na	0.22 U
NEtFOSAA	ng/g	-	-	-	-	-	-	-	-	na	na	0.14 U	0.11 U	0.14 U	na	0.48 J
NMeFOSAA	ng/g	-	-	-	-	-	-	-	-	na	na	0.55 U	0.25 U	0.11 U	na	0.31 U
Total Organic Carbon by Lloyd Kahn Method																
Total Organic Carbon	mg/kg	-	-	-	-	-	-	-	-	na	na	1930	55700	3770	na	3220
pH by Standard Method 9045D																
pH	pH units	-	-	-	-	-	-	-	-	na	8.1	8.3	7.8	8.3	na	8.2
Volatile Organic Compounds (VOCs) by USEPA Method 8260																
1,1,1-Trichloroethane (TCA)	ug/kg	680	680	100000	100000	500000	1000000	-	-	1400 U	na	160 U	3500 J	160 U	7.4 U	na
1,1,2,2-Tetrachloroethane	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
1,1,2-Trichloroethane	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
1,1-Dichloroethane	ug/kg	270	270	19000	26000	240000	480000	-	-	2700 J	na	550	8300 U	160 U	3.7 J	na
1,1-Dichloroethene	ug/kg	330	330	100000	100000	500000	1000000	-	-	730 J	na	160 U	8300 U	160 U	6.8 J	na
1,2,4-Trichlorobenzene	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
1,2-Dibromo-3-Chloropropane	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
1,2-Dibromoethane (Ethylene Dibromide)	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
1,2-Dichlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
1,2-Dichloroethane	ug/kg	20	20	2300	3100	30000	60000	10000	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
1,2-Dichloropropane	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
1,3-Dichlorobenzene	ug/kg	2400	2400	17000	49000	280000	560000	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
1,4-Dichlorobenzene	ug/kg	1800	1800	9800	13000	130000	250000	20000	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
2-Hexanone	ug/kg	-	-	-	-	-	-	-	-	7200 U	na	800 U	42000 U	820 U	37 U	na
Acetone	ug/kg	50	50	100000	100000	500000	1000000	2200	-	7200 U	na	800 U	42000 U	820 U	37 U	na
Benzene	ug/kg	60	60	2900	4800	44000	89000	70000	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Bromodichloromethane	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Bromoform	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Bromomethane	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Carbon Disulfide	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Carbon Tetrachloride	ug/kg	760	760	1400	2400	22000	44000	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Chlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	40000	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Chloroethane	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Chloroform	ug/kg	370	370	10000	49000	350000	700000	12000	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Chloromethane	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Cis-1,2-Dichloroethylene	ug/kg	250	250	59000	100000	500000	1000000	-	-	1400 U	na	160 U	4900 J	1200	40	na
Cis-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Cyclohexane	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Dibromochloromethane	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Dichlorodifluoromethane	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Ethylbenzene	ug/kg	1000	1000	30000	41000	390000	780000	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Isopropylbenzene (Cumene)	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Methyl Acetate	ug/kg	-	-	-	-	-	-	-	-	7200 U	na	800 U	42000 U	820 U	37 U	na
Methyl Ethyl Ketone (2-Butanone)	ug/kg	120	120	100000	100000	500000	1000000	100000	-	7200 U	na	800 U	42000 U	820 U	37 U	na
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	ug/kg	-	-	-	-	-	-	-	-	7200 U	na	800 U	42000 U	820 U	37 U	na
Methylcyclohexane	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Methylene Chloride	ug/kg	50	50	51000	100000	500000	1000000	12000	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Styrene	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Tert-Butyl Methyl Ether	ug/kg	930	930	62000	100000	500000	1000000	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Tetrachloroethylene (PCE)	ug/kg	1300	1300	5500	19000	150000	300000	2000	-	1400 U	na	160 U	8300 U	180	3.2 J	na
Toluene	ug/kg	700	700	100000	100000	500000	1000000	36000	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Trans-1,2-Dichloroethene	ug/kg	190	190	100000	100000	500000	1000000	-	-	1400 U	na	160 U	8300 U	64 J	2.3 J	na
Trans-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Trichloroethylene (TCE)	ug/kg	470	470	10000	21000	200000	400000	2000	-	73000	na	670	260000	28000	73000	na
Trichlorofluoromethane	ug/kg	-	-	-	-	-	-	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Vinyl Chloride	ug/kg	20	20	210	900	13000	27000	-	-	1400 U	na	160 U	8300 U	160 U	7.4 U	na
Xylenes, Total	ug/kg	260	1600	100000	100000	500000	1000000	260	-	2900 U	na	320 U	17000 U	330 U	15 U	na

Notes and Abbreviations

µg/kg - microgram per kilogram
mg/kg - milligrams per kilogram
U - Compound not detected
J - Estimated value
UJ - Estimated Non-Detect
N - Primary sample
FD - Field duplicate sample
ft bgs - Feet below ground surface
na - Sample not analyzed for this parameter
IRM PDI - Interim Remedial Measure Pre-Design Investigation
Shaded value indicates value equal to, or greater than, standard or guidance.
NY Part 375 = NYS Soil Cleanup Objective (SCO) in Title 6 of Official Compilation of New York Codes, Rules and Regulations (6 NY
USEPA Screening Values for PFOA and PFOS developed by USEPA based on the Health Advisory for PFOA and PFOS of 70 nanogra

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🟥	NYS Industrial Use SCO
⬜	NYS Protection of Ecological Resources SCO

Table A-4
Analytical Results in IRM PDI Soil Samples for PFAS, TOC, pH, and VOCs
Former Oak Materials Fluorglas Division - John Street

									Location ID:	JS-B-049	JS-B-049	JS-B-050	JS-B-052	JS-B-052	JS-B-052	JS-B-052
									Sample Date:	4/23/2018	4/23/2018	4/24/2018	4/30/2018	4/30/2018	4/30/2018	4/30/2018
									Sample Depth (ft bgs):	14-16 ft	15-16 ft	13-14 ft	8-9 ft	8-10 ft	10-12 ft	10-12 ft
									Sample Type:	N	N	N	N	N	N	N
Constituent	Units	NY375 1UNRES	NY375 2RPGW	NY375 3RRES	NY375 4RRRES	NY375 5RCOMM	NY375 6RINDU	NY375 7PER	USEPA Screen Value							
Perfluorinated Alkyl Compounds (PFAS) by USEPA Method 537-1.1 modified																
Perfluorobutanesulfonic acid (PFBS)	ng/g	-	-	-	-	-	-	-	-	0.22 U	na	0.19 U	na	0.2 U	na	0.19 U
Perfluorobutanoic Acid	ng/g	-	-	-	-	-	-	-	-	0.23 U	na	0.2 U	na	0.21 U	na	0.2 U
Perfluorodecane Sulfonic Acid	ng/g	-	-	-	-	-	-	-	-	0.22 U	na	0.19 U	na	0.2 U	na	0.19 U
Perfluorodecanoic acid (PFDA)	ng/g	-	-	-	-	-	-	-	-	0.28 J	na	0.22 U	na	0.24 U	na	0.24 J
Perfluorododecanoic acid (PFDoA)	ng/g	-	-	-	-	-	-	-	-	0.33 U	na	0.28 U	na	0.31 U	na	0.29 U
Perfluoroheptane Sulfonate (PFHPS)	ng/g	-	-	-	-	-	-	-	-	0.18 U	na	0.15 U	na	0.17 U	na	0.16 U
Perfluoroheptanoic acid (PFHpA)	ng/g	-	-	-	-	-	-	-	-	0.33 J	na	0.25 J	na	0.32 U	na	0.31 U
Perfluorohexanesulfonic acid (PFHxS)	ng/g	-	-	-	-	-	-	-	-	0.22 U	na	0.22 J	na	0.2 U	na	0.19 U
Perfluorohexanoic acid (PFHxA)	ng/g	-	-	-	-	-	-	-	-	0.27 U	na	0.23 U	na	0.25 U	na	0.23 U
Perfluorononanoic acid (PFNA)	ng/g	-	-	-	-	-	-	-	-	0.24 J	na	0.23 J	na	0.3 U	na	0.27 U
Perfluorooctane Sulfonamide (FOSA)	ng/g	-	-	-	-	-	-	-	-	0.17 U	na	0.14 U	na	0.16 U	na	0.15 U
Perfluorooctanesulfonic acid (PFOS)	ng/g	-	-	-	-	-	-	-	6270	0.22 U	na	0.19 U	na	0.2 U	na	0.19 U
Perfluorooctanoic acid (PFOA)	ng/g	-	-	-	-	-	-	-	15600	0.31 J	na	0.52 J	na	1.7	na	0.77 J
Perfluoropentanoic Acid (PFPeA)	ng/g	-	-	-	-	-	-	-	-	0.24 U	na	0.21 U	na	0.23 U	na	0.21 U
Perfluorotetradecanoic acid (PFTA)	ng/g	-	-	-	-	-	-	-	-	0.48 U	na	0.41 U	na	0.45 U	na	0.41 U
Perfluorotridecanoic Acid (PFTriA)	ng/g	-	-	-	-	-	-	-	-	0.19 U	na	0.16 U	na	0.18 U	na	0.17 U
Perfluoroundecanoic Acid (PFUnA)	ng/g	-	-	-	-	-	-	-	-	0.37 U	na	0.27 U	na	0.3 U	na	0.27 U
SODIUM 1H,1H,2H,2H-PERFLUORODECANE SULFONATE (8:2)	ng/g	-	-	-	-	-	-	-	-	0.28 U	na	0.24 U	na	0.26 U	na	0.24 U
SODIUM 1H,1H,2H,2H-PERFLUOROOCTANE SULFONATE (6:2)	ng/g	-	-	-	-	-	-	-	-	0.22 U	na	0.19 U	na	0.2 U	na	0.19 U
NEtFOSAA	ng/g	-	-	-	-	-	-	-	-	0.14 U	na	0.12 U	na	0.13 U	na	0.12 U
NMeFOSAA	ng/g	-	-	-	-	-	-	-	-	0.35 U	na	0.091 U	na	0.099 U	na	0.092 U
Total Organic Carbon by Lloyd Kahn Method																
Total Organic Carbon	mg/kg	-	-	-	-	-	-	-	-	2670 J	na	3230	na	3060	30400	na
pH by Standard Method 9045D																
pH	pH units	-	-	-	-	-	-	-	-	8.1	na	8	na	8.1	7.7	na
Volatile Organic Compounds (VOCs) by USEPA Method 8260																
1,1,1-Trichloroethane (TCA)	ug/kg	680	680	100000	100000	500000	1000000	-	-	na	27000 U	27000 U	3 J	na	8.7 U	na
1,1,2,2-Tetrachloroethane	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
1,1,2-Trichloroethane	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
1,1-Dichloroethane	ug/kg	270	270	19000	26000	240000	480000	-	-	na	27000 U	27000 U	3.6 J	na	4.8 J	na
1,1-Dichloroethene	ug/kg	330	330	100000	100000	500000	1000000	-	-	na	27000 U	27000 U	0.82 J	na	5.8 J	na
1,2,4-Trichlorobenzene	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
1,2-Dibromo-3-Chloropropane	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
1,2-Dibromoethane (Ethylene Dibromide)	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
1,2-Dichlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
1,2-Dichloroethane	ug/kg	20	20	2300	3100	30000	60000	10000	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
1,2-Dichloropropane	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
1,3-Dichlorobenzene	ug/kg	2400	2400	17000	49000	280000	560000	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
1,4-Dichlorobenzene	ug/kg	1800	1800	9800	13000	130000	250000	20000	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
2-Hexanone	ug/kg	-	-	-	-	-	-	-	-	na	130000 U	130000 U	22 U	na	43 U	na
Acetone	ug/kg	50	50	100000	100000	500000	1000000	2200	-	na	130000 U	130000 U	39	na	23 J	na
Benzene	ug/kg	60	60	2900	4800	44000	89000	70000	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Bromodichloromethane	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Bromoform	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Bromomethane	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Carbon Disulfide	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Carbon Tetrachloride	ug/kg	760	760	1400	2400	22000	44000	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Chlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	40000	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Chloroethane	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Chloroform	ug/kg	370	370	10000	49000	350000	700000	12000	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Chloromethane	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Cis-1,2-Dichloroethylene	ug/kg	250	250	59000	100000	500000	1000000	-	-	na	9800 J	27000 U	5.1	na	15	na
Cis-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Cyclohexane	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Dibromochloromethane	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Dichlorodifluoromethane	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Ethylbenzene	ug/kg	1000	1000	30000	41000	390000	780000	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Isopropylbenzene (Cumene)	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	1.2 J	na	8.7 U	na
Methyl Acetate	ug/kg	-	-	-	-	-	-	-	-	na	130000 U	130000 U	22 U	na	43 U	na
Methyl Ethyl Ketone (2-Butanone)	ug/kg	120	120	100000	100000	500000	1000000	100000	-	na	130000 U	130000 U	4.2 J	na	43 U	na
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	ug/kg	-	-	-	-	-	-	-	-	na	130000 U	130000 U	22 U	na	43 U	na
Methylcyclohexane	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Methylene Chloride	ug/kg	50	50	51000	100000	500000	1000000	12000	-	na	27000 U	27000 U	2.2 J	na	4.6 J	na
Styrene	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Tert-Butyl Methyl Ether	ug/kg	930	930	62000	100000	500000	1000000	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Tetrachloroethylene (PCE)	ug/kg	1300	1300	5500	19000	150000	300000	2000	-	na	27000 U	27000 U	2.8 J	na	8.7 U	na
Toluene	ug/kg	700	700	100000	100000	500000	1000000	36000	-	na	27000 U	27000 U	0.74 J	na	8.7 U	na
Trans-1,2-Dichloroethene	ug/kg	190	190	100000	100000	500000	1000000	-	-	na	27000 U	27000 U	0.92 J	na	1.2 J	na
Trans-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 U	na	8.7 U	na
Trichloroethylene (TCE)	ug/kg	470	470	10000	21000	200000	400000	2000	-	na	950000	980000	23	na	11000	na
Trichlorofluoromethane	ug/kg	-	-	-	-	-	-	-	-	na	27000 U	27000 U	4.5 UJ	na	8.7 UJ	na
Vinyl Chloride	ug/kg	20	20	210	900	13000	27000	-	-	na	27000 U	27000 U	2.5 J	na	2.2 J	na
Xylenes, Total	ug/kg	260	1600	100000	100000	500000	1000000	260	-	na	53000 U	54000 U	3.3 J	na	17 U	na

Notes and Abbreviations
µg/kg - microgram per kilogram
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U - Compound not detected
J - Estimated value
UJ - Estimated Non-Detect
N - Primary sample
FD - Field duplicate sample
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Shaded value indicates value equal to, or greater than, standard or guidance.
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USEPA Screening Values for PFOA and PFOS developed by USEPA based on the Health Advisory for PFOA and PFOS of 70 nanogra

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Table A-4
Analytical Results in IRM PDI Soil Samples for PFAS, TOC, pH, and VOCs
Former Oak Materials Fluorglas Division - John Street

									Location ID:	**JS-B-053**	**JS-B-054**	**JS-B-054**	**JS-B-055**	**JS-B-056**	**JS-B-056**	**JS-B-056**
									Sample Date:	**4/24/2018**	**4/25/2018**	**4/25/2018**	**5/1/2018**	**5/1/2018**	**5/1/2018**	**5/1/2018**
									Sample Depth (ft bgs):	**13-14 ft**	**10-12 ft**	**11-12 ft**	**5-7 ft**	**8.5-9.5 ft**	**8.5-9.5 ft**	**9.5-10 ft**
									Sample Type:	**N**	**N**	**N**	**N**	**N**	**SP**	**N**
Constituent	Units	**NY375 1UNRES**	**NY375 2RPGW**	**NY375 3RRES**	**NY375 4RRRES**	**NY375 5RCOMM**	**NY375 6RINDU**	**NY375 7PER**	**USEPA Screen Value**							
Perfluorinated Alkyl Compounds (PFAS) by USEPA Method 537-1.1 modified																
Perfluorobutanesulfonic acid (PFBS)	ng/g	-	-	-	-	-	-	-	-	0.21 U	0.23 U	na	0.2 U	0.2 U	0.24 U	0.22 U
Perfluorobutanoic Acid	ng/g	-	-	-	-	-	-	-	-	0.22 U	0.25 U	na	0.21 U	0.21 U	0.24 U	0.23 U
Perfluorodecane Sulfonic Acid	ng/g	-	-	-	-	-	-	-	-	0.21 U	0.23 U	na	0.2 U	0.2 U	0.35 U	0.22 U
Perfluorodecanoic acid (PFDA)	ng/g	-	-	-	-	-	-	-	-	0.25 U	0.27 U	na	0.92 U	0.24 U	0.24 U	0.26 U
Perfluorododecanoic acid (PFDoA)	ng/g	-	-	-	-	-	-	-	-	0.32 U	0.35 U	na	0.3 U	0.31 U	0.24 U	0.34 U
Perfluoroheptane Sulfonate (PFHPS)	ng/g	-	-	-	-	-	-	-	-	0.17 U	0.19 U	na	0.16 U	0.17 U	0.24 U	0.18 U
Perfluoroheptanoic acid (PFHpA)	ng/g	-	-	-	-	-	-	-	-	0.34 J	0.35 J	na	0.25 U	0.3 U	0.24 U	0.35 U
Perfluorohexanesulfonic acid (PFHxS)	ng/g	-	-	-	-	-	-	-	-	0.4 J	0.23 U	na	0.2 U	0.2 U	0.24 U	0.22 U
Perfluorohexanoic acid (PFHxA)	ng/g	-	-	-	-	-	-	-	-	0.26 U	0.29 U	na	0.24 U	0.25 U	0.24 U	0.27 U
Perfluorononanoic acid (PFNA)	ng/g	-	-	-	-	-	-	-	-	0.22 U	0.28 U	na	0.35 U	0.32 U	0.24 U	0.27 U
Perfluorooctane Sulfonamide (FOSA)	ng/g	-	-	-	-	-	-	-	-	0.17 J	0.18 U	na	0.15 U	0.16 U	0.24 U	0.17 U
Perfluorooctanesulfonic acid (PFOS)	ng/g	-	-	-	-	-	-	-	6270	0.21 U	0.23 U	na	0.25 J	0.2 U	0.35 U	0.22 U
Perfluorooctanoic acid (PFOA)	ng/g	-	-	-	-	-	-	-	15600	0.45 J	1.4	na	13	1.5	0.81 J	1.5
Perfluoropentanoic Acid (PFPeA)	ng/g	-	-	-	-	-	-	-	-	0.24 U	0.26 U	na	0.22 U	0.23 U	0.24 UJ	0.25 U
Perfluorotetradecanoic acid (PFTA)	ng/g	-	-	-	-	-	-	-	-	0.47 U	0.51 U	na	0.43 U	0.45 U	0.24 U	0.49 U
Perfluorotridecanoic Acid (PFTriA)	ng/g	-	-	-	-	-	-	-	-	0.21 U	0.21 U	na	0.27 U	0.24 J	0.24 U	0.2 U
Perfluoroundecanoic Acid (PFUnA)	ng/g	-	-	-	-	-	-	-	-	0.44 U	0.38 U	na	0.29 U	0.3 U	0.24 U	0.32 U
SODIUM 1H,1H,2H,2H-PERFLUORODECANE SULFONATE (8:2)	ng/g	-	-	-	-	-	-	-	-	0.27 U	0.3 U	na	0.25 U	0.26 U	0.71 U	0.28 U
SODIUM 1H,1H,2H,2H-PERFLUOROOCTANE SULFONATE (6:2)	ng/g	-	-	-	-	-	-	-	-	0.21 U	0.23 U	na	0.2 U	0.2 U	0.71 U	0.22 U
NEtFOSAA	ng/g	-	-	-	-	-	-	-	-	0.14 U	0.15 U	na	0.13 U	0.13 U	0.59 U	0.14 U
NMeFOSAA	ng/g	-	-	-	-	-	-	-	-	0.32 U	0.12 U	na	0.096 U	0.099 U	0.59 U	0.11 U
Total Organic Carbon by Lloyd Kahn Method																
Total Organic Carbon	mg/kg	-	-	-	-	-	-	-	-	2620	2790	na	na	1810	na	2430
pH by Standard Method 9045D																
pH	pH units	-	-	-	-	-	-	-	-	8.2	8	na	na	8.3	na	8.3
Volatile Organic Compounds (VOCs) by USEPA Method 8260																
1,1,1-Trichloroethane (TCA)	ug/kg	680	680	100000	100000	500000	1000000	-	-	13000 U	na	1900 U	1.5 J	7.1 U	na	78 U
1,1,2,2-Tetrachloroethane	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
1,1,2-Trichloroethane	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
1,1-Dichloroethane	ug/kg	270	270	19000	26000	240000	480000	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
1,1-Dichloroethene	ug/kg	330	330	100000	100000	500000	1000000	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
1,2,4-Trichlorobenzene	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
1,2-Dibromo-3-Chloropropane	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
1,2-Dibromoethane (Ethylene Dibromide)	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
1,2-Dichlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
1,2-Dichloroethane	ug/kg	20	20	2300	3100	30000	60000	10000	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
1,2-Dichloropropane	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
1,3-Dichlorobenzene	ug/kg	2400	2400	17000	49000	280000	560000	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
1,4-Dichlorobenzene	ug/kg	1800	1800	9800	13000	130000	250000	20000	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
2-Hexanone	ug/kg	-	-	-	-	-	-	-	-	65000 U	na	9500 U	19 U	36 U	na	390 U
Acetone	ug/kg	50	50	100000	100000	500000	1000000	2200	-	65000 U	na	9500 U	14 J	32 J	na	390 U
Benzene	ug/kg	60	60	2900	4800	44000	89000	70000	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Bromodichloromethane	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Bromoform	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Bromomethane	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Carbon Disulfide	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Carbon Tetrachloride	ug/kg	760	760	1400	2400	22000	44000	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Chlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	40000	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Chloroethane	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 UJ
Chloroform	ug/kg	370	370	10000	49000	350000	700000	12000	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Chloromethane	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 UJ
Cis-1,2-Dichloroethylene	ug/kg	250	250	59000	100000	500000	1000000	-	-	13000 U	na	2400	0.97 J	3 J	na	59 J
Cis-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Cyclohexane	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Dibromochloromethane	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Dichlorodifluoromethane	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 UJ
Ethylbenzene	ug/kg	1000	1000	30000	41000	390000	780000	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Isopropylbenzene (Cumene)	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Methyl Acetate	ug/kg	-	-	-	-	-	-	-	-	65000 U	na	9500 U	19 U	11 J	na	390 U
Methyl Ethyl Ketone (2-Butanone)	ug/kg	120	120	100000	100000	500000	1000000	100000	-	65000 U	na	9500 U	19 U	36 U	na	390 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	ug/kg	-	-	-	-	-	-	-	-	65000 U	na	9500 U	19 U	36 U	na	390 U
Methylcyclohexane	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Methylene Chloride	ug/kg	50	50	51000	100000	500000	1000000	12000	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Styrene	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Tert-Butyl Methyl Ether	ug/kg	930	930	62000	100000	500000	1000000	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Tetrachloroethylene (PCE)	ug/kg	1300	1300	5500	19000	150000	300000	2000	-	13000 U	na	1900 U	0.52 J	7.1 U	na	78 U
Toluene	ug/kg	700	700	100000	100000	500000	1000000	36000	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Trans-1,2-Dichloroethene	ug/kg	190	190	100000	100000	500000	1000000	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Trans-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 U
Trichloroethylene (TCE)	ug/kg	470	470	10000	21000	200000	400000	2000	-	380000	na	67000	47	11	na	150
Trichlorofluoromethane	ug/kg	-	-	-	-	-	-	-	-	13000 U	na	1900 U	3.9 UJ	7.1 U	na	78 UJ
Vinyl Chloride	ug/kg	20	20	210	900	13000	27000	-	-	13000 U	na	1900 U	3.9 U	7.1 U	na	78 UJ
Xylenes, Total	ug/kg	260	1600	100000	100000	500000	1000000	260	-	26000 U	na	3800 U	7.8 U	14 U	na	160 U

Notes and Abbreviations

µg/kg - microgram per kilogram
mg/kg - milligrams per kilogram
U - Compound not detected
J - Estimated value
UJ - Estimated Non-Detect
N - Primary sample
FD - Field duplicate sample
ft bgs - Feet below ground surface
na - Sample not analyzed for this parameter
IRM PDI - Interim Remedial Measure Pre-Design Investigation
Shaded value indicates value equal to, or greater than, standard or guidance.
NY Part 375 = NYS Soil Cleanup Objective (SCO) in Title 6 of Official Compilation of New York Codes, Rules and Regulations (6 NY
USEPA Screening Values for PFOA and PFOS developed by USEPA based on the Health Advisory for PFOA and PFOS of 70 nanogra

🟨	NYS Unrestricted Use SCO
🟩	NYS Protection of Groundwater SCO
🟦	NYS Residential Use SCO
🟪	NYS Restricted Residential SCO
🟧	NYS Commercial Use SCO
🟥	NYS Industrial Use SCO
⬜	NYS Protection of Ecological Resources SCO

Table A-4
Analytical Results in IRM PDI Soil Samples for PFAS, TOC, pH, and VOCs
Former Oak Materials Fluorglas Division - John Street

									Location ID:	**JS-B-056**	**JS-B-056**	**JS-B-057**	**JS-B-057**	**JS-B-057**	**JS-B-057**	**JS-B-057**
									Sample Date:	**5/1/2018**	**5/1/2018**	**5/1/2018**	**5/1/2018**	**5/1/2018**	**5/1/2018**	**5/1/2018**
									Sample Depth (ft bgs):	**10-11 ft**	**44-44.5 ft**	**10-10.5 ft**	**10.5-11 ft**	**11-12 ft**	**42-44 ft**	**42-44 ft**
									Sample Type:	**N**	**N**	**N**	**N**	**N**	**N**	**FD**
Constituent	Units	**NY375 1UNRES**	**NY375 2RPGW**	**NY375 3RRES**	**NY375 4RRRES**	**NY375 5RCOMM**	**NY375 6RINDU**	**NY375 7PER**	**USEPA Screen Value**							
Perfluorinated Alkyl Compounds (PFAS) by USEPA Method 537-1.1 modified																
Perfluorobutanesulfonic acid (PFBS)	ng/g	-	-	-	-	-	-	-	-	0.24 U	0.17 U	0.19 U	0.23 U	0.21 U	0.19 U	0.21 U
Perfluorobutanoic Acid	ng/g	-	-	-	-	-	-	-	-	0.26 U	0.18 U	0.2 U	0.25 U	0.22 U	0.2 U	0.22 U
Perfluorodecane Sulfonic Acid	ng/g	-	-	-	-	-	-	-	-	0.24 U	0.17 U	0.19 U	0.23 U	0.21 U	0.19 U	0.21 U
Perfluorodecanoic acid (PFDA)	ng/g	-	-	-	-	-	-	-	-	0.31 U	0.2 U	0.24 U	0.33 U	0.28 U	0.28 U	0.29 U
Perfluorododecanoic acid (PFDoA)	ng/g	-	-	-	-	-	-	-	-	0.37 U	0.26 U	0.28 U	0.35 U	0.32 U	0.29 U	0.32 U
Perfluoroheptane Sulfonate (PFHPS)	ng/g	-	-	-	-	-	-	-	-	0.2 U	0.14 U	0.15 U	0.19 U	0.18 U	0.16 U	0.17 U
Perfluoroheptanoic acid (PFHpA)	ng/g	-	-	-	-	-	-	-	-	0.43 U	0.29 U	0.24 U	0.32 U	0.32 U	0.25 U	0.32 U
Perfluorohexanesulfonic acid (PFHxS)	ng/g	-	-	-	-	-	-	-	-	0.24 U	0.17 U	0.19 J	0.23 U	0.21 U	0.19 U	0.21 U
Perfluorohexanoic acid (PFHxA)	ng/g	-	-	-	-	-	-	-	-	0.3 U	0.21 U	0.23 U	0.29 U	0.26 U	0.23 U	0.26 U
Perfluorononanoic acid (PFNA)	ng/g	-	-	-	-	-	-	-	-	0.33 U	0.24 U	0.22 U	0.35 U	0.31 U	0.26 U	0.32 U
Perfluorooctane Sulfonamide (FOSA)	ng/g	-	-	-	-	-	-	-	-	0.19 U	0.13 U	0.14 U	0.18 U	0.16 U	0.15 U	0.16 U
Perfluorooctanesulfonic acid (PFOS)	ng/g	-	-	-	-	-	-	-	6270	0.24 U	0.17 U	0.19 U	0.23 U	0.21 U	0.19 U	0.21 U
Perfluorooctanoic acid (PFOA)	ng/g	-	-	-	-	-	-	-	15600	7.3	7.5	0.2 U	0.25 U	0.22 U	0.2 U	0.22 U
Perfluoropentanoic Acid (PFPeA)	ng/g	-	-	-	-	-	-	-	-	0.27 U	0.19 U	0.21 U	0.26 U	0.24 U	0.21 U	0.23 U
Perfluorotetradecanoic acid (PFTA)	ng/g	-	-	-	-	-	-	-	-	0.53 U	0.38 U	0.41 U	0.51 U	0.47 U	0.42 U	0.46 U
Perfluorotridecanoic Acid (PFTriA)	ng/g	-	-	-	-	-	-	-	-	0.21 U	0.25 J	0.18 J	0.21 U	0.19 U	0.17 U	0.34 J
Perfluoroundecanoic Acid (PFUnA)	ng/g	-	-	-	-	-	-	-	-	0.35 U	0.25 U	0.27 U	0.34 U	0.31 U	0.28 U	0.3 U
SODIUM 1H,1H,2H,2H-PERFLUORODECANE SULFONATE (8:2)	ng/g	-	-	-	-	-	-	-	-	0.31 U	0.22 U	0.24 U	0.3 U	0.27 U	0.24 U	0.27 U
SODIUM 1H,1H,2H,2H-PERFLUOROOCTANE SULFONATE (6:2)	ng/g	-	-	-	-	-	-	-	-	0.24 U	0.17 U	0.19 U	0.23 U	0.21 U	0.19 U	0.21 U
NEtFOSAA	ng/g	-	-	-	-	-	-	-	-	0.16 U	0.11 U	0.12 U	0.15 U	0.14 U	0.12 U	0.14 U
NMeFOSAA	ng/g	-	-	-	-	-	-	-	-	0.12 U	0.085 U	0.091 U	0.12 U	0.11 U	0.093 U	0.11 U
Total Organic Carbon by Lloyd Kahn Method																
Total Organic Carbon	mg/kg	-	-	-	-	-	-	-	-	2960	na	1060	1540	2390	1870	1870
pH by Standard Method 9045D																
pH	pH units	-	-	-	-	-	-	-	-	8.5	na	7.8	8.1	8.2	8.4	8.3
Volatile Organic Compounds (VOCs) by USEPA Method 8260																
1,1,1-Trichloroethane (TCA)	ug/kg	680	680	100000	100000	500000	1000000	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
1,1,2,2-Tetrachloroethane	ug/kg	-	-	-	-	-	-	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/kg	-	-	-	-	-	-	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
1,1,2-Trichloroethane	ug/kg	-	-	-	-	-	-	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
1,1-Dichloroethane	ug/kg	270	270	19000	26000	240000	480000	-	-	250 U	15	7.8 U	6.5 U	100 U	5.3 U	4.6 U
1,1-Dichloroethene	ug/kg	330	330	100000	100000	500000	1000000	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
1,2,4-Trichlorobenzene	ug/kg	-	-	-	-	-	-	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
1,2-Dibromo-3-Chloropropane	ug/kg	-	-	-	-	-	-	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
1,2-Dibromoethane (Ethylene Dibromide)	ug/kg	-	-	-	-	-	-	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
1,2-Dichlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	-	-	250 U	7.5 U	7.8 U	0.54 J	100 U	5.3 U	4.6 U
1,2-Dichloroethane	ug/kg	20	20	2300	3100	30000	60000	10000	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
1,2-Dichloropropane	ug/kg	-	-	-	-	-	-	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
1,3-Dichlorobenzene	ug/kg	2400	2400	17000	49000	280000	560000	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
1,4-Dichlorobenzene	ug/kg	1800	1800	9800	13000	130000	250000	20000	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
2-Hexanone	ug/kg	-	-	-	-	-	-	-	-	1300 U	37 U	39 U	32 U	520 U	27 U	23 U
Acetone	ug/kg	50	50	100000	100000	500000	1000000	2200	-	1300 U	22 J	20 J	20 J	520 U	25 J	19 J
Benzene	ug/kg	60	60	2900	4800	44000	89000	70000	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Bromodichloromethane	ug/kg	-	-	-	-	-	-	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Bromoform	ug/kg	-	-	-	-	-	-	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Bromomethane	ug/kg	-	-	-	-	-	-	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Carbon Disulfide	ug/kg	-	-	-	-	-	-	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Carbon Tetrachloride	ug/kg	760	760	1400	2400	22000	44000	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Chlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	40000	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Chloroethane	ug/kg	-	-	-	-	-	-	-	-	250 UJ	7.5 U	7.8 U	6.5 U	100 UJ	5.3 U	4.6 U
Chloroform	ug/kg	370	370	10000	49000	350000	700000	12000	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Chloromethane	ug/kg	-	-	-	-	-	-	-	-	250 UJ	7.5 U	7.8 U	6.5 U	100 UJ	5.3 U	4.6 U
Cis-1,2-Dichloroethylene	ug/kg	250	250	59000	100000	500000	1000000	-	-	3400	1.9 J	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Cis-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Cyclohexane	ug/kg	-	-	-	-	-	-	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Dibromochloromethane	ug/kg	-	-	-	-	-	-	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Dichlorodifluoromethane	ug/kg	-	-	-	-	-	-	-	-	250 UJ	7.5 U	7.8 U	6.5 U	100 UJ	5.3 U	4.6 U
Ethylbenzene	ug/kg	1000	1000	30000	41000	390000	780000	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Isopropylbenzene (Cumene)	ug/kg	-	-	-	-	-	-	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Methyl Acetate	ug/kg	-	-	-	-	-	-	-	-	1300 U	37 U	39 U	32 U	520 U	27 U	23 U
Methyl Ethyl Ketone (2-Butanone)	ug/kg	120	120	100000	100000	500000	1000000	100000	-	1300 U	37 U	39 U	32 U	520 U	27 U	23 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	ug/kg	-	-	-	-	-	-	-	-	1300 U	37 U	39 U	32 U	520 U	27 U	23 U
Methylcyclohexane	ug/kg	-	-	-	-	-	-	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Methylene Chloride	ug/kg	50	50	51000	100000	500000	1000000	12000	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Styrene	ug/kg	-	-	-	-	-	-	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Tert-Butyl Methyl Ether	ug/kg	930	930	62000	100000	500000	1000000	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Tetrachloroethylene (PCE)	ug/kg	1300	1300	5500	19000	150000	300000	2000	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Toluene	ug/kg	700	700	100000	100000	500000	1000000	36000	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Trans-1,2-Dichloroethene	ug/kg	190	190	100000	100000	500000	1000000	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Trans-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	250 U	7.5 U	7.8 U	6.5 U	100 U	5.3 U	4.6 U
Trichloroethylene (TCE)	ug/kg	470	470	10000	21000	200000	400000	2000	-	10000	11	3.3 J	6.4 J	1000	5.3 U	4.6 U
Trichlorofluoromethane	ug/kg	-	-	-	-	-	-	-	-	250 UJ	7.5 U	7.8 U	6.5 U	100 UJ	5.3 U	4.6 U
Vinyl Chloride	ug/kg	20	20	210	900	13000	27000	-	-	250 UJ	28	7.8 U	6.5 U	100 UJ	5.3 U	4.6 U
Xylenes, Total	ug/kg	260	1600	100000	100000	500000	1000000	260	-	510 U	15 U	16 U	13 U	210 U	11 U	9.3 U

Notes and Abbreviations

µg/kg - microgram per kilogram
mg/kg - milligrams per kilogram
U - Compound not detected
J - Estimated value
UJ - Estimated Non-Detect
N - Primary sample
FD - Field duplicate sample
ft bgs - Feet below ground surface
na - Sample not analyzed for this parameter
IRM PDI - Interim Remedial Measure Pre-Design Investigation
Shaded value indicates value equal to, or greater than, standard or guidance.
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Table A-4
Analytical Results in IRM PDI Soil Samples for PFAS, TOC, pH, and VOCs
Former Oak Materials Fluorglas Division - John Street

									Location ID:	**JS-B-058**	**JS-B-058**	**JS-B-058**	**JS-B-059**	**JS-B-060**	**JS-B-061**	**JS-B-061**
									Sample Date:	**5/2/2018**	**5/2/2018**	**5/2/2018**	**5/2/2018**	**5/2/2018**	**5/2/2018**	**5/2/2018**
									Sample Depth (ft bgs):	**10-10.25 ft**	**10.25-12 ft**	**47.5-48 ft**	**4-6 ft**	**10-12 ft**	**12-14 ft**	**12-14 ft**
									Sample Type:	**N**	**N**	**N**	**N**	**N**	**N**	**FD**
Constituent	Units	**NY375 1UNRES**	**NY375 2RPGW**	**NY375 3RRES**	**NY375 4RRRES**	**NY375 5RCOMM**	**NY375 6RINDU**	**NY375 7PER**	**USEPA Screen Value**							
Perfluorinated Alkyl Compounds (PFAS) by USEPA Method 537-1.1 modified																
Perfluorobutanesulfonic acid (PFBS)	ng/g	-	-	-	-	-	-	-	-	0.2 U	0.22 U	0.24 U	0.17 U	0.21 U	0.21 U	0.23 U
Perfluorobutanoic Acid	ng/g	-	-	-	-	-	-	-	-	0.22 U	0.24 U	0.26 U	0.18 U	0.22 U	0.22 U	0.24 U
Perfluorodecane Sulfonic Acid	ng/g	-	-	-	-	-	-	-	-	0.2 U	0.22 U	0.24 U	0.17 U	0.21 U	0.21 U	0.23 U
Perfluorodecanoic acid (PFDA)	ng/g	-	-	-	-	-	-	-	-	0.25 J	0.26 U	0.3 J	0.26 J	0.24 J	0.25 U	0.27 U
Perfluorododecanoic acid (PFDoA)	ng/g	-	-	-	-	-	-	-	-	0.31 U	0.34 U	0.37 U	0.26 U	0.31 U	0.32 U	0.35 U
Perfluoroheptane Sulfonate (PFHPS)	ng/g	-	-	-	-	-	-	-	-	0.17 U	0.19 U	0.2 U	0.14 U	0.17 U	0.18 U	0.19 U
Perfluoroheptanoic acid (PFHpA)	ng/g	-	-	-	-	-	-	-	-	0.31 U	0.47 U	0.34 U	0.27 U	0.3 U	0.41 U	0.37 U
Perfluorohexanesulfonic acid (PFHxS)	ng/g	-	-	-	-	-	-	-	-	0.2 U	0.22 U	0.24 U	0.17 U	0.21 U	0.21 U	0.23 U
Perfluorohexanoic acid (PFHxA)	ng/g	-	-	-	-	-	-	-	-	0.25 U	0.28 U	0.3 U	0.21 U	0.25 U	0.26 U	0.28 U
Perfluorononanoic acid (PFNA)	ng/g	-	-	-	-	-	-	-	-	0.26 U	0.24 U	0.31 U	0.27 U	0.22 U	0.29 U	0.4 U
Perfluorooctane Sulfonamide (FOSA)	ng/g	-	-	-	-	-	-	-	-	0.16 U	0.17 U	0.19 U	0.13 U	0.16 U	0.18 J	0.2 J
Perfluorooctanesulfonic acid (PFOS)	ng/g	-	-	-	-	-	-	-	6270	0.2 U	0.22 U	0.24 U	0.17 U	0.21 U	0.21 U	0.23 U
Perfluorooctanoic acid (PFOA)	ng/g	-	-	-	-	-	-	-	15600	0.22 U	0.24 U	0.26 U	5	3.1	3.3	3
Perfluoropentanoic Acid (PFPeA)	ng/g	-	-	-	-	-	-	-	-	0.23 U	0.25 U	0.27 U	0.19 U	0.23 U	0.24 U	0.26 U
Perfluorotetradecanoic acid (PFTA)	ng/g	-	-	-	-	-	-	-	-	0.45 U	0.49 U	0.54 U	0.38 U	0.46 U	0.47 U	0.51 U
Perfluorotridecanoic Acid (PFTriA)	ng/g	-	-	-	-	-	-	-	-	0.2 J	0.31 J	0.33 J	0.15 U	0.25 J	0.26 J	0.23 J
Perfluoroundecanoic Acid (PFUnA)	ng/g	-	-	-	-	-	-	-	-	0.3 U	0.33 U	0.36 U	0.25 U	0.3 U	0.31 U	0.34 U
SODIUM 1H,1H,2H,2H-PERFLUORODECANE SULFONATE (8:2)	ng/g	-	-	-	-	-	-	-	-	0.26 U	0.29 U	0.31 U	0.22 U	0.27 U	0.27 U	0.3 U
SODIUM 1H,1H,2H,2H-PERFLUOROOCTANE SULFONATE (6:2)	ng/g	-	-	-	-	-	-	-	-	0.2 U	0.22 U	0.24 U	0.19 J	0.21 U	0.21 U	0.29 J
NEtFOSAA	ng/g	-	-	-	-	-	-	-	-	0.13 U	0.32 J	0.16 U	0.11 U	0.14 U	0.14 U	0.15 U
NMeFOSAA	ng/g	-	-	-	-	-	-	-	-	0.1 U	0.11 U	0.12 U	0.085 U	0.11 U	0.11 U	0.12 U
Total Organic Carbon by Lloyd Kahn Method																
Total Organic Carbon	mg/kg	-	-	-	-	-	-	-	-	na	2300	2690	11300	3100	3010	2670
pH by Standard Method 9045D																
pH	pH units	-	-	-	-	-	-	-	-	na	8	8.3	11.1	8.4	8.2	8.2
Volatile Organic Compounds (VOCs) by USEPA Method 8260																
1,1,1-Trichloroethane (TCA)	ug/kg	680	680	100000	100000	500000	1000000	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
1,1,2,2-Tetrachloroethane	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
1,1,2-Trichloroethane	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
1,1-Dichloroethane	ug/kg	270	270	19000	26000	240000	480000	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	3.1 J	2.4 J
1,1-Dichloroethene	ug/kg	330	330	100000	100000	500000	1000000	-	-	8.1 U	4.6 U	8.3 U	600 U	97	6.2 U	8.6 U
1,2,4-Trichlorobenzene	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
1,2-Dibromo-3-Chloropropane	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
1,2-Dibromoethane (Ethylene Dibromide)	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
1,2-Dichlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
1,2-Dichloroethane	ug/kg	20	20	2300	3100	30000	60000	10000	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
1,2-Dichloropropane	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
1,3-Dichlorobenzene	ug/kg	2400	2400	17000	49000	280000	560000	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
1,4-Dichlorobenzene	ug/kg	1800	1800	9800	13000	130000	250000	20000	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
2-Hexanone	ug/kg	-	-	-	-	-	-	-	-	40 U	23 U	41 U	3000 U	400 U	31 U	43 U
Acetone	ug/kg	50	50	100000	100000	500000	1000000	2200	-	42	15 J	27 J	3000 U	400 U	24 J	26 J
Benzene	ug/kg	60	60	2900	4800	44000	89000	70000	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Bromodichloromethane	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Bromoform	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Bromomethane	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Carbon Disulfide	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Carbon Tetrachloride	ug/kg	760	760	1400	2400	22000	44000	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Chlorobenzene	ug/kg	1100	1100	100000	100000	500000	1000000	40000	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Chloroethane	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 UJ	80 UJ	6.2 U	8.6 U
Chloroform	ug/kg	370	370	10000	49000	350000	700000	12000	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Chloromethane	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 UJ	80 UJ	6.2 U	8.6 U
Cis-1,2-Dichloroethylene	ug/kg	250	250	59000	100000	500000	1000000	-	-	8.1 U	4.6 U	8.3 U	600 U	2400	6.2 U	8.6 U
Cis-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Cyclohexane	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Dibromochloromethane	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Dichlorodifluoromethane	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 UJ	80 UJ	6.2 U	8.6 U
Ethylbenzene	ug/kg	1000	1000	30000	41000	390000	780000	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Isopropylbenzene (Cumene)	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Methyl Acetate	ug/kg	-	-	-	-	-	-	-	-	40 U	23 U	41 U	2500 J	400 U	31 U	43 U
Methyl Ethyl Ketone (2-Butanone)	ug/kg	120	120	100000	100000	500000	1000000	100000	-	40 U	23 U	41 U	3000 U	400 U	31 U	43 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	ug/kg	-	-	-	-	-	-	-	-	40 U	23 U	41 U	3000 U	400 U	31 U	43 U
Methylcyclohexane	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Methylene Chloride	ug/kg	50	50	51000	100000	500000	1000000	12000	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Styrene	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Tert-Butyl Methyl Ether	ug/kg	930	930	62000	100000	500000	1000000	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Tetrachloroethylene (PCE)	ug/kg	1300	1300	5500	19000	150000	300000	2000	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Toluene	ug/kg	700	700	100000	100000	500000	1000000	36000	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Trans-1,2-Dichloroethene	ug/kg	190	190	100000	100000	500000	1000000	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Trans-1,3-Dichloropropene	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 U	80 U	6.2 U	8.6 U
Trichloroethylene (TCE)	ug/kg	470	470	10000	21000	200000	400000	2000	-	4.3 J	4.6 U	8.3 U	840	4800	6.2 U	8.6 U
Trichlorofluoromethane	ug/kg	-	-	-	-	-	-	-	-	8.1 U	4.6 U	8.3 U	600 UJ	80 UJ	6.2 U	8.6 U
Vinyl Chloride	ug/kg	20	20	210	900	13000	27000	-	-	8.1 U	4.6 U	8.3 U	600 UJ	80 UJ	6.2 U	8.6 U
Xylenes, Total	ug/kg	260	1600	100000	100000	500000	1000000	260	-	16 U	9.1 U	17 U	1200 U	160 U	12 U	17 U

Notes and Abbreviations

μg/kg - microgram per kilogram
mg/kg - milligrams per kilogram
U - Compound not detected
J - Estimated value
UJ - Estimated Non-Detect
N - Primary sample
FD - Field duplicate sample
ft bgs - Feet below ground surface
na - Sample not analyzed for this parameter
IRM PDI - Interim Remedial Measure Pre-Design Investigation
Shaded value indicates value equal to, or greater than, standard or guidance.
NY Part 375 = NYS Soil Cleanup Objective (SCO) in Title 6 of Official Compilation of New York Codes, Rules and Regulations (6 NYC
USEPA Screening Values for PFOA and PFOS developed by USEPA based on the Health Advisory for PFOA and PFOS of 70 nanogra

🟨	NYS Unrestricted Use SCO
🟩	NYS Protection of Groundwater SCO
🟦	NYS Residential Use SCO
🟪	NYS Restricted Residential SCO
🟧	NYS Commercial Use SCO
🟥	NYS Industrial Use SCO
⬜	NYS Protection of Ecological Resources SCO

Table A-5
Comparative Analytical Results for PFAS and TOP Assay PFAS
Former Oak Materials Fluorglas Division - John Street

		JS-B-019	JS-B-019	JS-B-039	JS-B-039	JS-B-044	JS-B-044	JS-B-047	JS-B-047	JS-B-055	JS-B-055
		Apr-04-2018	Apr-04-2018	Apr-20-2018	Apr-20-2018	Apr-19-2018	Apr-19-2018	Apr-19-2018	Apr-19-2018	May-01-2018	May-01-2018
		16-17	16-17	13-15	13-15	17-19	17-19	4-6	4-6	5-7	5-7
		N	N	N	N	N	N	N	N	N	N
		537-1.1	TOP Assay	537-1.1	TOP Assay	537-1.1	TOP Assay	537-1.1	TOP Assay	537-1.1	TOP Assay
Constituent	**Units**										
Perfluorinated Alkyl Compounds (PFAS) by USEPA Method 537-1.1 modified											
Perfluorobutanoic Acid	ng/g	0.22 U	1.8 U	0.22 U	2.0 U	0.21 U	2.0 U	0.18 U	1.3 U	0.21 U	1.3 U
Perfluoropentanoic Acid (PFPeA)	ng/g	0.23 U	1.6 U	0.23 U	1.5 U	0.23 U	1.5 U	0.19 U	1.3 U	0.22 U	1.2 U
Perfluorohexanoic acid (PFHxA)	ng/g	0.25 U	34 U	0.26 U	31 U	0.25 U	38 U	0.21 U	30 U	0.24 U	24 U
Perfluoroheptanoic acid (PFHpA)	ng/g	0.26 U	1.4 U	0.38 J	1.5 UJ	0.41 J	1.4 UJ	0.34 J	1.1 UJ	0.25 U	1.2 UJ
Perfluorooctanoic acid (PFOA)	ng/g	21	23	0.81 J	1.5 U	2.4 J	2.1	9.3	10	13	7.1
Perfluorononanoic acid (PFNA)	ng/g	0.22 U	1.4 U	0.28 U	1.5 U	0.21 U	1.4 U	0.19 J	1.1 U	0.35 U	1.2 U
Perfluorodecanoic acid (PFDA)	ng/g	0.24 U	1.4 U	0.3 J	1.5 U	0.24 U	1.4 U	0.24 J	1.1 U	0.92 U	1.2 U
Perfluoroundecanoic Acid (PFUnA)	ng/g	0.3 U	1.4 U	0.38 U	1.5 U	0.34 U	1.4 U	0.31 U	1.1 U	0.29 U	1.2 U
Perfluorododecanoic acid (PFDoA)	ng/g	0.31 U	1.4 U	0.32 U	1.5 U	0.31 U	1.4 U	0.26 U	1.1 U	0.3 U	1.2 U
Perfluorotridecanoic Acid (PFTriA)	ng/g	0.18 U	1.4 U	0.2 U	1.5 U	0.28 U	1.4 U	0.15 U	1.1 U	0.27 U	1.2 U
Perfluorotetradecanoic acid (PFTA)	ng/g	0.45 U	1.4 U	0.46 U	1.5 U	0.45 U	1.4 U	0.38 U	1.1 U	0.43 U	1.2 U
Perfluorobutanesulfonic acid (PFBS)	ng/g	0.2 U	1.4 U	0.21 U	1.5 U	0.2 U	1.4 U	0.17 U	1.1 U	0.2 U	1.2 U
Perfluorohexanesulfonic acid (PFHxS)	ng/g	0.2 U	1.4 U	0.21 U	1.5 U	0.27 J	1.4 U	0.17 U	1.1 U	0.2 U	1.2 U
Perfluoroheptane Sulfonate (PFHPS)	ng/g	0.17 U	1.4 U	0.17 U	1.5 U	0.17 U	1.4 U	0.14 U	1.1 U	0.16 U	1.2 U
Perfluorooctanesulfonic acid (PFOS)	ng/g	0.2 U	1.4 U	0.21 U	1.5 U	0.2 U	1.4 U	0.17 U	1.1 U	0.25 J	1.2 U
Perfluorodecane Sulfonic Acid	ng/g	0.2 U	1.4 U	0.21 U	1.5 U	0.2 U	1.4 U	0.17 U	1.1 U	0.2 U	1.2 U
Perfluorooctane Sulfonamide (FOSA)	ng/g	0.16 U	1.4 U	0.16 U	1.5 U	0.16 U	1.4 U	0.13 U	1.1 U	0.15 U	1.2 U
SODIUM 1H,1H,2H,2H-PERFLUORODECANE SULFONATE (8:2)	ng/g	0.26 U	1.4 U	0.27 U	1.5 U	0.26 U	1.4 U	0.22 U	1.1 U	0.25 U	1.2 U
SODIUM 1H,1H,2H,2H-PERFLUOROOCTANE SULFONATE (6:2)	ng/g	0.2 U	1.4 U	0.21 U	1.5 U	0.2 U	1.4 U	0.17 U	1.1 U	0.2 U	1.2 U
NEtFOSAA	ng/g	0.13 U	1.4 U	0.14 U	1.5 U	0.13 U	1.4 U	0.11 U	1.1 U	0.13 U	1.2 U
NMeFOSAA	ng/g	0.1 U	1.4 U	0.11 U	1.5 U	0.099 U	1.4 U	0.025 U	1.1 U	0.096 U	1.2 U
		21	23	1.49	0	3.08	2.1	10.07	10	13.25	7.1
Relative Percent Difference - PFOA			9%		ND		13%		7%		59%

Notes and Abbreviations
U - Compound not detected
UJ - Estimated Non-Detect
N - Primary sample
ND - Non-Detect
ng/kg - nanograms per gram
TOP - Total Oxidizable Precursor
ft bgs - Feet below ground surface

Table A-6
Analytical Results for Non-Aqueous Phase Liquid (NAPL) in Temporary Monitoring Wells
Former Oak Materials Fluorglas Division - John Street

	Location ID	**JS-TMW-039**
	Sample Date	**23-May-2018**
	Sample Type	**N**
Constituent	**Units**	
Perfluorinated Alkyl Compounds (PFAS) by USEPA Method 537-1.1 modified		
NEtFOSAA	ng/l	3.2 U
NMeFOSAA	ng/l	5.2 U
Perfluorobutanesulfonic acid (PFBS)	ng/l	0.33 U
Perfluorobutanoic Acid	ng/l	0.58 U
Perfluorodecane Sulfonic Acid	ng/l	0.53 U
Perfluorodecanoic acid (PFDA)	ng/l	0.52 U
Perfluorododecanoic acid (PFDoA)	ng/l	0.92 U
Perfluoroheptane Sulfonate (PFHPS)	ng/l	0.32 U
Perfluoroheptanoic acid (PFHpA)	ng/l	2.4 J
Perfluorohexanesulfonic acid (PFHxS)	ng/l	0.28 U
Perfluorohexanoic acid (PFHxA)	ng/l	4.7
Perfluorononanoic acid (PFNA)	ng/l	3.6
Perfluorooctane Sulfonamide (FOSA)	ng/l	0.58 U
Perfluorooctanesulfonic acid (PFOS)	ng/l	1.1 J
Perfluorooctanoic acid (PFOA)	ng/l	170
Perfluoropentanoic Acid (PFPeA)	ng/l	0.82 U
Perfluorotetradecanoic acid (PFTA)	ng/l	0.48 U
Perfluorotridecanoic Acid (PFTriA)	ng/l	2.2 U
Perfluoroundecanoic Acid (PFUnA)	ng/l	1.8 J
SODIUM 1H,1H,2H,2H-PERFLUORODECANE SULFONATE (8:2)	ng/l	3.3 U
SODIUM 1H,1H,2H,2H-PERFLUOROOCTANE SULFONATE (6:2)	ng/l	17 J
Total Petroleum Hydrocarbon (TPH) Fingerprinting by NY310-13		
Gasoline Components	mg/kg	170 U
Kerosene	mg/kg	420 U
Motor Oils	mg/kg	830 U
PHC As #2 Fuel Oils C10-C23 #2 Diesel, #2 Fuel Oil	mg/kg	420 U
PHC As Heavy/Residual Fuel Oils Fuel Oils #4	mg/kg	420 U
PHC As Heavy/Residual Fuel Oils Fuel Oils #6	mg/kg	420 U
Unknown Hydrocarbons With 1st Highest Conc.	mg/kg	18000
Pesticides by USEPA Method 8081		
Aldrin	mg/kg	0.31
Alpha Bhc (Alpha Hexachlorocyclohexane)	mg/kg	0.23 J
Alpha Endosulfan	mg/kg	0.29 U
Beta Bhc (Beta Hexachlorocyclohexane)	mg/kg	0.61
Beta Endosulfan	mg/kg	0.29 U
cis-Chlordane	mg/kg	0.29 U
Delta BHC (Delta Hexachlorocyclohexane)	mg/kg	0.29 U
Dieldrin	mg/kg	0.16 J
Endosulfan Sulfate	mg/kg	0.29 U
Endrin	mg/kg	0.29 U
Endrin Aldehyde	mg/kg	0.29 U
Endrin Ketone	mg/kg	0.29 U
Gamma Bhc (Lindane)	mg/kg	0.29 U
Heptachlor	mg/kg	0.29
Heptachlor Epoxide	mg/kg	0.29 U
Methoxychlor	mg/kg	0.29 U
P,P'-DDD	mg/kg	0.18 J
P,P'-DDE	mg/kg	0.29 U
P,P'-DDT	mg/kg	0.29 U
Toxaphene	mg/kg	2.9 U
trans-Chlordane	mg/kg	0.29 U
Polychlorined Biphenyls (PCBs) by USEPA Method 8082		
PCB-1016 (Aroclor 1016)	mg/kg	38 U
PCB-1221 (Aroclor 1221)	mg/kg	38 U
PCB-1232 (Aroclor 1232)	mg/kg	38 U
PCB-1242 (Aroclor 1242)	mg/kg	38 U
PCB-1248 (Aroclor 1248)	mg/kg	38 U
PCB-1254 (Aroclor 1254)	mg/kg	38 U
PCB-1260 (Aroclor 1260)	mg/kg	38 U

Table A-6
Analytical Results for Non-Aqueous Phase Liquid (NAPL) in Temporary Monitoring Wells
Former Oak Materials Fluorglas Division - John Street

	Location ID	**JS-TMW-039**
	Sample Date	**23-May-2018**
	Sample Type	**N**
Constituent	**Units**	
Volatile Organic Compounds (VOCs) by USEPA Method 8260		
1,1,1-Trichloroethane (TCA)	mg/kg	10000 U
1,1,2,2-Tetrachloroethane	mg/kg	10000 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	mg/kg	10000 U
1,1,2-Trichloroethane	mg/kg	10000 U
1,1-Dichloroethane	mg/kg	10000 U
1,1-Dichloroethene	mg/kg	10000 U
1,2,4-Trichlorobenzene	mg/kg	10000 U
1,2-Dibromo-3-Chloropropane	mg/kg	10000 U
1,2-Dibromoethane (Ethylene Dibromide)	mg/kg	10000 U
1,2-Dichlorobenzene	mg/kg	10000 U
1,2-Dichloroethane	mg/kg	10000 U
1,2-Dichloropropane	mg/kg	10000 U
1,3-Dichlorobenzene	mg/kg	10000 U
1,4-Dichlorobenzene	mg/kg	10000 U
2-Hexanone	mg/kg	50000 U
Acetone	mg/kg	50000 UJ
Benzene	mg/kg	10000 U
Bromodichloromethane	mg/kg	10000 U
Bromoform	mg/kg	10000 U
Bromomethane	mg/kg	10000 U
Carbon Disulfide	mg/kg	10000 U
Carbon Tetrachloride	mg/kg	10000 U
Chlorobenzene	mg/kg	10000 U
Chloroethane	mg/kg	10000 U
Chloroform	mg/kg	10000 U
Chloromethane	mg/kg	10000 U
Cis-1,2-Dichloroethylene	mg/kg	10000 U
Cis-1,3-Dichloropropene	mg/kg	10000 U
Cyclohexane	mg/kg	10000 U
Dibromochloromethane	mg/kg	10000 U
Dichlorodifluoromethane	mg/kg	10000 U
Ethylbenzene	mg/kg	10000 U
Isopropylbenzene (Cumene)	mg/kg	10000 U
Methyl Acetate	mg/kg	50000 U
Methyl Ethyl Ketone (2-Butanone)	mg/kg	50000 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	mg/kg	50000 U
Methylcyclohexane	mg/kg	10000 U
Methylene Chloride	mg/kg	10000 U
Styrene	mg/kg	10000 U
Tert-Butyl Methyl Ether	mg/kg	10000 U
Tetrachloroethylene (PCE)	mg/kg	10000 U
Toluene	mg/kg	10000 U
Trans-1,2-Dichloroethene	mg/kg	10000 U
Trans-1,3-Dichloropropene	mg/kg	10000 U
Trichloroethylene (TCE)	mg/kg	280000
Trichlorofluoromethane	mg/kg	10000 U
Vinyl Chloride	mg/kg	10000 U
Xylenes, Total	mg/kg	20000 U
2,4,5-Trichlorophenol	mg/kg	430 U
2,4,6-Trichlorophenol	mg/kg	430 U
2,4-Dichlorophenol	mg/kg	430 U
2,4-Dimethylphenol	mg/kg	430 U
2,4-Dinitrophenol	mg/kg	4200 U
2,4-Dinitrotoluene	mg/kg	430 U
2,6-Dinitrotoluene	mg/kg	430 U
2-Chloronaphthalene	mg/kg	430 U
2-Chlorophenol	mg/kg	430 U
2-Methylnaphthalene	mg/kg	430 U
2-Methylphenol (O-Cresol)	mg/kg	430 U
2-Nitroaniline	mg/kg	830 U
2-Nitrophenol	mg/kg	430 U
3,3'-Dichlorobenzidine	mg/kg	830 U
3-Nitroaniline	mg/kg	830 U
4,6-Dinitro-2-Methylphenol	mg/kg	830 U
4-Bromophenyl Phenyl Ether	mg/kg	430 U
4-Chloro-3-Methylphenol	mg/kg	430 U

Table A-6

Analytical Results for Non-Aqueous Phase Liquid (NAPL) in Temporary Monitoring Wells

Former Oak Materials Fluorglas Division - John Street

	Location ID	JS-TMW-039
	Sample Date	23-May-2018
	Sample Type	N
Constituent	Units	
4-Chloroaniline	mg/kg	430 U
4-Chlorophenyl Phenyl Ether	mg/kg	430 U
4-Methylphenol (P-Cresol)	mg/kg	830 U
4-Nitroaniline	mg/kg	830 U
4-Nitrophenol	mg/kg	830 U
Acenaphthene	mg/kg	430 U
Acenaphthylene	mg/kg	430 U
Acetophenone	mg/kg	430 U
Anthracene	mg/kg	430 U
Atrazine	mg/kg	430 U
Benzaldehyde	mg/kg	430 U
Benzo(A)Anthracene	mg/kg	430 U
Benzo(A)Pyrene	mg/kg	430 U
Benzo(B)Fluoranthene	mg/kg	430 U
Benzo(G,H,I)Perylene	mg/kg	430 U
Benzo(K)Fluoranthene	mg/kg	430 U
Benzyl Butyl Phthalate	mg/kg	430 U
Biphenyl (Diphenyl)	mg/kg	430 U
Bis(2-Chloroethoxy) Methane	mg/kg	430 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	mg/kg	430 U
Bis(2-Chloroisopropyl) Ether	mg/kg	430 U
Bis(2-Ethylhexyl) Phthalate	mg/kg	430 U
Caprolactam	mg/kg	430 U
Carbazole	mg/kg	430 U
Chrysene	mg/kg	430 U
Dibenz(A,H)Anthracene	mg/kg	430 U
Dibenzofuran	mg/kg	430 U
Diethyl Phthalate	mg/kg	430 U
Dimethyl Phthalate	mg/kg	430 U
Di-N-Butyl Phthalate	mg/kg	430 U
Di-N-Octylphthalate	mg/kg	430 U
Fluoranthene	mg/kg	430 U
Fluorene	mg/kg	430 U
Hexachlorobenzene	mg/kg	430 U
Hexachlorobutadiene	mg/kg	430 U
Hexachlorocyclopentadiene	mg/kg	430 U
Hexachloroethane	mg/kg	430 U
Indeno(1,2,3-C,D)Pyrene	mg/kg	430 U
Isophorone	mg/kg	430 U
Naphthalene	mg/kg	6400
Nitrobenzene	mg/kg	430 U
N-Nitrosodi-N-Propylamine	mg/kg	430 U
N-Nitrosodiphenylamine	mg/kg	430 U
Pentachlorophenol	mg/kg	830 U
Phenanthrene	mg/kg	430 U
Phenol	mg/kg	430 U
Pyrene	mg/kg	430 U

Notes and Abbreviations

mg/kg - milligrams per kilogram
ng/L - nanograms per liter
U - Compound not detected
J - Estimated value
UJ -Estimated Non-Detect
N - Primary sample

Table A-7
Analytical Results for PFAS, VOCs, pH and TOC from Groundwater Samples from Temporary Monitoring Wells
Former Oak Materials Fluorglas Division - John Street

			Location ID	JS-TMW-018	JS-TMW-030	JS-TMW-033	JS-TMW-035	JS-TMW-036	JS-TMW-037	JS-TMW-038	JS-TMW-039	JS-TMW-039	JS-TMW-044	JS-TMW-049	JS-TMW-050	JS-TMW-053
			Sample Date	May-16-2018	May-24-2018	May-16-2018	May-24-2018	May-17-2018	May-16-2018	May-16-2018	May-15-2018	May-15-2018	May-15-2018	May-15-2018	May-14-2018	May-15-2018
			Sample Type	N	N	N	N	N	N	N	N	FD	N	N	N	N
Constituent	**Units**	**NYSDEC TOGS111 GA GUIDANCE**	**NYSDEC TOGS111 GA STANDARD**													
Perfluorinated Alkyl Compounds (PFAS) by USEPA Method 537-1.1 modified																
NEtFOSAA	ng/l	-	-	1.8 U	2.6 U	1.8 U	1.9 U	2 U	2 U	2 U	2 U	1.9 U	1.9 U	2 U	2.2 U	1.9 U
NMeFOSAA	ng/l	-	-	2.9 U	4.2 U	3 U	3.1 U	3.2 U	3.2 U	3.2 U	3.3 U	3 U	3.1 U	3.2 U	3.5 U	3.1 U
Perfluorobutanesulfonic acid (PFBS)	ng/l	-	-	1.7 J	0.5 J	0.59 J	1.8 J	0.21 U	0.6 J	0.21 U	0.74 J	0.8 J	1.2 J	1.3 J	1.6 J	0.2 U
Perfluorobutanoic Acid	ng/l	-	-	0.33 U	0.47 U	0.33 U	0.35 U	0.36 U	0.36 U	0.36 U	0.37 UJ	0.34 UJ	0.35 U	0.36 U	0.4 U	0.35 U
Perfluorodecane Sulfonic Acid	ng/l	-	-	0.3 U	0.43 U	0.31 U	0.32 U	0.33 U	0.33 U	0.33 U	0.34 U	0.31 U	0.32 U	0.33 U	0.37 U	0.32 U
Perfluorodecanoic acid (PFDA)	ng/l	-	-	0.63 J	0.42 U	0.3 U	0.31 U	0.32 U	0.32 U	0.32 U	0.33 U	0.3 U	1.1 J	0.42 J	0.44 J	0.31 U
Perfluorododecanoic acid (PFDoA)	ng/l	-	-	0.52 U	0.74 U	0.53 U	0.54 U	0.57 U	0.57 U	0.57 U	0.58 U	0.54 U	0.55 U	0.57 U	0.63 U	0.55 U
Perfluoroheptane Sulfonate (PFHPS)	ng/l	-	-	0.18 U	0.26 U	0.18 U	0.19 U	0.2 U	0.2 U	0.2 U	0.2 U	0.19 U	0.19 U	0.2 U	0.22 U	0.19 U
Perfluoroheptanoic acid (PFHpA)	ng/l	-	-	7.5	11	44	3.9	4.8	11	22	5.4	5.2	35	5.1	6.8	26
Perfluorohexanesulfonic acid (PFHxS)	ng/l	-	-	0.16 U	0.23 U	0.16 U	0.17 U	0.18 U	0.17 U	0.17 U	0.18 U	0.17 U	0.17 U	0.18 U	0.19 U	0.17 U
Perfluorohexanoic acid (PFHxA)	ng/l	-	-	14	10	38	3.7	6.1	6.7	17	4.4	4.1	16	3.8	5.6	27
Perfluorononanoic acid (PFNA)	ng/l	-	-	0.41 J	0.37 J	1.2 J	1.7 J	0.28 U	0.53 J	1.5 J	0.62 J	0.73 J	7	0.93 J	1.2 J	0.47 J
Perfluorooctane Sulfonamide (FOSA)	ng/l	-	-	0.33 U	0.47 U	0.33 U	0.35 U	0.36 U	0.36 U	0.36 U	0.37 U	0.34 U	0.35 U	0.36 U	0.4 U	0.35 U
Perfluorooctanesulfonic acid (PFOS)	ng/l	-	-	0.51 U	0.73 U	0.52 U	0.53 U	0.56 U	0.55 U	0.56 U	0.57 U	0.53 U	2.3	2.1	3.9	1.5 J
Perfluorooctanoic acid (PFOA)	ng/l	-	-	320	140	1200 J	120	68	1000 J	680 J	260	260	4100 J	260	290	860 J
Perfluoropentanoic Acid (PFPeA)	ng/l	-	-	3.1	2.4 J	9.2	0.88 J	1.5 J	1.7 J	3.3	0.8 J	0.98 J	6.4	2.1	4	6
Perfluorotetradecanoic acid (PFTA)	ng/l	-	-	0.27 U	0.39 U	0.28 U	0.29 U	0.3 U	0.3 U	0.3 U	0.31 U	0.28 U	0.29 U	0.3 U	0.33 U	0.29 U
Perfluorotridecanoic Acid (PFTriA)	ng/l	-	-	1.2 U	1.8 U	1.2 U	1.3 U	1.3 U	1.3 U	1.3 U	1.4 U	1.3 U	1.3 U	1.3 U	1.5 U	1.3 U
Perfluoroundecanoic Acid (PFUnA)	ng/l	-	-	1 U	1.5 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	1.1 U
SODIUM 1H,1H,2H,2H-PERFLUORODECANE SULFONATE (8:2)	ng/l	-	-	1.9 U	2.7 U	1.9 U	2 U	2.1 U	2.1 U	2.1 U	2.1 U	2 U	2 U	2.1 U	2.3 U	2 U
SODIUM 1H,1H,2H,2H-PERFLUOROOCTANE SULFONATE (6:2)	ng/l	-	-	1.9 U	7.1 J	2.5 J	2 U	2.1 U	2.2 J	8.1 J	2.1 U	2 U	2 U	2.1 U	2.3 U	2.1 J
Volatile Organic Compounds (VOCs) by USEPA Method 8260																
1,1,1-Trichloroethane	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	130	400 U	8 U	4000 U
1,1,2,2-Tetrachloroethane	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
1,1,2-Trichloroethane	µg/l	-	1	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
1,1-Dichloroethane	µg/l	-	5	460 J	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	200	400 U	8 U	4000 U
1,1-Dichloroethene	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
1,2,4-Trichlorobenzene	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
1,2-Dibromo-3-chloropropane	µg/l	-	0.04	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
1,2-Dibromoethane	µg/l	-	0.0006	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
1,2-Dichlorobenzene	µg/l	-	3	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
1,2-Dichloroethane	µg/l	-	0.6	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
1,2-Dichloropropane	µg/l	-	1	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
1,3-Dichlorobenzene	µg/l	-	3	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
1,4-Dichlorobenzene	µg/l	-	3	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
2-Butanone	µg/l	50	-	5000 U	400000 U	200000 UJ	10000 U	40000 U	40000 U	200000 U	400000 U	400000 U	400 U	4000 U	80 U	40000 U
2-Hexanone	µg/l	50	-	2500 U	200000 U	100000 UJ	5000 U	20000 U	20000 U	100000 U	200000 U	200000 U	200 U	2000 U	40 U	20000 U
4-Methyl-2-pentanone	µg/l	-	-	2500 U	200000 U	100000 UJ	5000 U	20000 U	20000 U	100000 U	200000 U	200000 U	200 U	2000 U	40 U	20000 U
Acetone	µg/l	50	-	5000 U	400000 U	200000 UJ	10000 U	40000 U	40000 U	200000 U	400000 U	400000 U	400 U	4000 U	80 U	40000 U
Benzene	µg/l	-	1	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Bromodichloromethane	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Bromoform	µg/l	50	-	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Bromomethane	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Carbon Disulfide	µg/l	60	-	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Carbon Tetrachloride	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Chlorobenzene	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Chloroethane	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Chloroform	µg/l	-	7	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Chloromethane	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
cis-1,2-Dichloroethene	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	24	4000 U
cis-1,3-Dichloropropene	µg/l	-	0.4	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Cyclohexane	µg/l	-	-	500 U	40000 UJ	20000 UJ	1000 UJ	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Dibromochloromethane	µg/l	50	-	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U

Table A-7
Analytical Results for PFAS, VOCs, pH and TOC from Groundwater Samples from Temporary Monitoring Wells
Former Oak Materials Fluorglas Division - John Street

			Location ID	**JS-TMW-018**	**JS-TMW-030**	**JS-TMW-033**	**JS-TMW-035**	**JS-TMW-036**	**JS-TMW-037**	**JS-TMW-038**	**JS-TMW-039**	**JS-TMW-039**	**JS-TMW-044**	**JS-TMW-049**	**JS-TMW-050**	**JS-TMW-053**
			Sample Date	**May-16-2018**	**May-24-2018**	**May-16-2018**	**May-24-2018**	**May-17-2018**	**May-16-2018**	**May-16-2018**	**May-15-2018**	**May-15-2018**	**May-15-2018**	**May-15-2018**	**May-14-2018**	**May-15-2018**
			Sample Type	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**FD**	**N**	**N**	**N**	**N**
Constituent	**Units**	**NYSDEC TOGS111 GA GUIDANCE**	**NYSDEC TOGS111 GA STANDARD**													
Dichlorodifluoromethane	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Ethylbenzene	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Freon 113	µg/l	-	5	500 U	40000 UJ	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Isopropylbenzene (Cumene)	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Methyl Acetate	µg/l	-	-	1300 U	100000 U	50000 UJ	2500 U	10000 U	10000 U	50000 U	100000 U	100000 U	100 U	1000 U	20 U	10000 U
Methyl Tertiary Butyl Ether (MTBE)	µg/l	10	-	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Methylcyclohexane	µg/l	-	-	500 U	40000 UJ	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Methylene Chloride	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Styrene	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Tetrachloroethene	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Toluene	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
trans-1,2-Dichloroethene	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
trans-1,3-Dichloropropene	µg/l	-	0.4	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Trichloroethene	µg/l	-	5	20000	1600000	1400000 J	210000	200000	200000	1000000	1900000	1800000	2100 J	18000	480	160000
Trichlorofluoromethane	µg/l	-	5	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Vinyl Chloride	µg/l	-	2	500 U	40000 U	20000 UJ	1000 U	4000 U	4000 U	20000 U	40000 U	40000 U	40 U	400 U	8 U	4000 U
Xylenes (Total)	µg/l	-	5	1000 U	80000 U	40000 UJ	2000 U	8000 U	8000 U	40000 U	80000 U	80000 U	80 U	800 U	16 U	8000 U
Total Organic Carbon by Lloyd Kahn Method																
Total Organic Carbon	mg/l	-	-	2.3 J	3 J	8.6	5.9	7	12.1	6.3	20 U	4.7 J	1.7 J	1.6 J	1.6 J	14.7
pH by Standard Method 9045D																
pH	pH units	-	6.5 - 8.5	7.74	7.77	7.79	7.83	7.69	7.75	7.88	9.1	9.31	7.57	7.74	7.35	7.75

Notes and Abbreviations

ng/L - nanograms per liter
µg/L - micrograms per liter
mg/L - milligrams per liter
U - Compound not detected
J - Estimated value
UJ - Estimated Non-Detect
N - Primary sample
FD - Field duplicate sample
NYSDEC TOGS111 - Standards listed are the New York State Department of Environmental Conservation (NYSDEC) Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 values for Class GA groundwater.

🟨	Exceedance of NYS GA Guidance
🟩	Exceedance of NYS GA Standard

Table 8
Analytical Results in Groundwater Samples from Shallow Monitoring Wells Not Validated
Former Oak Materials Fluorglas Division - John Street

			Location ID	**JS-MW-001A**	**JS-MW-002A**	**JS-MW-003A**	**JS-MW-004A**	**JS-MW-005A**	**JS-MW-005A**
			Sample Date	**1-May-2018**	**2-May-2018**	**2-May-2018**	**2-May-2018**	**2-May-2018**	**2-May-2018**
			Sample Type	**N**	**N**	**N**	**N**	**N**	**FD**
Constituent	**Unit**	**NYSDEC TOGS111 GA GUIDANCE**	**NYSDEC TOGS111 GA STANDARD**						
Dechlorinating Bacteria									
Dehalococcoides	Cells/mL	-	-	0.2	31.4	0.5	0.4	0.5	0.5
TCEA Reductase	Cells/mL	-	-	0.5	9.1	0.5	0.4	0.5	0.5
BVCA Reductase	Cells/mL	-	-	0.5	0.4	0.5	0.4	0.5	0.5
Vinyl Chloride Reductase	Cells/mL	-	-	0.5	6.3	0.5	0.4	0.5	0.5
Dehalobacter spp.	Cells/mL	-	-	5	1100	5	4	5	5
Functional Genes									
Soluble Methane Monooxygenase	Cells/mL	-	-	5	97.3	5	4	5	5
Phylogenetic Group									
Methane Oxidizing Bacteria	Cells/mL	-	-	436	567000	274	23.2	196	5
Dissolved Gases									
Ethane	µg/l	-	-	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U	7.5 U
Ethene	µg/l	-	-	7 U	7 U	7 U	7 U	7 U	7 U
Methane	µg/l	-	-	4 U	2 J	4 U	4 U	4 U	4 U
Sulfate by D-516-90									
Sulfate (As SO4)	mg/l	-	250	95.5	218	5 U	6.6	5 U	5 U
Nitrogen, Nitrate-Nitrite by USEPA Method 353.2									
Nitrogen, Nitrate (As N)	mg/l	-	10	1.1	0.2	0.88	2.9	0.58	0.58
Nitrogen, Nitrite	mg/l	-	0.02	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Sulfide by SM4500-S2-F									
Sulfide	µg/l	-	-	1 U	1 U	1 U	1 U	1 U	1 U
Metals by USEPA Method 6010C									
Iron, Dissolved	mg/l	-	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Iron, Total	mg/l	-	0.3	0.05 U	4.2	0.058	0.05 U	0.05 U	0.05 U
Manganese, Dissolved	mg/l	-	-	0.003 U	1	0.003 U	0.003 U	0.003 U	0.003 U
Manganese, Total	mg/l	-	0.3	0.003 U	1	0.003 U	0.003 U	0.003 U	0.003 U
Perfluorinated Alkyl Compounds (PFAS) by USEPA Method 537-1.1 modified									
NEtFOSAA	ng/l	-	-	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U
NMeFOSAA	ng/l	-	-	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U
Perfluorobutanesulfonic acid (PFBS)	ng/l	-	-	0.9 U	0.9 U	0.9 U	1.1 J	0.9 U	0.9 U
Perfluorobutanoic Acid	ng/l	-	-	5.1 J	2.7 U	2.7 U	3.3 J	2.7 U	2.7 U
Perfluorodecane Sulfonic Acid	ng/l	-	-	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
Perfluorodecanoic acid (PFDA)	ng/l	-	-	3.7 U	12	0.9 U	0.83 U	0.85 U	0.75 U
Perfluorododecanoic acid (PFDoA)	ng/l	-	-	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U
Perfluoroheptane Sulfonate (PFHPS)	ng/l	-	-	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U
Perfluoroheptanoic acid (PFHpA)	ng/l	-	-	17	14	4.4	9.2	2.7 J	2.5 J
Perfluorohexanesulfonic acid (PFHxS)	ng/l	-	-	0.97 J	0.94 U	0.94 U	1.4 J	0.94 U	0.94 U
Perfluorohexanoic acid (PFHxA)	ng/l	-	-	11	11	2.5 J	7.4	1.1 J	1.1 J
Perfluorononanoic acid (PFNA)	ng/l	-	-	14	17	1.2 J	1.6 J	1 U	1.2 U
Perfluorooctane Sulfonamide (FOSA)	ng/l	-	-	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U
Perfluorooctanesulfonic acid (PFOS)	ng/l	-	-	4.1 J	3.1 J	1.3 J	4.3 J	1 U	1.6 J
Perfluorooctanoic acid (PFOA)	ng/l	-	-	3600	1800	110	410	82	80
Perfluoropentanoic Acid (PFPeA)	ng/l	-	-	3.6 J	3.1 J	1.1 U	1.3 J	1.1 U	1.1 U
Perfluorotetradecanoic acid (PFTA)	ng/l	-	-	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Perfluorotridecanoic Acid (PFTriA)	ng/l	-	-	0.77 J	1 J	0.75 U	0.95 J	0.75 U	0.78 U
Perfluoroundecanoic Acid (PFUnA)	ng/l	-	-	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
SODIUM 1H,1H,2H,2H-PERFLUORODECANE SULFONAT	ng/l	-	-	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U
SODIUM 1H,1H,2H,2H-PERFLUOROOCTANE SULFONAT	ng/l	-	-	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Volatile Organic Compounds (VOCs) by USEPA Method 8260									
1,1,1-Trichloroethane (TCA)	µg/l	-	5	13	2 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	µg/l	-	5	2 U	2 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	µg/l	-	1	2 U	2 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	µg/l	-	5	1.5 J	2 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	µg/l	-	5	2 U	2 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	µg/l	-	5	2 U	2 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-Chloropropane	µg/l	-	0.04	2 U	2 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane (Ethylene Dibromide)	µg/l	-	0.0006	2 U	2 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	µg/l	-	3	2 U	2 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	µg/l	-	0.6	2 U	2 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	µg/l	-	1	2 U	2 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	µg/l	-	3	2 U	2 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	µg/l	-	3	2 U	2 U	1 U	1 U	1 U	1 U
2-Butanone	µg/l	50	-	20 U	20 U	10 U	10 U	10 U	10 U
2-Hexanone	µg/l	50	-	10 U	10 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	µg/l	-	-	10 U	10 U	5 U	5 U	5 U	5 U
Acetone	µg/l	50	-	20 U	20 U	7.2 J	10 UJ	10 UJ	10 UJ
Benzene	µg/l	-	1	2 U	2 U	1 U	1 U	1 U	1 U
Bromodichloromethane	µg/l	-	5	2 U	2 U	1 U	1 U	1 U	1 U
Bromoform	µg/l	50	-	2 U	2 U	1 U	1 U	1 U	1 U
Bromomethane	µg/l	-	5	2 U	2 U	1 U	1 U	1 U	1 U
Carbon Disulfide	µg/l	60	-	2 U	2 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	µg/l	-	5	2 U	2 U	1 U	1 U	1 U	1 U
Chlorobenzene	µg/l	-	5	2 U	2 U	1 U	1 U	1 U	1 U
Chloroethane	µg/l	-	5	2 U	2 U	1 U	1 U	1 U	1 U
Chloroform	µg/l	-	7	2 U	2 U	1 U	1 U	1 U	1 U
Chloromethane	µg/l	-	5	2 U	2 U	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethylene	µg/l	-	5	8.8	2.1	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	µg/l	-	0.4	2 U	2 U	1 U	1 U	1 U	1 U
Cyclohexane	µg/l	-	-	2 U	2 U	1 U	1 U	1 U	1 U
Dibromochloromethane	µg/l	50	-	2 U	2 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	µg/l	-	5	2 U	2 U	1 U	1 U	1 U	1 U
Ethylbenzene	µg/l	-	5	2 U	2 U	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	µg/l	-	5	2 U	2 U	1 U	1 U	1 U	1 U
Isopropylbenzene (Cumene)	µg/l	-	5	2 U	2 U	1 U	1 U	1 U	1 U
Methyl Acetate	µg/l	-	-	5 U	5 U	2.5 U	2.5 U	2.5 U	2.5 U
Methyl Tertiary Butyl Ether (MTBE)	µg/l	-	-	2 U	2 U	1 U	1 U	1 U	1 U
Methylcyclohexane	µg/l	-	-	2 U	2 U	1 U	1 U	1 U	1 U
Methylene Chloride	µg/l	-	5	2 U	2.5 U	1 U	1 U	1 U	1 U
Styrene	µg/l	-	5	2 U	2 U	1 U	1 U	1 U	1 U
Tetrachloroethylene (PCE)	µg/l	-	5	0.78 J	2 U	0.38 J	1 U	1 U	1 U
Toluene	µg/l	-	5	2 U	2 U	1 U	1 U	1 U	1 U
Trans-1,2-Dichloroethene	µg/l	-	5	2 U	2 U	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	µg/l	-	0.4	2 U	2 U	1 U	1 U	1 U	1 U
Trichloroethylene (TCE)	µg/l	-	5	120 J	12	1.9	1 U	1 U	1 U
Trichlorofluoromethane	µg/l	-	5	2 U	2 U	1 U	1 U	1 U	1 U
Vinyl Chloride	µg/l	-	2	2 U	2 U	1 U	1 U	1 U	1 U
Xylenes, Total	µg/l	-	5	4 U	4 U	2 U	2 U	2 U	2 U
Total Organic Carbon by Lloyd Kahn Method									
Total Organic Carbon	mg/l	-	-	1.3 J	2.7 J	1.2 J	1.4 J	1.3 J	1.2 J
Geochemical Parameters									
Dissolved Oxygen	mg/l	-	-	9.01	1.76	8.45	9.05	5.23	5.23
Oxygen Reduction Potential	mV	-	-	-2.8	-0.9	59.9	52.9	53.2	53.2

Notes and Abbreviations
ng/L - nanograms per liter
µg/L - micrograms per liter
mg/L - milligrams per liter
mV - millivolts
U - Compound not detected
J - Estimated value
UJ - Estimated Non-Detect
N - Primary sample
FD - Field duplicate sample
NYSDEC TOGS111 - Standards listed are the New York State Department of Environmental Conservation (NYSDEC)
Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 values for Class GA groundwater.
🟨 Exceedance of NYS GA Guidance
🟩 Exceedance of NYS GA Standard

LIST OF APPENDICES

Appendix A-1
Boring Logs

ERM
105 Maxess Road; Suite 316
Melville, New York 11747
Telephone: (631) 756-8900

JS-B/MW-001BR

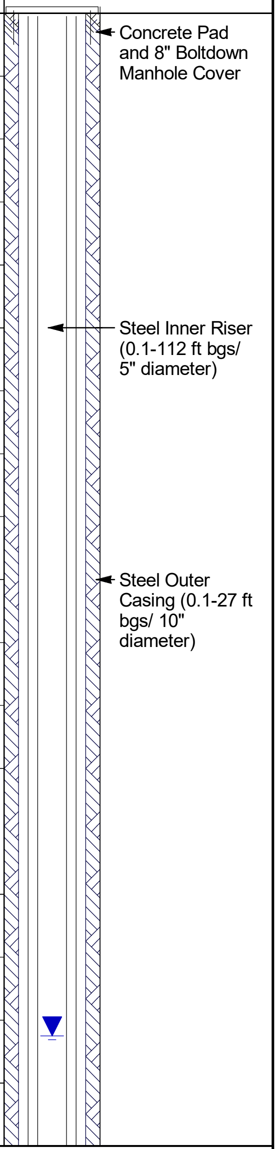
PAGE 1 OF 7

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DIRECT PUSH CONTRACTOR: Parratt Wolff, Inc.
TOTAL DEPTH: 137.1 feet bgs
GROUND ELEVATION: 428.10 feet amsl
DATE DIRECT PUSH COMPLETED: 8/10/2016
DIAMETER: 1.25-6 inches
TOC ELEVATION: 427.62 feet amsl
SONIC CONTRACTOR: Cascade Drilling
LOGGED BY: C. Payne
NORTHING: 1484141.08
DATE SONIC COMPLETED: 5/21/2018
CHECKED BY: H. Usle
EASTING: 799436.71
WIRELINE CONTRACTOR: Cascade Drilling
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
DATE MW INSTALLED: 5/31/2018
DRILLING METHODS: Hand Auger/ Direct Push/ Sonic Coring/ Wireline Rock Coring
NOTES: Lithologic details from ground surface to 79.5 feet bgs and surface elevation derived from JS-B-001. Soil samples collected as part of the Clay Remedial Investigation.

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY %	RQD %	STRUCTURE (angle\ type)	U.S.C.S.	MATERIAL DESCRIPTION	PID (ppm)
		DP	50			GP	Light Gray, GRAVEL AND SAND, trace clay, moisture from precipitation, compact, moist. 1.0	0.1
						SP	Brown, FINE TO MEDIUM GRAVELLY SAND, subangular gravels (0.25"-1" diameter), poorly graded, loose to medium dense, dry. 3.0	0.1 0.0
		DP	50			GP	Brown, COARSE GRAVEL, subangular and subrounded, brick, iron oxidized surfaces, dry. 4.5	0.1 0.1
5	423					CL	Gray to Brown, CLAY, some fine sand, trace subangular gravel (0.5" diameter), soft, wet. 6.5	0.4 0.6
						SP	Brown to Brownish Gray, FINE TO MEDIUM GRAVELLY SAND, subangular quartz (1" diameter), medium dense, moist, mottling. 8.0	0.5
10	418	DP	50			SP	Brownish Gray, FINE TO COARSE GRAVELLY SAND, subangular and subrounded gravels (1"-2" diameter), medium dense, wet. 12.0	0.4 1.0 0.6 0.5
		DP JS-B-001BR (14.1-14.7) for VOCs, PFAS, TOC, and pH JS-B-001BR (14.7-16.8) for VOCs, PFAS, TOC, and pH	75			SP	Brownish Gray, FINE TO MEDIUM GRAVELLY SAND, trace clay, subangular gravel (0.5"-1" diameter), loose, wet. 14.0	0.8
15	413					SP	Brown to Gray, MEDIUM TO COARSE SAND, some gravel, subrounded (0.5" diameter) and subangular (1"-2" diameter) gravels, poorly graded, loose, wet. 16.3	0.7 0.3
						CL	Light Brown To Gray Brown, CLAY, soft, plastic, saturated. 17.2	10.5
						CL	Gray, CLAY, gray to brown transition, soft, plastic, saturated.	12.4

WELL DIAGRAM



SAMPLE TYPE:
☒ DP = Direct Push
◎ SC = Sonic Coring
▮ RC = Wireline Rock Coring

GRAPHIC LOG LEGEND:
- Poorly-graded Sandy Gravel
- Poorly-graded Gravelly Sand
- Poorly-graded Gravel
- ▨ Low Plasticity Clay
- Poorly-graded Sand
- ▦ Silty Clay
- Silty Sand
- Well-graded Sand
- ▨ Low Plasticity Sandy Clay

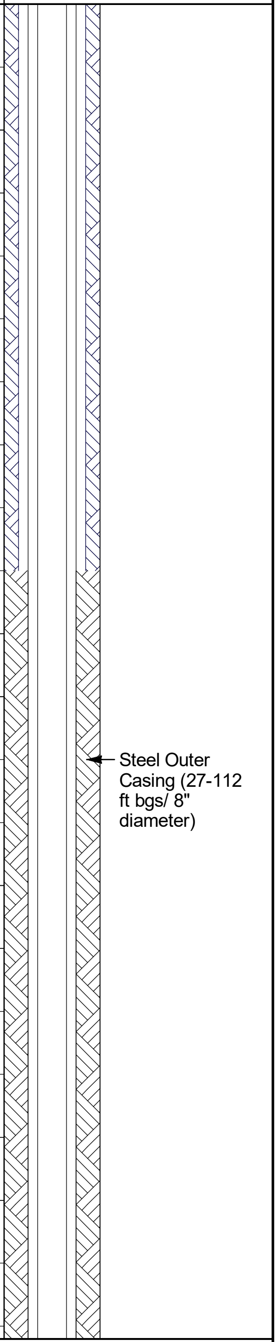
ACRONYM LEGEND:
amsl = above mean sea level
bgs = below ground surface
NM = not measured
ppm = parts per million
PFAS = per- and polyfluoroalkyl substances
PID = photoionization detector
TOP = total oxidizable precursor
TOC = total organic carbon
VOCs = volatile organic compounds

STRUCTURE LEGEND:
fr = fracture
vn = vein
vnlt = veinlet
jnt = joint
flt = fault
fol = foliation

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY %	RQD %	STRUCTURE (angle type)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	88			CL		Gray, CLAY, gray to brown transition, soft, plastic, saturated. *(continued)*	28.4
20	408						20.0		10.2
		DP	100			CL-ML	21.0	Dark Gray, CLAY, interbedded very fine silty sand, soft, saturated.	0.9
						CL		Dark Gray To Gray, CLAY, soft to medium stiff, plastic, saturated.	0.2
									0.2
									0.2
25	403	DP	100						0.5
									0.2
									0.1
							28.0		0.3
		DP	100			CL-ML		Gray, CLAY, interbedded very fine silty sand, gray color lightening down core, soft to medium stiff, plastic, saturated.	0.4
30	398								0.2
									0.2
							32.0		0.3
		DP	100			CL		Gray, CLAY, soft, plastic, saturated.	0.2
							33.8		0.2
35	393					CL-ML		Gray, CLAY, interbedded very fine silty sand, interbedded very fine-grained silty sands throughout, soft, plastic, saturated.	0.2
									0.2
		DP	100						0.3
									0.3
									0.3

WELL DIAGRAM



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▨	Low Plasticity Clay	▨	Poorly-graded Sand	▥	Silty Clay
▥	Silty Sand	▨	Well-graded Sand	▨	Low Plasticity Sandy Clay

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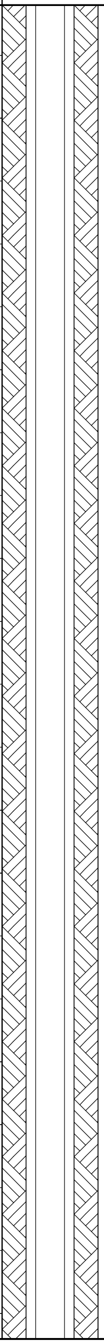
Client: Arnold & Porter **Project Name:** Hoosick

Project Number: 0378075 **Project Location:** Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY %	RQD %	STRUCTURE (angle type)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
						CL-ML		Gray, CLAY, interbedded very fine silty sand, interbedded very fine-grained silty sands throughout, soft, plastic, saturated. *(continued)*	0.2
40	388	DP JS-B-001BR (42.5-43.6) for VOCs, PFAS, TOC, and pH	100						0.2
									0.2
								42.8	0.2
						SM		Dark Gray, VERY FINE SILTY SAND, loose, saturated. 44.0	0.3
		DP	50			SW		Dark Gray, VERY FINE SAND, well graded, loose, saturated. 45.5	0.4
45	383					SP		Grayish Brown, FINE TO COARSE SAND, with rounded fine gravel, (0.25" diameter), poorly graded, loose, saturated.	1.0
									0.7
								48.0	1.0
		DP	83			SP		Brownish Gray, COARSE SAND, and rounded gravel, (0.25" diameter), loose, saturated.	0.7
								50.0	1.0
50	378					SP		Brownish Gray, FINE TO MEDIUM SAND, loose, saturated. 51.0	0.3
						GP		Gray, Red Brown, White, and Brown, FINE GRAVEL, trace subrounded coarse sand, loose, saturated. 52.0	0.6
		DP	63			SP		Grayish Black, MEDIUM TO COARSE SAND, some gravel, well sorted, subrounded gravel (1"-2" diameter), subangular near 60 ft bgs, loose, saturated.	0.4
									0.4
									0.4
55	373								0.9
		DP	63						0.5
									0.7
									0.9
								60.0	0.8
60	368					CL			

WELL DIAGRAM



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Poorly-graded Gravel
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Poorly-graded Sand
Silty Clay
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Project Location: Hoosick, New York

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		DP	25			CL		Dark Gray, SANDY CLAY, trace subrounded gravel, gravel (0.5" diameter), slight bluish hue, "organic-like odor", soft to medium stiff, saturated. *(continued)* 64.0	12.0	
65	363	DP	75			SP		Dark Grayish - Black, MEDIUM TO COARSE GRAVELLY SAND, some sandy clay, subangular gravel (0.25"-0.5" diameter), poorly sorted, varying colors, loose, saturated. 68.0	4.4 5.0 3.8 2.1	
70	358	DP	17			SP		Dark Gray, MEDIUM TO COARSE GRAVELLY SAND, trace clay, subangular gravel (3" diameter), medium dense, wet. 72.0	1.4	
		DP	63			SW		Gray To Dark Gray, MEDIUM TO COARSE SAND, with fine to medium gravel, rounded to subrounded, well graded, repeated upward fining units, varying colors, loose to medium dense, saturated. 75.0	1.7 0.8 0.9	
75	353					SP		Gray To Dark Gray, FINE TO MEDIUM GRAVELLY SAND, with subangular medium gravel, (1"-2" diameter), dense, saturated. 76.0	0.4	
		DP	57			SP		Dark Gray To Black, FINE SAND, interbedded white sand lenses "sticky", loose, saturated. 76.5	1.0	
						SW		Dark Gray, FINE TO MEDIUM SAND, trace rounded fine gravel, well graded, fining upward, loose, saturated. 78.0	1.3	
						GP		Dark Gray To Reddish-Brown, FINE GRAVEL, some rounded fine to medium sand, saturated. 78.5	1.5	
						SP		Dark Gray, FINE TO MEDIUM SAND, with subangular gravel, black gravel (1"-2" diameter), saturated. 79.5	0.6	
80	348	SC				GP		Dark Gray, COARSE GRAVEL AND COBBLES, subrounded to subangular medium to coarse lithic sand matrix, saturated. 80.5	0.4 2.6	
						GC		Dark Gray, DIAMICT, with cobbles, dense, wet.	2.6	

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ERM
105 Maxess Road; Suite 316
Melville, New York 11747
Telephone: (631) 756-8900

JS-B/MW-001BR

Client: Arnold & Porter **Project Name:** Hoosick

Project Number: 0378075 **Project Location:** Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY %	RQD %	STRUCTURE (angle type)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
		SC	100			GC	82.7	Dark Gray, DIAMICT, with cobbles, dense, wet. *(continued)*	0.0	
									0.0	
									0.0	
85	343								0.5	
									0.2	
									34.3	
									42.7	
									73.7	
						GP		Dark Gray, COARSE GRAVEL, subrounded to subangular medium to coarse lithic sand matrix, loose, saturated.	62.5	
90	338								87.4	
									5.9	
									72.5	
		SC	100						NM	
									27.4	
95	333								81.1	
							96.5		46.5	
						GP	97.8	Medium Gray, FINE TO MEDIUM GRAVEL, trace rounded to subangular silt, coarse lithic gravel, loose, saturated.	15.5	
						SP		Dark Gray, LITHIC SAND, trace subrounded fine gravel, well sorted.	2.6	
							99.8		31.6	
100	328					GP		Dark Gray, MEDIUM TO COARSE GRAVEL, subrounded medium to coarse lithic gravel, loose, saturated.	21.8	
							101.7		3.7	
								Dark Gray, PHYLLITE, foliated calcite veinlets and white-tan milky quartz veins, several sigmoidal folds, tight foliations, foliation axis steepens with depth.	3.8	

SAMPLE TYPE:

- ☒ DP = Direct Push
- ◎ SC = Sonic Coring
- ◨ RC = Wireline Rock Coring

GRAPHIC LOG LEGEND:

- Poorly-graded Sandy Gravel
- Poorly-graded Gravelly Sand
- Poorly-graded Gravel
- Low Plasticity Clay
- Poorly-graded Sand
- Silty Clay
- Silty Sand
- Well-graded Sand
- Low Plasticity Sandy Clay

ACRONYM LEGEND:

amsl = above mean sea level
bgs = below ground surface
NM = not measured
ppm = parts per million
PFAS = per- and polyfluoroalkyl substances
PID = photoionization detector
TOP = total oxidizable precursor
TOC = total organic carbon
VOCs = volatile organic compounds

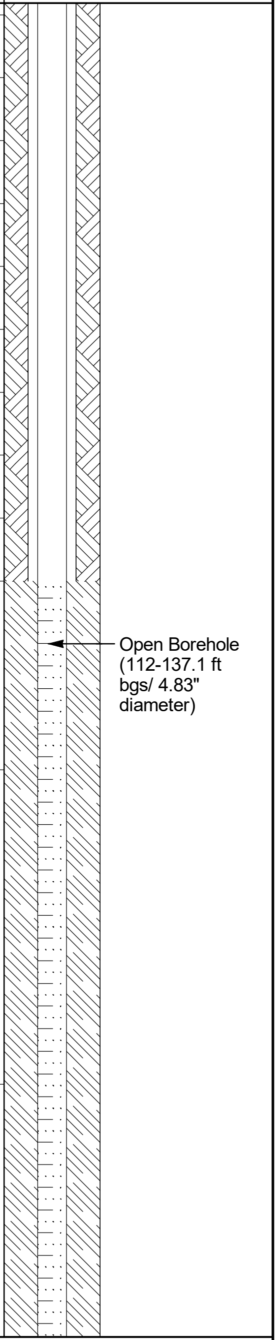
STRUCTURE LEGEND:

fr = fracture
vn = vein
vnlt = veinlet
jnt = joint
flt = fault
fol = foliation

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY %	RQD %	STRUCTURE (angle type)		U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		SC	100						Dark Gray, PHYLLITE, foliated calcite veinlets and white-tan milky quartz veins, several sigmoidal folds, tight foliations, foliation axis steepens with depth. *(continued)*	51.5
										50.2
105	323									
										13.3
										1.9
										2.4
										0.0
										0.0
110	318									
										0.0
										0.0
		RC	100	42.5						
					80	vnlt				0.0
					60	fol				
115	313									
		RC	100	54	30	fr				
					45	fr				0.0
					55	fol				
					20	fr				
120	308									
		RC	102	94.1	65	fol				
					45	fr			121.5	
									Dark Gray, PHYLLITE, tightly folded and foliated phyllite, thin foliations, pseudo-chevron folds, 1-centimeter calcite stringers along foliation and healed fractures, weak schistosity.	0.0
					18	fr				

WELL DIAGRAM



SAMPLE TYPE:
DP = Direct Push
SC = Sonic Coring
RC = Wireline Rock Coring

GRAPHIC LOG LEGEND:
Poorly-graded Sandy Gravel
Poorly-graded Gravelly Sand
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Low Plasticity Sandy Clay

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STRUCTURE LEGEND:
fr = fracture
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ERM
105 Maxess Road; Suite 316
Melville, New York 11747
Telephone: (631) 756-8900

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY %	RQD %	STRUCTURE (angle type)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
125	303						▨			Open Borehole (112-137.1 ft bgs/ 4.83" diameter)
		RC	104	84.6	21 fol 55 vn 18 fr		▨	Dark Gray, PHYLLITE, tightly folded and foliated phyllite, thin foliations, pseudo-chevron folds, 1-centimeter calcite stringers along foliation and healed fractures, weak schistosity. *(continued)*	0.0	
130	298						▨			
		RC	100	92	60 fol 50 fol 60 vn		▨		0.0	
135	293						▨			
		RC	0		50 fol		▨	137.1	0.0	
								Bottom of Boring @ 137.10 feet bgs		
140	288									
145	283									

SAMPLE TYPE:

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- ▮ RC = Wireline Rock Coring

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ERM
5788 Widewaters Parkway
Syracuse, New York 13214
Telephone: (315) 445-2554

JS-APS/B/MW-002A

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

APS CONTRACTOR: Cascade
DATE APS COMPLETED: 8/9/2016
B/MW CONTRACTOR: Parratt Wolff, Inc.
DATE B COMPLETED: 8/15/2016
DATE MW COMPLETED: 10/4/2016
GROUND ELEVATION: 428.90 feet amsl
NOTES:

DRILLING METHOD: Hand Auger/ Direct Push
TOTAL DEPTH: 83.9 feet bgs
DIAMETER: 1.25-3.25 inches
LOGGED BY: T. Daniluk/ J. Reynolds
CHECKED BY: H. Usle
TOC ELEVATION: 428.42 feet amsl

ACRONYM LEGEND

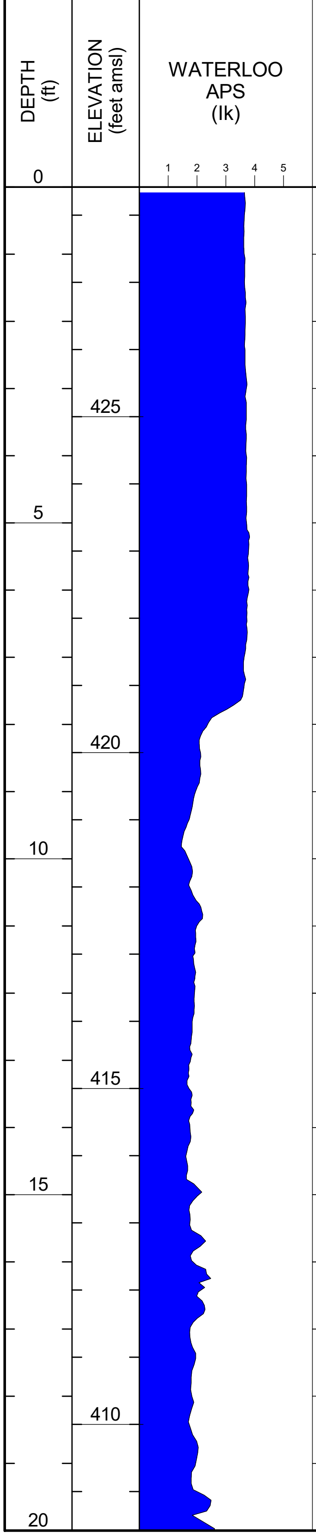
APS = Waterloo Advanced Profiling System
MW = Monitoring Well
B = Soil Boring
Ik = Index of Hydraulic Conductivity
amsl = above mean sea level
bgs = below ground surface
PID = Photoionization Detector
ppm = parts per million
HA = Hand Auger
DP = Direct Push

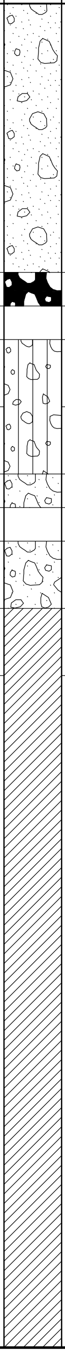
GRAPHIC LOG LEGEND

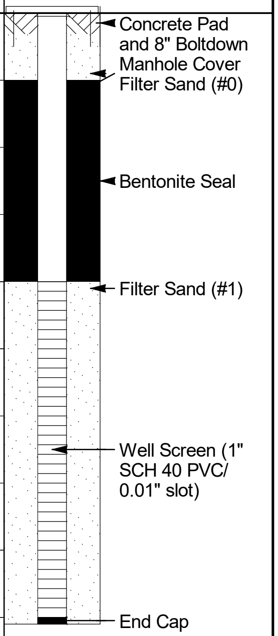
- ▨ USCS Poorly-graded Gravelly Sand
- ■ Boulders and cobbles
- ▥ USCS Gravelly Silt
- ▨ USCS Poorly-graded Sandy Gravel
- ▨ USCS Low Plasticity Clay
- ▨ USCS Low Plasticity Sandy Clay

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	U.S.C.S.	MATERIAL DESCRIPTION
4.0	DP	73	SP	Red Brown, FINE TO MEDIUM GRAVELLY SAND, subangular fine to coarse gravel, 2" of wood at 3 feet bgs, rock fragments from 4-4.5 feet bgs, poorly sorted, firm, dry to moist.
4.5	DP	67		Rock fragments.
5.0				Brick.
6.0			ML	Red Brown, GRAVELLY SILT, some angular fine sand and gravel, angular rock fragments from cobbles, firm, moist.
7.0			ML	Red Brown, GRAVELLY SILT, with subangular fine to coarse gravel, some metal fragments, fine- to medium-grained white material at 6.5 ft bgs, firm, moist to wet.
7.5			GP	Red Brown, FINE TO MEDIUM SANDY GRAVEL, subangular fine to coarse gravel, firm, wet.
8.0				Black/dark Brown, metal debris and "petroleum-like" odor.
9.0	DP	100	GP	Red Brown, FINE TO MEDIUM SANDY GRAVEL, subangular fine to medium gravel, poorly graded, firm, wet.
10.0			CL	Light Brown, CLAY, trace fine sand, gray clay within center of core, semi firm, plastic, saturated.
			CL	Gray, CLAY, semi firm, plastic, saturated.
	DP	100		
	DP	100		

DEPTH (ft)	PID (ppm)
0-1	0.0
1-2	0.0
2-3	0.0
3-4	0.0
4-5	0.0
5-6	0.0
6-7	0.0
7-8	0.3
8-9	0.1
9-10	0.2
10-11	0.7
11-12	0.4
12-14	0.0
14-15	0.0
15-16	0.0
16-17	0.0
17-18	0.0
18-19	0.0
19-20	0.0







Client: Arnold & Porter

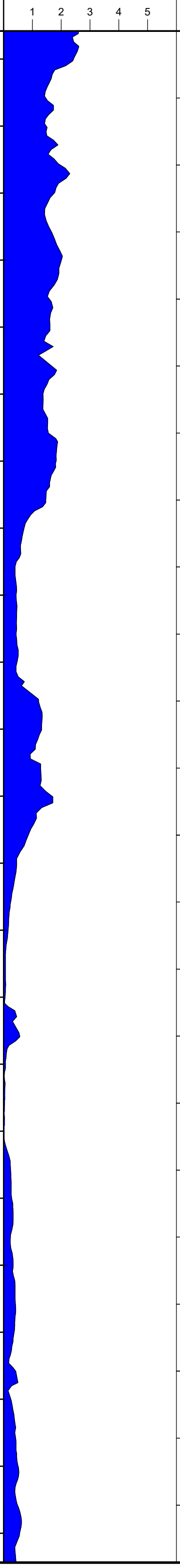
Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (ft)	ELEVATION (feet amsl)	SAMPLE TYPE NUMBER	RECOVERY %	U.S.C.S.	MATERIAL DESCRIPTION	PID (ppm)
20		DP	100	CL	Gray, CLAY, semi firm, plastic, saturated. *(continued)*	0.0 0.0
21.5				CL	Grayish Brown, SANDY CLAY, fine-grained, semi firm, saturated.	0.0
22.5	405			SC-SM	Grayish Brown, CLAYEY SAND, fine-grained, firm, wet to saturated.	0.0
24.0		DP	100	CL	Grayish Brown, SANDY CLAY, soft to medium stiff, plastic, saturated.	0.0
25.0				CL	Grayish Brown, CLAY, soft, plastic, saturated.	0.0
26.0				SC-SM	Grayish Brown, CLAYEY SAND, semi firm, saturated.	0.0
26.5				CL	Grayish Brown, SANDY CLAY, soft, plastic, saturated.	0.0
28.0	400	DP	100	CL	Brownish Gray, GRAVELLY CLAY, fine gravel, semi firm, saturated.	0.0
28.5				CL	Grayish Brown, SANDY CLAY, with fine gravel and medium to fine sand, firm, wet to saturated.	0.0 0.0 0.0 0.0
32.0	395	DP	100			0.0
33.5				SC-SM	Grayish Brown, CLAYEY SAND, fine-grained, semi firm, saturated.	0.0 0.0
35.0				CL	Grayish Brown, SANDY CLAY, fine-grained, soft, plastic, saturated.	0.0
36.0	390	DP	100	SC-SM	Grayish Brown, CLAYEY SAND, fine-grained, semi firm, saturated.	0.0 0.0 0.0 0.0
40		DP	100			0.0 0.0 0.0

WATERLOO APS (Ik)



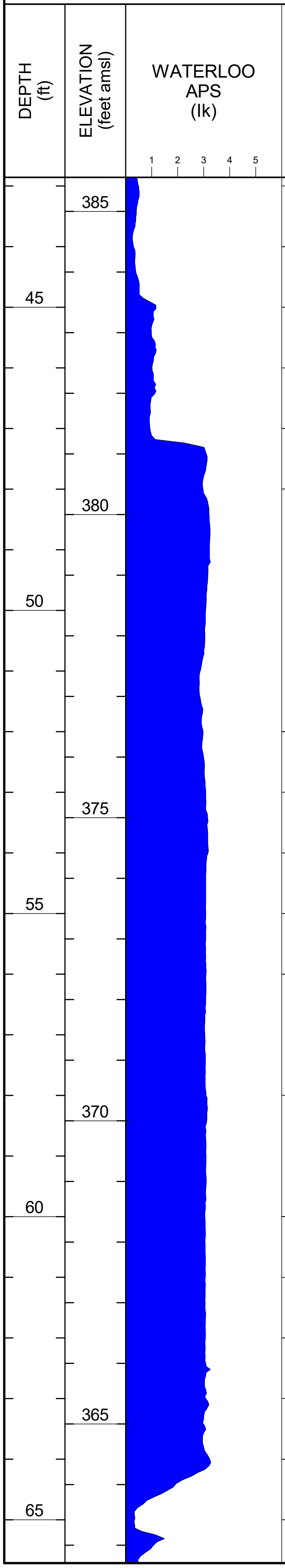
WELL DIAGRAM

ERM
5788 Widewaters Parkway
Syracuse, New York 13214
Telephone: (315) 445-2554

JS-APS/B/MW-002A

Client: Arnold & Porter **Project Name:** Hoosick

Project Number: 0378075 **Project Location:** Hoosick, New York

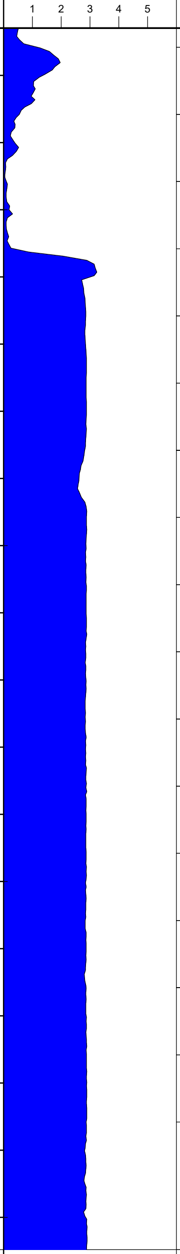


SAMPLE TYPE NUMBER	RECOVERY %	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
				43.0			
		SP		44.0	Grayish Brown, FINE SAND, some clay, trace fine to medium gravel, firm, saturated.	0.0	
DP	58	SP		45.0	Gray, FINE SAND, firm, saturated.	0.0	
		SP		46.0	Gray, FINE TO MEDIUM SAND, some fine gravel, firm, saturated.	0.0	
		SP		47.0	Gray, FINE TO MEDIUM GRAVELLY SAND, subangular fine gravel, poorly sorted, firm, saturated.	0.0	
		SP		48.0	Gray, FINE TO MEDIUM SAND, trace subangular fine gravel, firm, saturated.	0.4	
DP	0			52.0	No recovery.		
DP	50	SP		54.0	Gray, FINE TO COARSE GRAVELLY SAND, subangular fine gravel, firm, wet.	0.5 1.7	
		GP		55.0	Gray, FINE TO COARSE SANDY GRAVEL, subrounded fine to medium gravel, poorly graded, semi firm, wet.	1.5	
		SP		56.0	Gray, FINE TO COARSE GRAVELLY SAND, subrounded fine to coarse gravel, poorly sorted, semi firm, wet.	1.7	
DP DP	25 50	SP		62.0	Gray, FINE TO COARSE GRAVELLY SAND, subrounded fine to medium gravel, faint "organic-like" odor, large cobble at 57.5 feet bgs, poorly sorted, semi firm, wet to saturated.	2.1 3.1 4.4 1.4	
		GP		64.0	Gray, FINE TO COARSE SANDY GRAVEL, subrounded fine to coarse gravel, poorly graded, loose, wet.	5.3 4.8	
		GP			Grayish Brown, FINE SAND, with subangular fine to medium gravel, some rock fragments, poorly graded, loose, wet.	0.0 0.1	

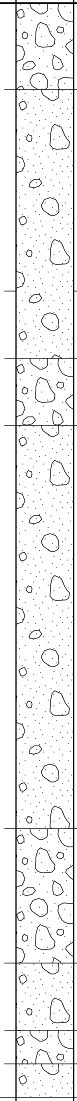
JS-APS/B/MW-002A

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

WATERLOO APS (Ik)



GRAPHIC LOG



DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	U.S.C.S.	MATERIAL DESCRIPTION	PID (ppm)
67.0	DP	79	GP	Grayish Brown, FINE SAND, with subangular fine to medium gravel, some rock fragments, poorly graded, loose, wet. *(continued)*	0.1
70.0	DP	56	SP	Grayish Brown, FINE TO MEDIUM GRAVELLY SAND, subangular fine to coarse gravel, firm, wet.	0.9 0.3
71.0			SP	Red Brown, FINE TO MEDIUM SAND, with subangular fine to coarse gravel, poorly sorted, hard, wet.	0.0 0.3
72.0			GP	Grayish Brown, FINE TO COARSE SANDY GRAVEL, subrounded fine to coarse gravel, fine- to medium-grained sand, poorly graded, loose, wet.	0.1
78.0	DP DP	79 50	SP	Grayish Brown, FINE TO MEDIUM GRAVELLY SAND, subrounded fine- to medium-grained sand, fine to coarse gravel, cobbles and rock fragments, poorly graded, firm, wet.	0.4 0.3 0.5 0.2 0.0 0.2
80.0			GP	Grayish Brown, FINE TO MEDIUM SANDY GRAVEL, subrounded fine- to medium-grained sand, fine to coarse gravel, some subangular rock fragments, poorly graded, firm, wet.	0.1 0.0
81.0	DP	34	SP	Grayish Brown, FINE TO COARSE GRAVELLY SAND, trace silt, fine to coarse subangular gravel, some oxidation, poorly sorted, hard, wet.	0.0
81.5			GP	Grayish Brown, FINE TO MEDIUM SANDY GRAVEL, subrounded poorly graded, loose, saturated.	0.0
82.0			SP	Grayish Brown, FINE GRAVELLY SAND, subrounded fine to coarse gravel, hard, wet.	

DEPTH (ft): 70, 75, 80
ELEVATION (feet amsl): 360, 355, 350, 345, 340

WELL DIAGRAM

Bottom of APS Boring @ 83.90 ft

Bottom of Boring @ 82.00 ft

ERM
105 Maxess Road; Suite 316
Melville, New York 11747
Telephone: (631) 756-8900

JS-B/MW-003BR

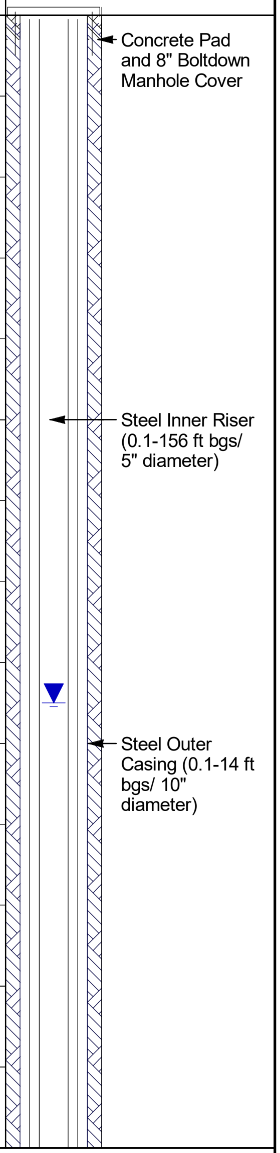
PAGE 1 OF 12

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DIRECT PUSH CONTRACTOR: Parratt Wolff, Inc.
DATE DIRECT PUSH COMPLETED: 8/4/2016
SONIC CONTRACTOR: Cascade Drilling
DATE SONIC COMPLETED: 5/16/2018
WIRELINE CONTRACTOR: Cascade Drilling
DATE MW INSTALLED: 6/11/2018
TOTAL DEPTH: 181.5 feet bgs
DIAMETER: 1.25-6 inches
LOGGED BY: C. Payne
CHECKED BY: H. Usle
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
DRILLING METHODS: Hand Auger/ Direct Push/ Sonic Coring/ Wireline Rock Coring
GROUND ELEVATION: 430.70 feet amsl
TOC ELEVATION: 430.50 feet amsl
NORTHING: 1484032.02
EASTING: 799375.88
NOTES: Lithologic details from ground surface to 87 feet bgs and surface elevation derived from JS-B-003. Soil samples collected as part of the Clay Remedial Investigation.

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY %	RQD %	STRUCTURE (angle/ type)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
						SP		Grayish Brown, FINE GRAVELLY SAND, subangular fine to coarse gravel, large roots, dry.	0.0 0.2
2.5	428.2	HA	100			SP		2.0 Reddish Brown, FINE TO MEDIUM GRAVELLY SAND, subrounded fine to medium gravel, loose, dry.	0.0
						SP		3.0 Reddish Brown, GRAVELLY SAND, subangular fine to coarse gravel, some debris, loose, dry to moist.	0.0 0.0
5.0	425.7							5.0	
		DP	33			CL-ML		Reddish Brown, CLAYEY SILT, some subangular fine to medium gravelly sand, wood present, semi firm, moist.	0.0
						GP		6.5 MEDIUM TO COARSE GRAVEL, subangular wood present, loose.	0.0
7.5	423.2					CL-ML		7.5 Reddish Brown, CLAYEY SILT, with fine to medium sand, some fine to medium subangular gravel, semi firm, moist to wet.	0.0
		JS-B-003BR (8.2-8.5) for VOCs, PFAS, TOC, pH				GP		8.0 Reddish Brown, FINE TO MEDIUM SANDY GRAVEL, some silt, subangular gravel, semi firm, wet.	NM
						CL		8.5 Reddish Brown, CLAY, trace subangular fine to medium gravel, soft, saturated.	
10.0	420.7	JS-B-003BR (8.5-9.5) for VOCs, PFAS, TOC, pH DP	75			CL		9.0 Grayish Brown, CLAY, soft, saturated.	0.0 0.0 0.0
12.5	418.2					CL		12.0 Grayish Brown, CLAY, trace subrounded fine to medium gravel, soft, saturated.	0.0 8.1

WELL DIAGRAM



SAMPLE TYPE:
- HA = Hand Auger
- DP = Direct Push
- SC = Sonic Coring
- RC = Wireline Rock Coring

GRAPHIC LOG LEGEND:
- Poorly-graded Gravelly Sand
- Silty Clay
- Poorly-graded Gravel
- Poorly-graded Sandy Gravel
- Low Plasticity Clay
- Clayey Sand
- Low Plasticity Sandy Clay
- Silty Sand
- Well-graded Gravelly Sand

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ERM
105 Maxess Road; Suite 316
Melville, New York 11747
Telephone: (631) 756-8900

JS-B/MW-003BR

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY %	RQD %	STRUCTURE (angle type)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
15.0	415.7	☒ DP	100			CL	▨	Grayish Brown, CLAY, trace subrounded fine to medium gravel, soft, saturated. *(continued)*	52.9 201.2	
								16.0		
17.5	413.2	☒ DP	100			CL	▨	Grayish Brown, CLAY, soft, low plasticity, saturated.	188.9 123.3 61.2 37.1	Steel Outer Casing (14-156 ft bgs/ 8" diameter)
20.0	410.7							20.0		
22.5	408.2	☒ DP	100			CL	▨	Grayish Brown, CLAY, soft to medium stiff, saturated.	2.0 0.0 0.0 0.0	
25.0	405.7	☒ DP	100				▨		0.0 0.0 0.0	
								27.0		
27.5	403.2					CL	▨	Reddish Brown, CLAY, soft to medium stiff, saturated.	0.0	
								28.0		
						SC	▨	Grayish Brown, CLAYEY SAND, fine-grained, semi firm, saturated.	0.0	
								28.5		
						CL	▨	Grayish Brown, CLAY, trace fine to medium sand, semi firm, saturated.		
								29.5	0.0	
30.0	400.7	☒ DP	100			SC	▨	Grayish Brown, CLAYEY SAND, fine-grained, soft to medium stiff, saturated.		
								30.0		
						CL	▨	Grayish Brown, CLAY, trace fine sand, semi firm, saturated.		

SAMPLE TYPE:

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- ☒ DP = Direct Push
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Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY %	RQD %	STRUCTURE (angle type)	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
						CL		32.0	Grayish Brown, CLAY, trace fine sand, semi firm, saturated. *(continued)*	0.4 0.4	
32.5 35.0	398.2 395.7	DP	100			CL		36.5	Grayish Brown, CLAY, trace fine sand, soft to medium stiff, plastic, saturated.	0.4 0.4 0.3 0.2	
		DP	100			SC		37.5	Grayish Brown, CLAYEY SAND, very fine sand, semi firm, saturated.	0.5	
37.5	393.2					CL		38.0	Grayish Brown, CLAY, soft, plastic, saturated.	0.3	
40.0	390.7					SC		40.0	Grayish Brown, CLAYEY SAND, very fine sand, semi firm, saturated.	0.2 0.1	
		DP	100			CL		41.5	Grayish Brown, SANDY CLAY, very fine sand, poorly sorted, semi firm, saturated.	0.0	
						CL		42.0	Grayish Brown, CLAY, soft, plastic, saturated.	0.1	
42.5	388.2					CL		44.0	Grayish Brown, SANDY CLAY, very fine sand, poorly sorted, semi firm, saturated.	0.2 0.2	
45.0	385.7	DP	100			SC		47.0	Grayish Brown, CLAYEY SAND, very fine sand, poorly sorted, soft, saturated.	0.1 0.1 0.1	

SAMPLE TYPE:

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GRAPHIC LOG LEGEND:

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STRUCTURE LEGEND:

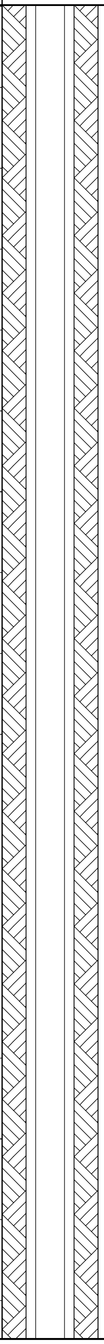
fr = fracture
vn = vein
vnlt = veinlet
jnt = joint
flt = fault
fol = foliation

JS-B/MW-003BR

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY %	RQD %	STRUCTURE (angle type)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
47.5	383.2					CL	47.5	Grayish Brown, SANDY CLAY, trace subangular fine gravel, very fine-grained sand, semi firm, saturated. *(continued)*	0.1
						SM	48.5	Reddish Brown, FINE TO MEDIUM SILTY SAND, trace clay, firm, wet.	
		JS-B-003BR (48.8-49.6) for VOCs, PFAS, TOC, pH DP	50						0.0
						SW	54.0	Reddish Brown, MEDIUM TO COARSE GRAVELLY SAND, subrounded fine to coarse gravel, subangular sand grains, poorly sorted, loose to medium dense, wet.	0.0
50.0	380.7								0.0
									0.0
52.5	378.2	DP	75						2.0
									1.1
						GW	56.0	Grayish Brown, SANDY GRAVEL, subangular medium to coarse gravel, medium- to coarse-grained sand, poorly sorted, loose, wet.	2.3
55.0	375.7								0.5
		DP	13			SP	60.0	Grayish Brown, FINE TO COARSE GRAVELLY SAND, fine to coarse sand, subrounded to subangular, coarse gravel in tip, dense, wet.	0.9
57.5	373.2								
60.0	370.7	DP	96			SW	63.0	Grayish Brown, FINE TO MEDIUM SAND, trace coarse gravel, poorly sorted, dense, wet.	0.6
									0.9
62.5	368.2								0.6
						SP	63.5	Reddish Brown, FINE SAND, well sorted, dense, wet.	

WELL DIAGRAM



SAMPLE TYPE:

- HA = Hand Auger
- DP = Direct Push
- SC = Sonic Coring
- RC = Wireline Rock Coring

GRAPHIC LOG LEGEND:

- Poorly-graded Gravelly Sand
- Silty Clay
- Poorly-graded Gravel
- Poorly-graded Sandy Gravel
- Low Plasticity Clay
- Clayey Sand
- Low Plasticity Sandy Clay
- Silty Sand
- Well-graded Gravelly Sand

ACRONYM LEGEND:

amsl = above mean sea level
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						SW	64.0	Reddish Brown, FINE TO MEDIUM SAND, poorly sorted, dense, wet. *(continued)*	0.0	
65.0	365.7	DP	58			GW	67.0	Gray, SANDY GRAVEL, medium to coarse gravel, fine- to coarse-grained sand, some rock fragments, fining upward sequence, poorly sorted, loose, wet.	0.1 0.0 0.1	
67.5	363.2					GP	68.0	Grayish Brown, FINE TO COARSE SANDY GRAVEL, subrounded fine to coarse gravel, dense, wet.	0.0	
						SP	68.5	Grayish Brown, FINE TO COARSE GRAVELLY SAND, subangular fine to medium gravel, well sorted, loose, wet.	0.1	
						GP	69.0	Grayish Brown, COARSE SANDY GRAVEL, subangular fine gravel, loose, wet.		
						GP	69.3	Gray, MEDIUM TO COARSE GRAVEL, subrounded dense, wet.	0.0	
						SW	70.0	Grayish Brown, FINE TO MEDIUM SAND, some subangular fine to medium gravel, fining upward sequence, some coarse-grained sand, well graded, loose, wet.		
70.0	360.7	DP	75			GP	71.0	FINE TO COARSE GRAVEL, trace subangular and subrounded coarse sand, loose, wet.	0.0	
						SP	72.0	Reddish Brown, FINE TO MEDIUM GRAVELLY SAND, some silt, fine to coarse subangular gravel, weathered bedrock fragments at base, wet.	0.0	
72.5	358.2					SW	72.5	Grayish Brown, FINE TO COARSE GRAVELLY SAND, subangular medium to coarse gravel, poorly sorted, dense, wet.	0.0	
		DP	83			GW	74.0	Grayish Brown, FINE TO COARSE GRAVEL, trace subrounded coarse sand, poorly sorted, wet.	0.0	
						SW	74.5	Grayish Brown, FINE TO MEDIUM GRAVELLY SAND, angular fine to medium gravel, poorly sorted, semi firm, saturated.	0.0	
75.0	355.7					GP	75.0	Grayish Brown, MEDIUM TO COARSE GRAVEL, some subrounded fine to medium sand, well sorted, wet.		
						GP	75.5	Grayish Brown, FINE GRAVEL, some subrounded fine to medium sand, well sorted, wet.	0.0	
						GP	76.0	Grayish Brown, SANDY GRAVEL, subrounded medium to coarse gravel, fine-grained sand, loose, wet.		
						SP	76.5	Brown, FINE TO MEDIUM SAND, some fine gravel, well sorted, semi firm, wet.	0.1	
77.5	353.2					GW	78.0	Gray, FINE TO COARSE GRAVEL, subrounded poorly sorted, loose, wet.	0.1	
		DP	75			GW	79.5	Gray, FINE TO COARSE SANDY GRAVEL, subangular fine to coarse gravel, fine- to coarse-grained sand, poorly sorted, loose, wet.	0.2 0.0	
						SP	80.0	Reddish Brown, FINE TO MEDIUM GRAVELLY SAND,		

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- ▨ Clayey Sand
- ▨ Low Plasticity Sandy Clay
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Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

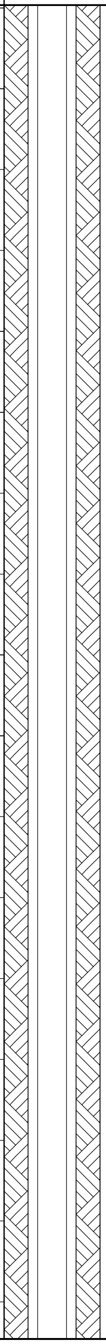
DEPTH (feet)	ELEVATION (feet amsl)
82.5	348.2
85.0	345.7
87.5	343.2
90.0	340.7
92.5	338.2
95.0	335.7

SAMPLE TYPE	RECOVERY %	RQD %	STRUCTURE (angle type)
DP	88		
DP	38		
SC	100		

U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
SP	80.5	subangular fine to coarse gravel, rock fragments at 79.5 feet bgs, dense, wet. *(continued)* Grayish Brown, FINE TO MEDIUM GRAVELLY SAND, subangular medium to coarse gravel, dense, wet.
GP	81.5	Gray, SANDY GRAVEL, subrounded fine to coarse gravel, fine- to medium-grained sand, shale fragments, loose, wet.
GP	83.0	Gray, FINE TO COARSE GRAVEL, some subrounded fine to medium sand, shale fragments, loose, wet.
GP	84.0	Grayish Brown, FINE TO COARSE SANDY GRAVEL, subangular fine to medium sand, shale fragments, loose, wet.
GW	87.0	Grayish Brown, FINE TO COARSE SANDY GRAVEL, subrounded fine to coarse sand, fine to coarse subrounded and subangular rock fragments, poorly sorted, dense, wet.
GP		Grayish Brown, FINE TO COARSE GRAVEL, with rounded to angular coarse sand, lithic gravel, loose, saturated.

PID (ppm)
0.3
0.1
0.0
0.0
5.0
5.0
5.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0

WELL DIAGRAM



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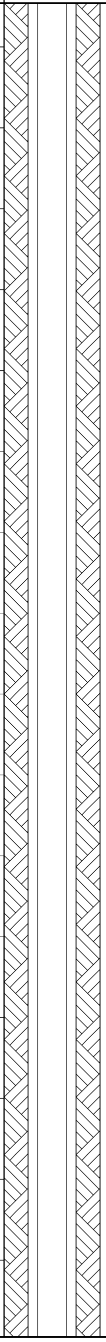
Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)
97.5	333.2
100.0	330.7
102.5	328.2
105.0	325.7
107.5	323.2
110.0	320.7
112.5	318.2

SAMPLE TYPE	RECOVERY %	RQD %	STRUCTURE (angle type)	U.S.C.S.	MATERIAL DESCRIPTION	PID (ppm)
◎				GP	Grayish Brown, FINE TO COARSE GRAVEL, with rounded to angular coarse sand, lithic gravel, loose, saturated. *(continued)*	0.0 0.0 0.0 0.0 0.0
					101.1	
SC	95			SP	Black, MEDIUM SAND, lithic sands, well sorted, loose, saturated.	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

WELL DIAGRAM



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ERM
105 Maxess Road; Suite 316
Melville, New York 11747
Telephone: (631) 756-8900

JS-B/MW-003BR

Client: Arnold & Porter **Project Name:** Hoosick

Project Number: 0378075 **Project Location:** Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY %	RQD %	STRUCTURE (angle type)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
								113.0	0.0	
									0.0	
115.0	315.7					SP		Dark Gray To Black, MEDIUM TO COARSE SAND, with subrounded coarse gravel and cobbles, lithic gravel, loose, saturated.	0.0	
									0.0	
117.5	313.2							117.0	0.0	
									0.0	
									0.0	
120.0	310.7					SP		Dark Gray To Black, MEDIUM TO COARSE SAND, with subrounded coarse gravel and cobbles, lithic gravel, loose, saturated.	0.0	
									0.0	
122.5	308.2								0.0	
								123.2	0.0	
									0.0	
125.0	305.7								0.0	
						GP-GM		Dark Gray, COBBLES, with coarse sand, gravel and silt, loose, saturated.	0.0	
127.5	303.2	SC	100						0.0	
									0.0	

SAMPLE TYPE:

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Poorly-graded Gravelly Sand
Silty Clay
Poorly-graded Gravel
Poorly-graded Sandy Gravel
Low Plasticity Clay
Clayey Sand
Low Plasticity Sandy Clay
Silty Sand
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Client: Arnold & Porter

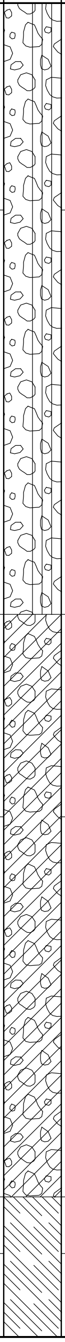
Project Name: Hoosick

Project Number: 0378075

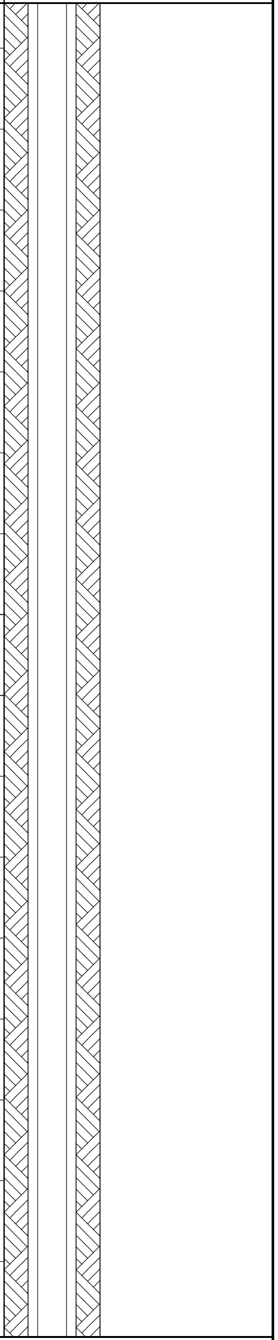
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY %	RQD %	STRUCTURE (angle type)	U.S.C.S.	MATERIAL DESCRIPTION	PID (ppm)
130.0	300.7					GP-GM	Dark Gray, COBBLES, with coarse sand, gravel and silt, loose, saturated. *(continued)* 132.0	0.0 0.0 0.0
132.5 135.0	298.2 295.7					GP-GM	Dark Gray, COARSE GRAVEL, with subrounded sand and silt, lithic gravel, dense, wet. 137.0	0.0 0.0 0.0 0.0 0.0
137.5	293.2					GC	Medium Gray to Light Brown, DIAMICT, with subrounded sand, silt, clay and gravel, coarse to medium-grained cobbles and gravel, lithic, dense, moderately plastic. 139.5	0.0 0.0
140.0 142.5	290.7 288.2	JS-B-003BR (141-142) for VOCs, PFAS, pH SC	91			GC	Gray Brown, DIAMICT, some clay and sand, weakly plastic, saturated. 144.2	0.0 0.0 5.7 0.0 0.0
							Dark Gray, PHYLLITE, weathered, clay matrix, very weak, moist. 144.9	0.0
145.0	285.7						Dark Gray, PHYLLITE, moderately platey, weak schistosity, dry.	0.0

GRAPHIC LOG



WELL DIAGRAM



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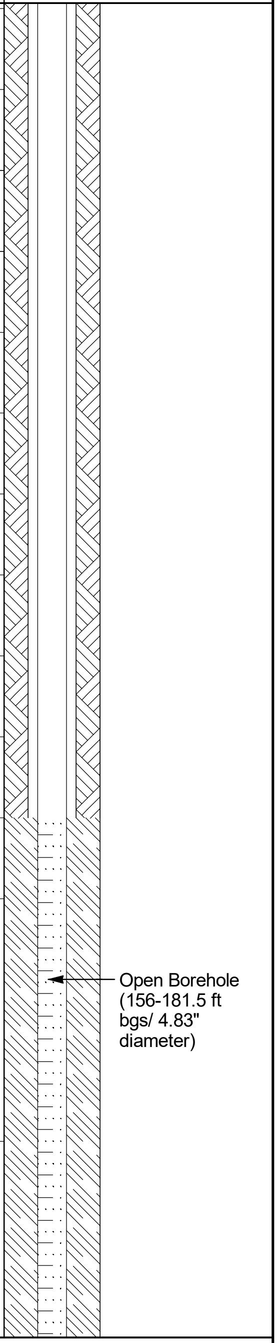
JS-B/MW-003BR

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY %	RQD %	STRUCTURE (angle	type)	U.S.C.S.	MATERIAL DESCRIPTION	PID (ppm)
									0.0
147.5	283.2								0.0
									0.0
									0.0
150.0	280.7								0.0
								Dark Gray, PHYLLITE, moderately platey, weak schistosity, dry. *(continued)*	0.0
		SC	49						
152.5	278.2								0.0
									0.0
									0.0
155.0	275.7								0.0
								156.0	
		RC	90	0				Dark Gray, PHYLLITE, milky quartz veins, possible structural zone, multiple strain indicators, quartz fill.	0.0
								157.0	
157.5	273.2				45	vn			
		RC	167	62					0.0
					29	fr		Dark Gray, PHYLLITE, thinly foliated with crenulation folding, calcite foliation parrallel, cross-cutting quartz, calcite, and pyrite veins, vein at 157.8 ft bgs.	
160.0	270.7								
					4	fr			
					77	fol			



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Client: Arnold & Porter
Project Name: Hoosick
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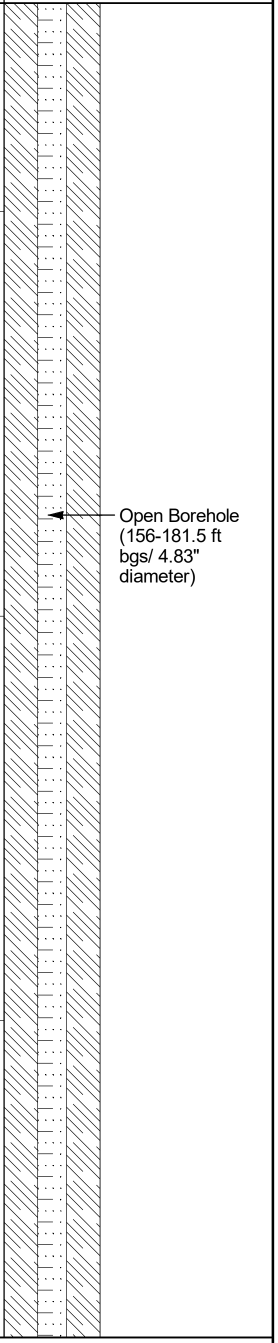
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY %	RQD %	STRUCTURE (angle type)		U.S.C.S.	MATERIAL DESCRIPTION	PID (ppm)
		RC	98	67	65	fol		Dark Gray, PHYLLITE, thinly foliated with crenulation folding, calcite foliation parrallel, cross-cutting quartz, calcite, and pyrite veins, vein at 157.8 ft bgs. *(continued)*	0.0
					48	fr			
					49	fr			
165.0	265.7				66	fol			
167.5	263.2	RC	98	80	28	fr		167.6	0.0
					62	fol		Dark Gray, PHYLLITE, secondary foliation axis and increased quartz and calcite veining (shear zone), open fracture at 167.6 ft bgs.	
					27	vn			
170.0	260.7				60	vn			
					70	vn			
172.5	258.2	RC	58	41					0.0
175.0	255.7								
177.5	253.2	RC	70	72	53	vn			0.0

WELL DIAGRAM



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ERM
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Melville, New York 11747
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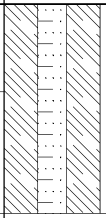
JS-B/MW-003BR

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY %	RQD %	STRUCTURE (angle)	STRUCTURE (type)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
180.0	250.7	▮			50	fr		▨	Dark Gray, PHYLLITE, secondary foliation axis and increased quartz and calcite veining (shear zone), open fracture at 167.6 ft bgs. *(continued)*		
		RC	0		60	fol		▨			
181.5									Bottom of Boring @ 181.50 feet bgs		
182.5	248.2										
185.0	245.7										
187.5	243.2										
190.0	240.7										
192.5	238.2										
195.0	235.7										

SAMPLE TYPE:

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GRAPHIC LOG LEGEND:

- ⛶ Poorly-graded Gravelly Sand
- ▨ Silty Clay
- ⛶ Poorly-graded Gravel
- ⛶ Poorly-graded Sandy Gravel
- ▨ Low Plasticity Clay
- ▨ Clayey Sand
- ▨ Low Plasticity Sandy Clay
- ▥ Silty Sand
- ⛶ Well-graded Gravelly Sand

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ERM
5788 Widewaters Parkway
Syracuse, NY 13214
Telephone: (315) 445-2554

JS-APS/B/MW-004A

PAGE 1 OF 7

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

APS CONTRACTOR: Cascade
DATE APS COMPLETED: 8/9/2016
B/MW CONTRACTOR: Parratt Wolff, Inc.
DATE B COMPLETED: 8/23/2016
DATE MW COMPLETED: 10/4/2016
GROUND ELEVATION: 432.10 feet amsl
NOTES:

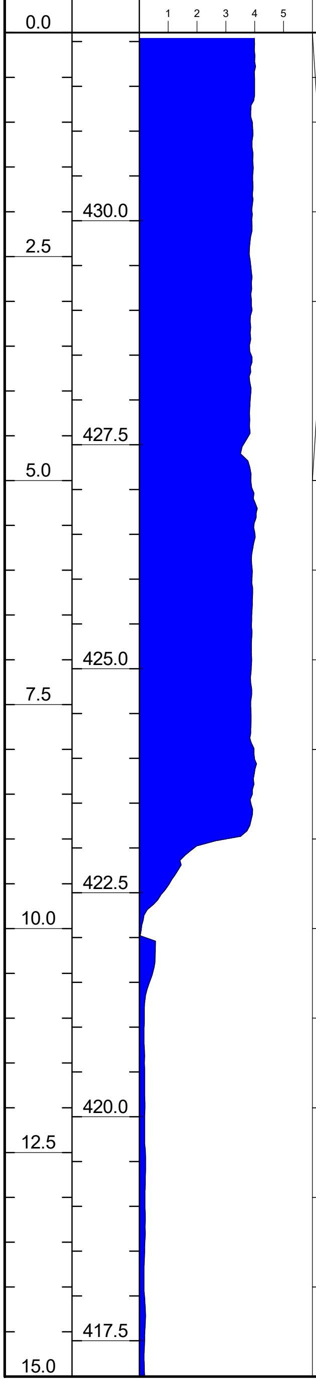
DRILLING METHOD: Hand Auger/ Direct Push
TOTAL DEPTH: 111.5 feet bgs
DIAMETER: 1.25-3.25 inches
LOGGED BY: J. Reynolds/ H. Usle
CHECKED BY: J. Fox
TOC ELEVATION: 431.73 feet amsl

ACRONYM LEGEND

APS = Waterloo Advanced Profiling System
MW = Monitoring Well
B = Soil Boring
Ik = Index of Hydraulic Conductivity
amsl = above mean sea level
bgs = below ground surface
PID = Photoionization Detector
ppm = parts per million
HA = Hand Auger
DP = Direct Push

GRAPHIC LOG LEGEND

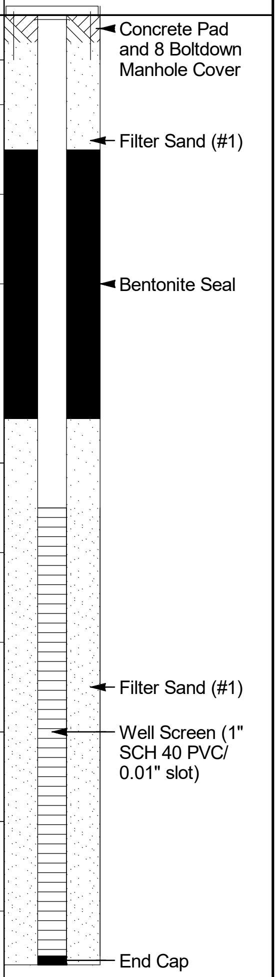
▥ USCS Gravelly Silt	▥ USCS Sandy Silt
░ USCS Poorly-graded Sand	░ USCS Poorly-graded Gravelly Sand
▨ USCS Low Plasticity Clay	▥ USCS Silt



SAMPLE TYPE	RECOVERY %	U.S.C.S.	DEPTH	MATERIAL DESCRIPTION
HA	100	ML	0.5	Reddish Brown, GRAVELLY SILT, trace fine to medium sand, subrounded gravel, organics, loose, dry to moist.
		ML	2.0	Reddish Brown, GRAVELLY SILT, trace fine sand, fine to coarse gravel, some organics, loose, dry to moist.
		ML	5.0	SANDY SILT, some fine to coarse gravel, subangular, fine- to medium-grained sand, loose, dry.
DP	70	SP	6.0	Dark Brown To Gray Brown, FINE SAND, some silt, trace subangular gravel (1" diameter), brick fragments, medium dense, moist.
		SP	6.5	Brown Orange, MEDIUM SAND, some subangular gravel, medium dense, dry.
		SP	8.0	Gray Brown, FINE TO MEDIUM GRAVELLY SAND, subangular (1"-2" diameter), medium dense, dry.
DP	63	SP	10.0	Brown, MEDIUM TO COARSE GRAVELLY SAND, subangular (0.5"-3" diameter), trace clay, loose to medium dense, saturated.
		CL	10.3	Brownish Gray, CLAY, soft, plastic, saturated.
DP	100	CL		Gray, CLAY, soft, plastic, saturated.

PID (ppm)
0.5
0.9
1.4
2.1
1.6
0.1
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0

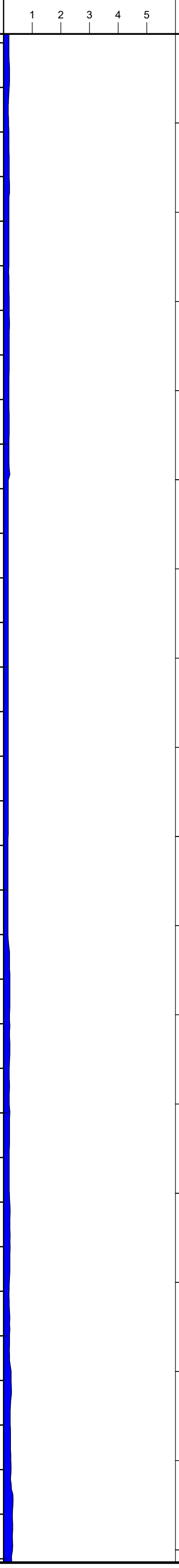
WELL DIAGRAM



ERM
5788 Widewaters Parkway
Syracuse, NY 13214
Telephone: (315) 445-2554

Client: Arnold & Porter **Project Name:** Hoosick

Project Number: 0378075 **Project Location:** Hoosick, New York



DEPTH (ft)	ELEVATION (feet amsl)	WATERLOO APS (Ik)	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
15.0								0.0	
	415.0		DP	100				0.0	
17.5					CL		Gray, CLAY, soft, plastic, saturated. *(continued)*	0.0	
								0.0	
	412.5							0.0	
20.0			DP	100			20.0	0.0	
								0.0	
	410.0							0.0	
22.5								0.0	
			DP	100	CL		Gray, CLAY, trace silt, soft, plastic, wet to saturated.	0.0	
	407.5							0.0	
25.0								0.0	
								0.0	
	405.0							0.0	
27.5								0.0	
			DP	100			28.0	0.0	
	402.5							0.0	
30.0					CL		Gray To Dark Gray, CLAY, trace silt, interbedded, soft to medium stiff, plastic, wet to saturated.	0.0	
								0.0	
	400.0								

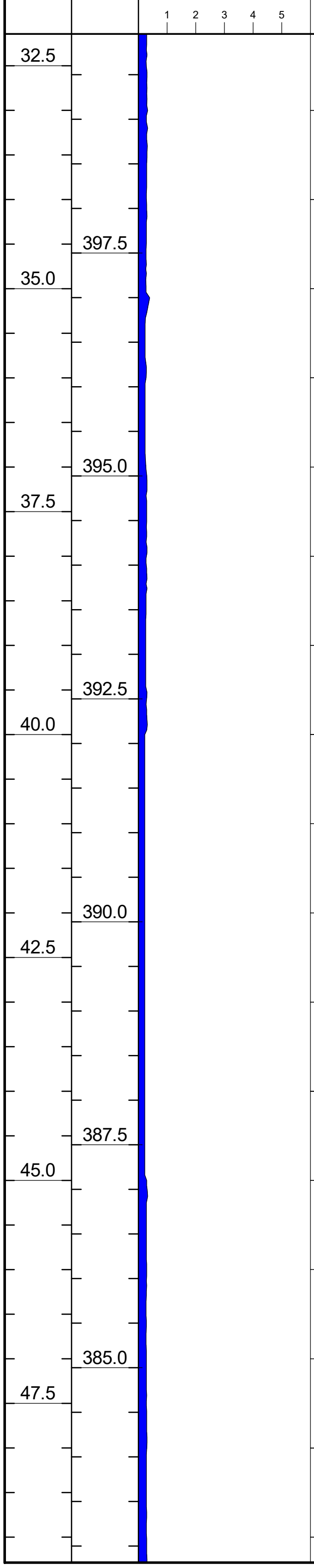
JS-APS/B/MW-004A

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York



SAMPLE TYPE	RECOVERY %	U.S.C.S.	DEPTH (ft)	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
DP	100	CL	34.0	Gray To Dark Gray, CLAY, trace silt, interbedded, soft to medium stiff, plastic, wet to saturated. *(continued)*	0.0 0.0	
		ML	34.8	Dark Gray, SILT, trace fine sand and clay, soft, saturated.	0.0	
		CL-ML	36.0	Dark Gray, SILTY CLAY, some very fine sand, interbedded, soft to medium stiff, saturated.	0.0	
DP	100	CL-ML	37.0	Dark Gray, SILTY CLAY, interbedded, soft to medium stiff, saturated.	0.0	
		SP-SM	38.0	Dark Gray, SANDY SILT, very fine sand, soft, saturated.	0.0	
		CL-ML	40.0	Dark Gray, SILTY CLAY, some fine sand, soft to medium stiff, saturated.	0.0 0.0	
DP DP	100 100	CL	48.0	Dark Gray, CLAY, some silt, interbedded, non laminar, silt content decreasing with depth, soft, plastic, saturated.	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	
		ML		Gray To Dark Gray, SILT AND CLAY, interbedded, soft to medium stiff, plastic, saturated.	0.0	

ERM
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Syracuse, NY 13214
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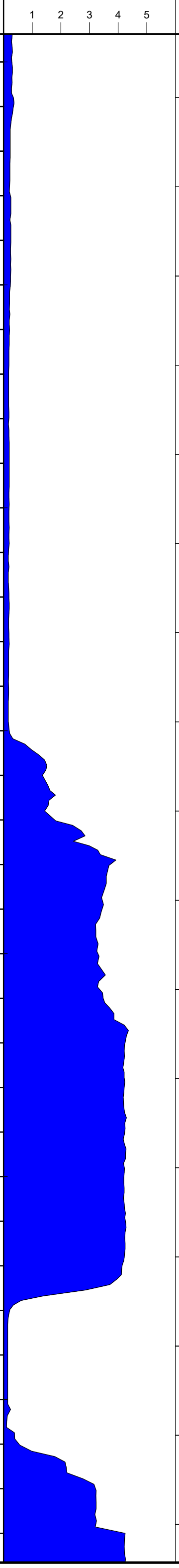
JS-APS/B/MW-004A

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York



DEPTH (ft)	ELEVATION (feet amsl)	U.S.C.S.	MATERIAL DESCRIPTION
50.0	382.5	ML	Gray To Dark Gray, SILT AND CLAY, interbedded, soft to medium stiff, plastic, saturated. *(continued)*
52.0	380.0	CL	Dark Gray, CLAY, some silt, medium stiff, cohesive, saturated.
52.5		ML	Dark Gray, SILT, some clay, soft, saturated.
53.5		CL	Dark Gray, CLAY, some silt, medium stiff, cohesive, saturated.
54.0	377.5	ML	Dark Gray, SILT, soft, saturated.
55.0		CL	Dark Gray, CLAY, some silt, medium stiff, cohesive, saturated.
56.0		CL-ML	Dark Gray, SILTY CLAY, medium stiff, cohesive, saturated.
56.5	375.0	CL-ML	Dark Gray, CLAYEY SILT, soft, saturated.
58.0		CL	Dark Gray, CLAY, stiff, saturated.
58.2		CL-ML	Dark Gray, CLAYEY SILT, soft, saturated.
59.5	372.5	ML	Dark Gray, SILT, trace clay layers and fine sands, trace rounded gravel (0.5" diameter), stiff, wet.
60.0	370.0	SP-SM	Dark Gray, VERY FINE SILTY SAND, loose, saturated.
63.5	367.5	SP	Dark Gray To Black, MEDIUM TO COARSE GRAVELLY SAND, subangular to subrounded, (0.25"-1" diameter), loose, wet to saturated.

SAMPLE TYPE	RECOVERY %
DP	100
DP	100
DP	100
DP	95
DP	63

PID (ppm)
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.0
0.2
0.2
0.3
0.2
0.0
0.0

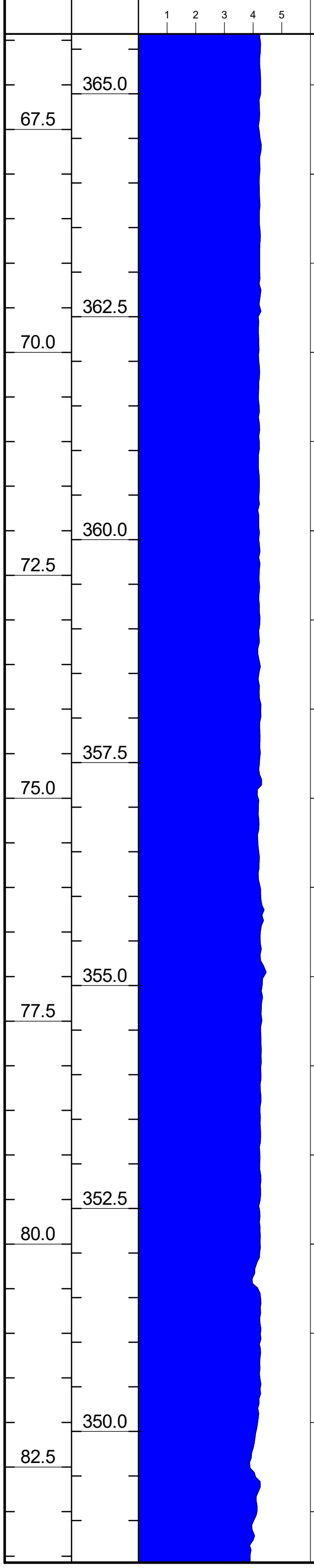
WELL DIAGRAM

Client: Arnold & Porter

Project Name: Hoosick

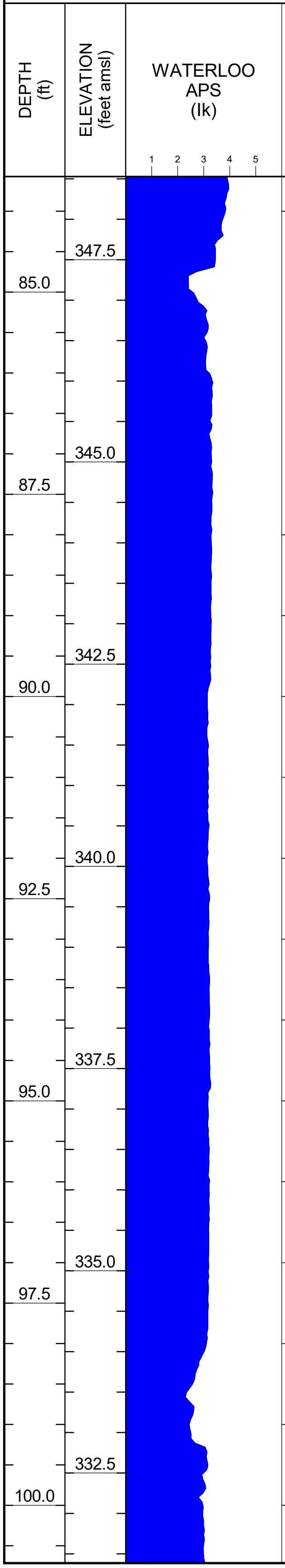
Project Number: 0378075

Project Location: Hoosick, New York



SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
		SP	67.0		0.0	
DP	50	SC-SM	72.0	Light Gray, CLAYEY COARSE SAND, some subangular gravel, (0.5" diameter), some silt, medium dense to dense, saturated.	0.0 0.0 0.1 0.0 0.0	
DP	25	SP	76.0	Light Gray, COARSE GRAVELLY COARSE TO FINE SAND, some clay, subangular (1" diameter), loose, saturated.	0.0 0.0 0.0 0.0	
DP	50	GW	80.0	Dark Gray, GRAVEL, some medium to coarse sand, subrounded (0.25"-1" diameter), fining upward sequence, well graded, loose, saturated.	0.0 0.0 0.0 0.0	
		SW	81.0	Gray, Red and White, COARSE SAND, rounded, fining upward sequence, well graded, loose, saturated.	0.0	
DP	75	GP	83.0	Dark Gray, Green and White, GRAVEL, subangular to subrounded, (0.5"-2" diameter), saturated.	0.0 0.0	
		SP		Dark Gray, COARSE GRAVELLY COARSE TO FINE SAND, subangular (0.5" diameter), loose, saturated.		

Client: Arnold & Porter
Project Number: 0378075
Project Name: Hoosick
Project Location: Hoosick, New York



SAMPLE TYPE	RECOVERY %	U.S.C.S.	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
		SP	84.0	0.0	
DP	6	SP	Gray, COARSE SAND AND GRAVEL, some clay, subrounded to subangular (0.5"-1" diameter), poorly sorted, dense, saturated.	0.0	
DP	25			0.0	
				0.1	
				0.0	
			92.0	0.0	
DP	85	SP	Dark Gray, MEDIUM TO COARSE SAND, trace rounded fine gravel, loose, saturated. 93.5	0.0	
		GP	Dark Gray To Black, GRAVEL, some coarse sand, subrounded to subangular (0.5"-1" diameter), loose, saturated. 94.5	0.0	
		SP	Dark Gray To Black, COARSE SAND, rounded well sorted, loose, saturated. 95.2	0.0	
		SP	Dark Bluish-Gray, COARSE GRAVELLY COARSE TO FINE SAND, subrounded (0.5" diameter), loose, wet. 96.0	0.0	
DP	45	SP	Dark Gray To Black, MEDIUM TO COARSE SAND, well sorted, loose, saturated.	0.0	
			98.0	0.0	
		GP	Dark Gray To Black, FINE GRAVEL, some coarse sand, subrounded to subangular (0.5" diameter), loose, saturated. 99.0	0.0	
		SP	Gray, MEDIUM TO COARSE SAND, some clay and gravel, subangular, loose, saturated. 100.0	0.0	
		SW	Dark Bluish-Gray, MEDIUM TO COARSE SAND, grading to gravelly coarse sand, subangular and subrounded (0.5"-1"	0.0	

JS-APS/B/MW-004A

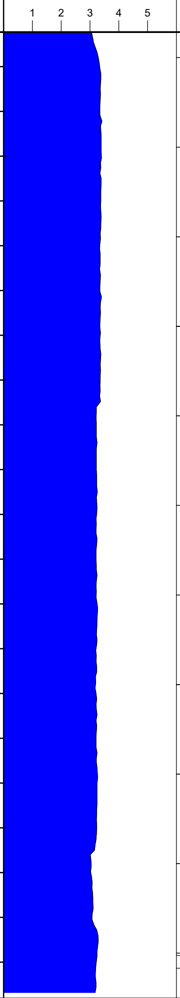
Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

WATERLOO APS (Ik)



DEPTH (ft)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY %	U.S.C.S.	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
					diameter), well graded, loose, saturated.		
						0.0	
	330.0	DP	33				
102.5				SW	Dark Bluish-Gray, MEDIUM TO COARSE SAND, grading to gravelly coarse sand, subangular and subrounded (0.5"-1" diameter), well graded, loose, saturated. *(continued)*	0.0	
						0.1	
					104.0		
	327.5					0.0	
105.0				SP	Dark Gray, FINE TO COARSE SAND, well sorted, loose, saturated.		
						0.0	
		DP	50		106.0		
						0.0	
	325.0			SP	Dark Gray, COARSE GRAVELLY COARSE TO FINE SAND, subrounded and subangular (1"-2" diameter), loose, saturated.		
107.5						0.0	
					108.0		
						0.1	
	322.5	DP	8	SP	Grayish Blue, COARSE GRAVELLY COARSE TO FINE SAND, subangular (0.5"-1" diameter), laminar toward base with light-brown and greenish layering, green/blue shale fragments at base, dense.	0.1	
110.0							
						0.1	
					111.2	0.1	

Bottom of APS Boring @ 111.50 ft

Bottom of Boring @ 111.20 ft

ERM
5788 Widewaters Parkway
Syracuse, NY 13214
Telephone: (315) 445-2554

JS-APS/B/MW-005A

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

APS CONTRACTOR: Cascade
DATE APS COMPLETED: 8/4/2016
B/MW CONTRACTOR: Parratt Wolff, Inc.
DATE B COMPLETED: 8/25/2016
DATE MW COMPLETED: 10/4/2016
GROUND ELEVATION: 433.30 feet amsl
NOTES:

DRILLING METHOD: Hand Auger/ Direct Push
TOTAL DEPTH: 112.2 feet bgs
DIAMETER: 1.25-3.25 inches
LOGGED BY: H. Usle/ B. Lynch
CHECKED BY: J. Reynolds
TOC ELEVATION: 433.00 feet amsl

ACRONYM LEGEND

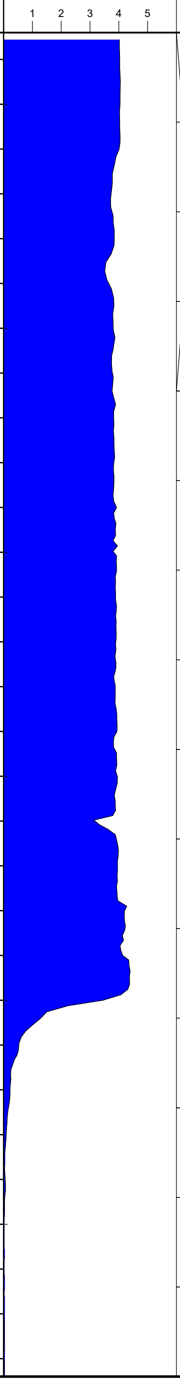
APS = Waterloo Advanced Profiling System
MW = Monitoring Well
B = Soil Boring
Ik = Index of Hydraulic Conductivity
amsl = above mean sea level
bgs = below ground surface
PID = Photoionization Detector
ppm = parts per million
HA = Hand Auger
DP = Direct Push

GRAPHIC LOG LEGEND

- Topsoil
- USCS Silty Sand
- USCS Poorly-graded Sand with Clay
- USCS Silt
- USCS Sandy Silt
- USCS Poorly-graded Sand

DEPTH (ft)	ELEVATION (feet amsl)
0.0	
	432.5
2.5	
	430.0
5.0	
	427.5
7.5	
	425.0
10.0	
	422.5
12.5	
	420.0
15.0	

WATERLOO APS (Ik)

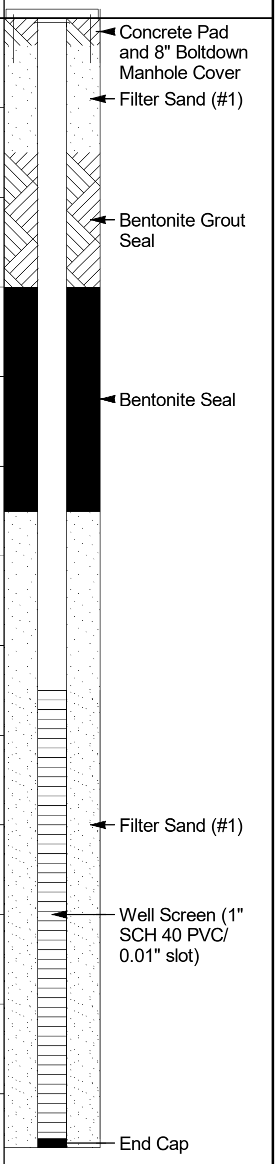


SAMPLE TYPE	RECOVERY %
HA	75
DP	80
DP	63
DP	80

U.S.C.S.		MATERIAL DESCRIPTION
OH	1.0	Dark Brown, TOPSOIL, with subangular fine to medium gravelly sand, 1" diameter quartz gravel, medium dense, dry.
SM	1.5	Black, VERY FINE SILTY SAND, loose, dry.
SP-SC	3.5	Light Gray To Brown, FINE TO MEDIUM SAND, some clay and gravel, subangular gravel (0.5" diameter), dense, moist.
ML	4.0	Grayish Brown, SILT, some fine gravelly sand, gravel (0.25" diameter), medium stiff to stiff, dry to moist.
SP-SC	5.0	Grayish Brown, FINE TO COARSE SAND, some clay, medium dense, dry to moist, trace mottling.
ML	6.0	Dark Brown To Brown, SANDY SILT, some subrounded fine gravel, (0.5" diameter), shale fragments, soft to medium stiff, dry to moist.
SP	6.5	Brown, MEDIUM TO COARSE SAND, loose, dry to moist.
SM	7.5	Brownish Gray, SILTY SAND, some subangular gravel, (0.25"-0.5" diameter), white particulates, coal and metal fragments and oxidation, soft, moist.
GP	8.0	Brown, MEDIUM TO COARSE GRAVEL, some rounded medium sand, (I" diameter), loose, dry.
SP-SM	8.5	Brown To Dark Brown, FINE TO MEDIUM SAND, some silt and gravel, subangular gravel (0.25" diameter), loose, moist.
SP	9.0	Brown, MEDIUM TO COARSE SAND, some subangular gravel, (0.25" diameter), trace silt, loose, wet.
GP	11.0	Light Brown, FINE GRAVEL, some fine to medium sand, subangular gravel (0.5"-1.5" diameter), shale fragments, trace clay, loose, saturated.
CL	12.0	Brownish Gray, CLAY, soft, plastic, saturated.
CL		Gray, CLAY, soft, plastic, saturated.

PID (ppm)
0.0
0.1
0.0
0.0
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1
0.1

WELL DIAGRAM



ERM
5788 Widewaters Parkway
Syracuse, NY 13214
Telephone: (315) 445-2554

JS-APS/B/MW-005A

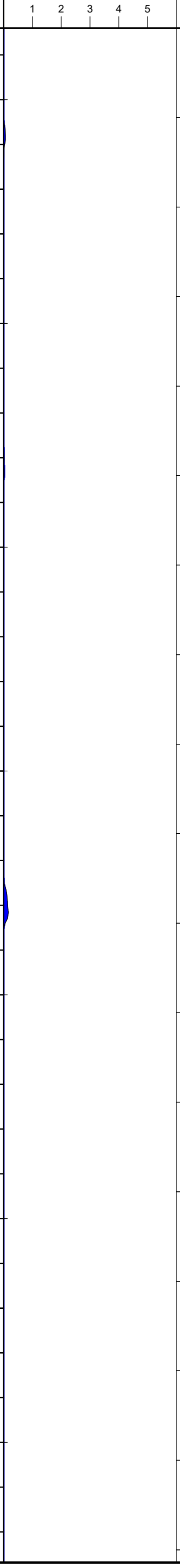
Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

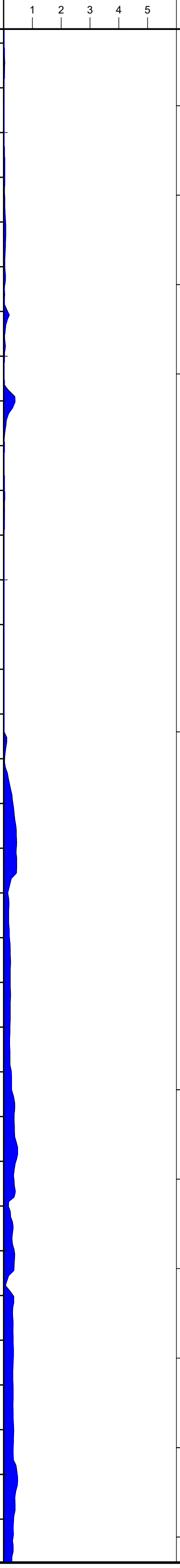
Project Location: Hoosick, New York

WATERLOO APS (Ik)



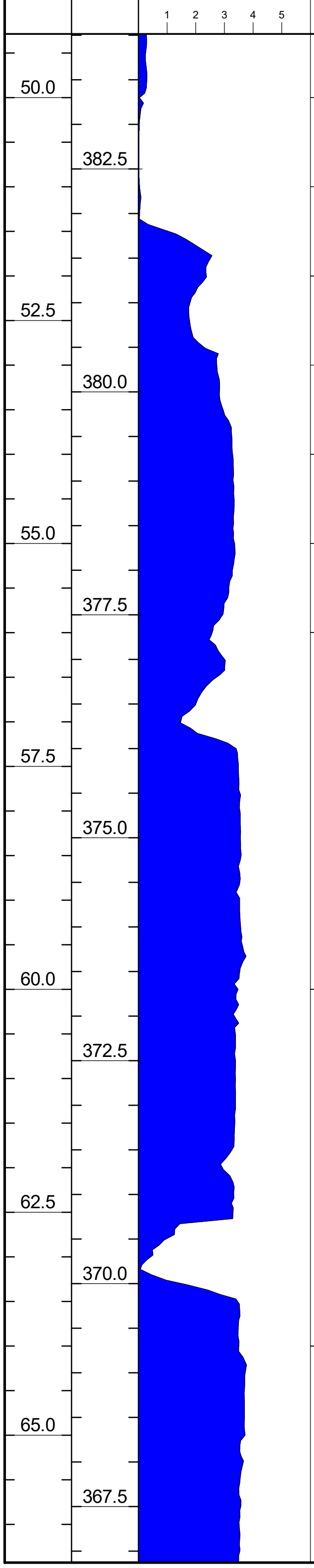
DEPTH (ft)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY %	U.S.C.S.	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
15.0	417.5			CL	Gray, CLAY, soft, plastic, saturated. *(continued)*	0.1	
		DP	56			0.0	
17.5						0.0	
	415.0					0.0	
						0.0	
20.0	412.5	DP	38			0.0	
						0.0	
22.5						0.0	
	410.0					0.0	
		DP	38			0.0	
25.0	407.5					0.0	
						0.0	
27.5						0.0	
	405.0	DP	50			0.0	
						0.0	
30.0	402.5					0.0	
						0.0	

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York



DEPTH (ft)	ELEVATION (feet amsl)	WATERLOO APS (Ik)	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
32.5			DP	25	CL	▨	Gray, CLAY, soft, plastic, saturated. *(continued)*	0.0	
	400.0							0.0	
								0.0	
35.0	397.5						36.0	0.0	
37.5	395.0		DP	0			No Recovery.		
40.0	392.5		DP	0					
42.5	390.0						44.0		
			DP	63	CL	▨	Gray, CLAY, tight, plastic, saturated.	0.0	
45.0	387.5							0.0	
								0.0	
47.5							48.0	0.0	
	385.0				CL-ML	▥	Gray To Dark Gray, SILT, interbedded clay, cohesive, plastic, soft to stiff, saturated.	0.0	

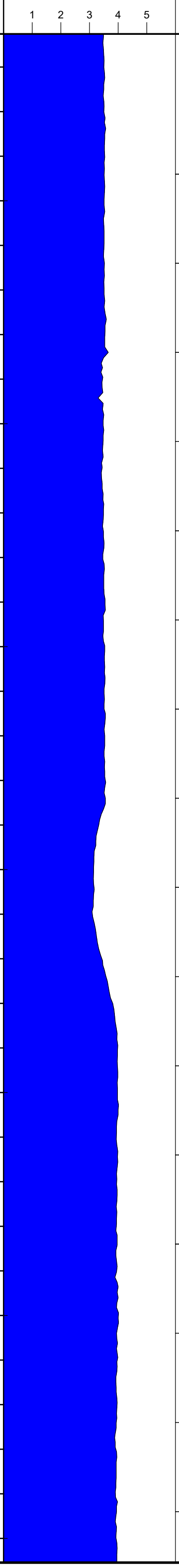
Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York



SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
DP	83	CL-ML	52.0	Gray To Dark Gray, SILT, interbedded clay, cohesive, plastic, soft to stiff, saturated. *(continued)*	0.0 0.0 0.0	
DP	63	SM	53.0	Gray, FINE SILTY SAND, some clay, saturated.		
		SP	53.5	Gray, MEDIUM TO COARSE SAND, saturated.		
		ML	55.0	Gray, SILT, interbedded clay, medium stiff, saturated.	0.0 0.0 0.0	
		SP	56.0	Gray, MEDIUM TO COARSE SAND, with fine to medium gravel, subangular and subrounded, saturated.	0.0	
DP	100	SM	58.0	Gray, FINE SILTY SAND, little rounded fine gravel, saturated.		
		CL-ML	59.5	Gray, SILT, interbedded clay, soft, saturated.		
DP	50	SP	64.0	Gray, MEDIUM TO COARSE SAND, with rounded fine to medium gravel, saturated.	0.0	
DP	25	GP		Gray, MEDIUM SANDY GRAVEL AND SILT, little subrounded clay, saturated.	0.0	

JS-APS/B/MW-005A

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York



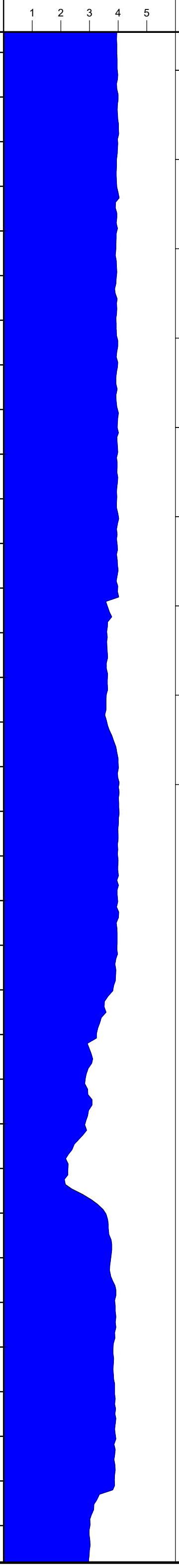
DEPTH (ft)	ELEVATION (feet amsl)	SAMPLE TYPE	RECOVERY %	U.S.C.S.	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
67.5				GP	Gray, MEDIUM SANDY GRAVEL AND SILT, little subrounded clay, saturated. *(continued)* 68.0		
70.0	365.0 362.5	DP	13	GP	Gray, FINE TO MEDIUM GRAVEL, with coarse sand and silt, subangular, saturated. 72.0	0.0 0.0 0.0 0.0	
72.5 75.0	360.0 357.5	DP	38	GP	Gray, MEDIUM SANDY GRAVEL, some silt, medium- to coarse-grained sand, well sorted, saturated. 76.0	0.0 0.0 0.0 0.0	
77.5 80.0	355.0	DP	50	GP	Gray, FINE TO COARSE SANDY GRAVEL, little silt, well sorted, saturated. 80.0	0.0 0.0 0.0 0.0	
	352.5	DP	50	SP	Gray, MEDIUM TO COARSE SAND, little silt, saturated. 82.0	0.0 0.0	
82.5	350.0			GP	Gray, FINE TO COARSE SANDY GRAVEL, some silt, saturated.	0.0	

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York



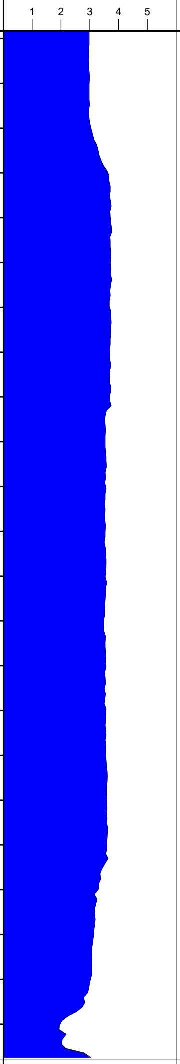
DEPTH (ft)	ELEVATION (feet amsl)	WATERLOO APS (Ik)	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
					GP		84.0	0.0	
85.0								0.0	
	347.5		DP	50	GP		Gray, FINE TO COARSE SANDY GRAVEL, with silt, well sorted, saturated.	0.0	
								0.0	
87.5							88.0	0.0	
	345.0							0.0	
90.0			DP	31	GP		Dark Gray, FINE TO COARSE SANDY GRAVEL, some silt, subangular gravel, well sorted, saturated.	0.0	
	342.5						91.0	0.0	
					SP		Dark Gray, MEDIUM SAND, with subrounded fine to medium gravel, saturated. 92.0	0.0	
92.5									
	340.0								
95.0									
	337.5						Samples for description not available below drilling refusal depth.		
97.5									
	335.0								
100.0									

ERM
5788 Widewaters Parkway
Syracuse, NY 13214
Telephone: (315) 445-2554

JS-APS/B/MW-005A

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (ft)	ELEVATION (feet amsl)	WATERLOO APS (Ik)	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
102.5 105.0 107.5 110.0	332.5 330.0 327.5 325.0 322.5						Samples for description not available below drilling refusal depth. *(continued)*		



Bottom of APS Boring @ 112.20 ft

Bottom of Boring @ 92.00 ft

ERM
5788 Widewaters Parkway
Syracuse, NY 13214
Telephone: (315) 445-2554

JS-B-006
PAGE 1 OF 2

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

APS CONTRACTOR: Not Applicable
DATE APS COMPLETED: Not Applicable
B/MW CONTRACTOR: Parratt Wolff, Inc.
DATE B COMPLETED: 11/28/2016
DATE MW COMPLETED: Not Applicable
GROUND ELEVATION: 427.50 feet amsl
NOTES:

DRILLING METHOD: Hand Auger/ Direct Push
TOTAL DEPTH: 24 feet bgs
DIAMETER: 1.25 inches
LOGGED BY: R. Holt
CHECKED BY: H. Usle
TOC ELEVATION: Not Applicable

ACRONYM LEGEND
APS = Waterloo Advanced Profiling System
MW = Monitoring Well
B = Soil Boring
Ik = Index of Hydraulic Conductivity
amsl = above mean sea level
bgs = below ground surface
PID = Photoionization Detector
ppm = parts per million
HA = Hand Auger
DP = Direct Push

GRAPHIC LOG LEGEND
░ USCS Poorly-graded Sand
▥ USCS Poorly-graded Sand with Silt
◌ USCS Poorly-graded Gravelly Sand
▨ USCS Low Plasticity Silty Clay
▨ USCS Low Plasticity Clay

DEPTH (ft)	ELEVATION (feet amsl)	WATERLOO APS (Ik)	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
0.0	427.5	1 2 3 4 5							
								0.1	
								0.1	
2.5	425.0		HA	100				0.1	
					SP		Dark Brown, FINE TO COARSE SAND, some subangular gravel, trace cobbles, brick fragments at 4 feet bgs, black fine- to medium-grained sand at 4.5 feet bgs, loose, dry to moist.	0.3	
5.0	422.5							5.8	
								0.3	
			DP	50		7.0		0.3	
7.5	420.0				SP-SM	7.3	Brown, FINE TO MEDIUM SAND, with silt, moist.	0.0	
								0.0	
								0.3	
10.0	417.5		DP	50	SP		Light Gray, FINE TO COARSE SAND, and angular gravel, gravel layer at 8.5 feet bgs (0.25" thick), red fine- to coarse-grained sand at 10 feet bgs (0.25" thick), moist.	0.2	
								0.5	
12.5	415.0					13.0		0.0	
								0.0	
			DP	31	SP		Brown, FINE TO COARSE SAND, very moist.	0.0	
15.0	412.5					15.0			

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JS-B-006

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Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (ft)	ELEVATION (feet amsl)	WATERLOO APS (lk) 1 2 3 4 5	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
15.0	412.5				SP		Light Brown, FINE TO COARSE SAND, and angular gravel, wet.	0.0	
			DP	100		16.5		1.8	
17.5	410.0				CL-ML		Light Brown, CLAYEY SILT, semi firm, wet to saturated.	31.8	
					CL-ML	18.0	Light Brown, SILTY CLAY, soft, saturated.	52.0	
					CL	19.0	Grayish Brown, CLAY, trace silt, soft, saturated.	14.2	
20.0	407.5		DP	100				0.2	
								0.0	
22.5	405.0							0.0	
						24.0		0.0	

Bottom of Boring @ 24.00 ft

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Telephone: (315) 445-2554

JS-B-007

PAGE 1 OF 2

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

APS CONTRACTOR: Not Applicable
DATE APS COMPLETED: Not Applicable
B/MW CONTRACTOR: Parratt Wolff, Inc.
DATE B COMPLETED: 11/30/2016
DATE MW COMPLETED: Not Applicable
GROUND ELEVATION: 427.90 feet amsl
NOTES:

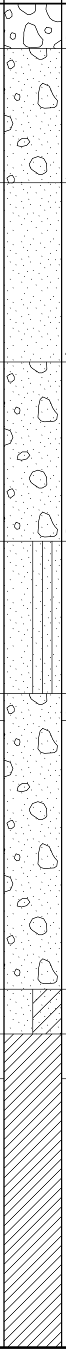
DRILLING METHOD: Hand Auger/ Direct Push
TOTAL DEPTH: 24 feet bgs
DIAMETER: 1.25 inches
LOGGED BY: R. Holt
CHECKED BY: H. Usle
TOC ELEVATION: Not Applicable

ACRONYM LEGEND
APS = Waterloo Advanced Profiling System
MW = Monitoring Well
B = Soil Boring
Ik = Index of Hydraulic Conductivity
amsl = above mean sea level
bgs = below ground surface
PID = Photoionization Detector
ppm = parts per million
HA = Hand Auger
DP = Direct Push

GRAPHIC LOG LEGEND
- USCS Poorly-graded Gravel
- USCS Poorly-graded Gravelly Sand
- USCS Poorly-graded Sand
- USCS Poorly-graded Sand with Silt
- USCS Poorly-graded Sand with Clay
- ▨ USCS Low Plasticity Clay

DEPTH (ft): 0.0, 2.5, 5.0, 7.5, 10.0, 12.5, 15.0
ELEVATION (feet amsl): 427.5, 425.0, 422.5, 420.0, 417.5, 415.0
WATERLOO APS (Ik): 1 2 3 4 5

GRAPHIC LOG



DEPTH (ft)	U.S.C.S.	MATERIAL DESCRIPTION
0.5	GP	Gray, GRAVEL.
2.0	SP	Gray, SAND AND GRAVEL, trace clay, no odor, loose, dry to moist.
4.0	SP	Brown, COARSE SAND, some rounded gravel, no odor, loose, dry to moist.
6.0	SP	Brown To Black, FINE TO COARSE SAND, and subrounded gravel, loose, moist.
7.7	SP-SM	SILTY FINE SAND, trace clay, oxide stringers, medium dense, moist.
8.0	SP	FINE TO COARSE SAND, and subrounded gravel, loose, moist.
11.0	SP	Grayish Brown To Blackish Orange, FINE TO COARSE SAND, and gravel, medium dense, moist.
11.5	SP-SC	Grayish Brown To Blackish Orange, FINE TO COARSE SAND AND GRAVEL, and clay, medium dense, saturated.
12.0	CL	Gray, CLAY, firm, low plasticity, saturated, mottling.
	CL	Gray, CLAY, plastic, saturated.

SAMPLE TYPE	RECOVERY %
HA	
DP	200
DP	50
DP	100

PID (ppm)
0.0
0.0
0.1
0.1
0.5
1.5
1.7
1.3
0.7
0.7
0.7
0.1
1.0
0.3
0.5

WELL DIAGRAM

ERM
5788 Widewaters Parkway
Syracuse, NY 13214
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JS-B-007

PAGE 2 OF 2

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (ft)	ELEVATION (feet amsl)	WATERLOO APS (Ik) 1 2 3 4 5	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
15.0	412.5					▨			0.5	
						▨			0.5	
17.5					CL	▨		Gray, CLAY, plastic, saturated. *(continued)*	0.4	
	410.0		DP	100		▨			0.2	
						▨	19.7		0.4	
20.0	407.5				CL-ML	▥	21.0	Black To Gray, CLAY, with fine silty sand, saturated.	0.4	
			DP	100	CL	▨		Gray, CLAY, plastic, saturated.	0.3	
22.5						▨	22.7		0.3	
	405.0				CL-ML	▥	23.5	Gray To Dark Gray, SILT AND CLAY, medium plasticity, saturated.	0.3	
					CL	▨	24.0	Gray, CLAY, plastic, saturated.		

Bottom of Boring @ 24.00 ft

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Syracuse, NY 13214
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JS-B-008

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

APS CONTRACTOR: Not Applicable
DATE APS COMPLETED: Not Applicable
B/MW CONTRACTOR: Parratt Wolff, Inc.
DATE B COMPLETED: 12/1/2016
DATE MW COMPLETED: Not Applicable
GROUND ELEVATION: 428.10 feet amsl
NOTES:

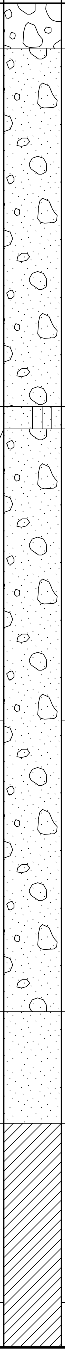
DRILLING METHOD: Hand Auger/ Direct Push
TOTAL DEPTH: 24 feet bgs
DIAMETER: 1.25 inches
LOGGED BY: R. Holt
CHECKED BY: H. Usle
TOC ELEVATION: Not Applicable

ACRONYM LEGEND
APS = Waterloo Advanced Profiling System
MW = Monitoring Well
B = Soil Boring
Ik = Index of Hydraulic Conductivity
amsl = above mean sea level
bgs = below ground surface
PID = Photoionization Detector
ppm = parts per million
HA = Hand Auger
DP = Direct Push

GRAPHIC LOG LEGEND
- USCS Poorly-graded Gravel
- USCS Poorly-graded Gravelly Sand
- USCS Poorly-graded Sand with Silt
- USCS Poorly-graded Sand
- ▨ USCS Low Plasticity Clay

DEPTH (ft): 0.0, 2.5, 5.0, 7.5, 10.0, 12.5, 15.0
ELEVATION (feet amsl): 427.5, 425.0, 422.5, 420.0, 417.5, 415.0
WATERLOO APS (Ik): 1 2 3 4 5

SAMPLE TYPE	RECOVERY %
DP	63
DP	56
DP	56
DP	50



U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
GP	0.5	Gray, GRAVEL, moist.
SP	4.5	Brown, FINE TO COARSE SAND, and subangular gravel, orange debris at 3.5 feet bgs, loose, moist.
SP-SM	4.8	Black, SANDY SILT, trace clay, soft, low plasticity, wet.
SP	8.0	Brown, FINE TO COARSE SAND, and subangular gravel, orange and black debris at 6.5 and 7 feet bgs.
SP	11.3	Brown, FINE TO COARSE SAND, and subangular and subrounded gravel, loose, moist to wet.
SP	12.5	Brown To Black, FINE TO MEDIUM SAND, coarsening downward, wet.
CL	14.5	Light Brown, CLAY, trace silt and fine sand, soft, plastic, saturated.
CL		Light Gray, CLAY, soft, plastic, saturated.

PID (ppm)
0.4
0.3
0.4
0.4
1.7
2.5
2.0
1.4
1.0
1.0
0.8
1.1
0.8
0.7
0.9

WELL DIAGRAM

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JS-B-008

Client: Arnold & Porter

Project Number: 0378075

Project Name: Hoosick

Project Location: Hoosick, New York

DEPTH (ft)	ELEVATION (feet amsl)	WATERLOO APS (lk) 1 2 3 4 5	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
15.0	412.5				CL		Light Gray, CLAY, soft, plastic, saturated. *(continued)*	0.8	
			DP	100				0.6	
17.5								0.6	
	410.0							0.5	
							20.0	0.5	
20.0	407.5		DP	100	SP-SM		Gray To Black, FINE SAND AND SILT, with clay, soft, low plasticity, saturated.	0.1	
								0.7	
22.5							23.0	0.3	
	405.0				CL		Light Gray, CLAY, soft, plastic, saturated. 24.0	0.4	

Bottom of Boring @ 24.00 ft

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JS-B-009

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

APS CONTRACTOR: Not Applicable
DATE APS COMPLETED: Not Applicable
B/MW CONTRACTOR: Parratt Wolff, Inc.
DATE B COMPLETED: 11/30/2016
DATE MW COMPLETED: Not Applicable
GROUND ELEVATION: 429.80 feet amsl
NOTES:

DRILLING METHOD: Hand Auger/ Direct Push
TOTAL DEPTH: 24 feet bgs
DIAMETER: 1.25 inches
LOGGED BY: R. Holt
CHECKED BY: H. Usle
TOC ELEVATION: Not Applicable

ACRONYM LEGEND
APS = Waterloo Advanced Profiling System
MW = Monitoring Well
B = Soil Boring
Ik = Index of Hydraulic Conductivity
amsl = above mean sea level
bgs = below ground surface
PID = Photoionization Detector
ppm = parts per million
HA = Hand Auger
DP = Direct Push

GRAPHIC LOG LEGEND
○ USCS Poorly-graded Gravel
⁘ USCS Poorly-graded Gravelly Sand
▨ USCS Low Plasticity Clay
⁘ USCS Poorly-graded Sand

DEPTH (ft)	ELEVATION (feet amsl)	WATERLOO APS (Ik) 1 2 3 4 5	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
0.0					GP		0.5 Light Gray, GRAVEL, angular loose, dry.	0.2	
								0.3	
2.5	427.5		HA	100				0.1	
					SP		Gray To Brown, FINE TO COARSE SAND, and gravel, crushed rock fragments, loose, moist.	0.2	
								0.1	
5.0	425.0							1.0	
			DP	25				1.1	
7.5	422.5				SP		7.0 Brown, FINE TO COARSE SAND, and gravel, loose, saturated.	1.0	
							8.5	1.3	
								4.1	
10.0	420.0		DP	75				1.6	
					CL		Gray, CLAY, medium plasticity, medium stiffness, saturated.	6.1	
12.5	417.5							1.0	
								0.1	
			DP	100				0.3	
15.0	415.0								

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Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (ft)	ELEVATION (feet amsl)	WATERLOO APS (Ik) 1 2 3 4 5	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
15.0					CL	▨	Gray, CLAY, medium plasticity, medium stiffness, saturated. *(continued)*	0.5	
			DP	100		▨		0.5	
17.5	412.5					▨		0.4	
						▨		0.2	
						▨		0.2	
20.0	410.0		DP	100		▨		0.6	
						▨ 22.3		0.3	
22.5	407.5				SP	⁘	Black To Gray, FINE SAND, with silt, well sorted, dense, saturated.	0.5	
						⁘ 24.0		0.1	

Bottom of Boring @ 24.00 ft

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JS-B-010

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Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

APS CONTRACTOR: Not Applicable
DATE APS COMPLETED: Not Applicable
B/MW CONTRACTOR: Parratt Wolff, Inc.
DATE B COMPLETED: 11/28/2016
DATE MW COMPLETED: Not Applicable
GROUND ELEVATION: 431.50 feet amsl
NOTES:

DRILLING METHOD: Hand Auger/ Direct Push
TOTAL DEPTH: 24 feet bgs
DIAMETER: 1.25 inches
LOGGED BY: R. Holt
CHECKED BY: H. Usle
TOC ELEVATION: Not Applicable

ACRONYM LEGEND
APS = Waterloo Advanced Profiling System
MW = Monitoring Well
B = Soil Boring
Ik = Index of Hydraulic Conductivity
amsl = above mean sea level
bgs = below ground surface
PID = Photoionization Detector
ppm = parts per million
HA = Hand Auger
DP = Direct Push

GRAPHIC LOG LEGEND
▩ Concrete
⬚ USCS Poorly-graded Sand
▨ USCS Low Plasticity Clay

DEPTH (ft)	ELEVATION (feet amsl)	WATERLOO APS (Ik) 1 2 3 4 5	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
0.0			HA	100		▩	0.3 CONCRETE.		
					SP	⬚	Dark Brown, FINE TO COARSE SAND, some subangular gravel, dry. 1.0	0.3	
	430.0				SP	⬚	Dark Brown, FINE TO COARSE SAND, trace subangular gravel, trace cobbles at 3.5 feet bgs, dry.	0.1	
2.5						⬚		0.2	
	427.5					⬚		0.1	
						⬚	5.0	0.1	
5.0	425.0		DP	17	SP	⬚	Brown, FINE TO COARSE SAND, and gravel, moist to wet.		
7.5	422.5		DP	88		⬚	9.5		
10.0					CL	▨	Gray, CLAY, plastic, medium stiff, wet.	0.0	
	420.0					▨		0.5	
12.5			DP	100		▨		0.0	
	417.5					▨		0.0	
15.0						▨		0.0	

JS-B-010

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (ft)	ELEVATION (feet amsl)	WATERLOO APS (Ik) 1 2 3 4 5	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
15.0					CL	▨	Gray, CLAY, plastic, medium stiff, wet. *(continued)*	0.0	
						▨	16.0		
	415.0					▨		0.0	
17.5						▨		0.0	
			DP	100		▨		0.0	
	412.5					▨		0.0	
20.0					CL	▨	Gray, CLAY, soft, saturated.	0.0	
	410.0					▨		0.0	
22.5			DP	100		▨		0.0	
	407.5					▨	24.0	0.0	

Bottom of Boring @ 24.00 ft

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JS-B-011

PAGE 1 OF 2

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

APS CONTRACTOR: Not Applicable
DATE APS COMPLETED: Not Applicable
B/MW CONTRACTOR: Parratt Wolff, Inc.
DATE B COMPLETED: 11/28/2016
DATE MW COMPLETED: Not Applicable
GROUND ELEVATION: 431.40 feet amsl
NOTES:

DRILLING METHOD: Hand Auger/ Direct Push
TOTAL DEPTH: 24 feet bgs
DIAMETER: 1.25 inches
LOGGED BY: R. Holt
CHECKED BY: H. Usle
TOC ELEVATION: Not Applicable

ACRONYM LEGEND
APS = Waterloo Advanced Profiling System
MW = Monitoring Well
B = Soil Boring
Ik = Index of Hydraulic Conductivity
amsl = above mean sea level
bgs = below ground surface
PID = Photoionization Detector
ppm = parts per million
HA = Hand Auger
DP = Direct Push

GRAPHIC LOG LEGEND
USCS Poorly-graded Gravelly Sand
USCS Poorly-graded Sand
USCS Low Plasticity Clay

DEPTH (ft)	ELEVATION (feet amsl)	WATERLOO APS (Ik) 1 2 3 4 5	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
0.0			HA	100	SP		Dark Brown To Black, FINE TO COARSE SAND, and subangular gravel, dry.	0.1	
	430.0							0.1	
								0.3	
2.5							3.0	0.3	
	427.5				SP		Dark Brown To Black, FINE TO COARSE SAND, trace to some gravel, some orange fine- to coarse-grained sand at 3.5 feet bgs, dry to moist.	0.3	
								0.5	
5.0							5.0	0.0	
	425.0		DP	50	SP		Dark Brown To Gray, FINE TO COARSE SAND, with gravel, moist. 6.0	0.0	
					SP		Brown, FINE TO COARSE SAND, and gravel, brick at 6.25 feet bgs, wet at 7.5 feet bgs, moist to wet.	0.0	
7.5								0.0	
	422.5		DP	75			9.0	0.0	
10.0					CL		Brown, CLAY, plastic, wet. 10.0	0.0	
	420.0				CL		Gray, CLAY, plastic, wet.	0.0	
								0.0	
12.5			DP	100				0.0	
	417.5							0.0	
15.0								0.0	

JS-B-011

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (ft)	ELEVATION (feet amsl)	WATERLOO APS (Ik) 1 2 3 4 5	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
15.0					CL	▨	Gray, CLAY, plastic, wet. *(continued)*	0.0	
	415.0		DP	100				0.0	
17.5								0.0	
	412.5							0.0	
20.0								0.0	
			DP	100				0.0	
	410.0							0.0	
22.5								0.0	
	407.5						24.0	0.0	

Bottom of Boring @ 24.00 ft

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PAGE 1 OF 2

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

APS CONTRACTOR: Not Applicable
DATE APS COMPLETED: Not Applicable
B/MW CONTRACTOR: Parratt Wolff, Inc.
DATE B COMPLETED: 11/30/2016 2:30:00 PM
DATE MW COMPLETED: Not Applicable
GROUND ELEVATION: 430.00 feet amsl
NOTES:

DRILLING METHOD: Hand Auger/ Direct Push
TOTAL DEPTH: 24 feet bgs
DIAMETER: 1.25 inches
LOGGED BY: R. Holt
CHECKED BY: H. Usle
TOC ELEVATION: Not Applicable

ACRONYM LEGEND
APS = Waterloo Advanced Profiling System
MW = Monitoring Well
B = Soil Boring
Ik = Index of Hydraulic Conductivity
amsl = above mean sea level
bgs = below ground surface
PID = Photoionization Detector
ppm = parts per million
HA = Hand Auger
DP = Direct Push

GRAPHIC LOG LEGEND

⬭ USCS Poorly-graded Gravel	⁘ USCS Poorly-graded Gravelly Sand
▨ USCS Low Plasticity Clay	▦ USCS Low Plasticity Silty Clay

DEPTH (ft)	ELEVATION (feet amsl)	WATERLOO APS (Ik) 1 2 3 4 5	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
0.0	430.0		HA	100	GP	⬭	0.5 Brown To Light Gray, FINE TO COARSE GRAVEL, grass.	0.0	
					SP	⁘	Dark Brown To Black, FINE TO COARSE SAND, and subangular gravel, brick fragments, dry.	0.0	
2.5	427.5					⁘		0.0	
						⁘		0.0	
						⁘	5.0	0.0	
5.0	425.0		DP	17	SP	⁘	Dark Brown To Black, FINE TO COARSE SAND, and subangular gravel, glass fragments, dry.	0.2	
						⁘		0.2	
7.5	422.5					⁘	8.0	0.2	
			DP	75	SP	⁘	Brown, FINE TO COARSE SAND, and subangular gravel, loose to medium dense, wet. 9.0	0.3	
					CL	▨	Gray, CLAY, mottling present from 9 to 10 feet bgs, medium plasticity, medium stiffness, saturated.	0.9	
10.0	420.0					▨		0.2	
						▨		0.8	
12.5	417.5		DP	100		▨		0.7	
						▨		0.9	
						▨		0.3	
15.0	415.0								

JS-B-012

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (ft)	ELEVATION (feet amsl)	WATERLOO APS (lk) 1 2 3 4 5	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
15.0	415.0				CL		Gray, CLAY, mottling present from 9 to 10 feet bgs, medium plasticity, medium stiffness, saturated. *(continued)*	0.6	
			DP	100				0.4	
17.5	412.5							0.3	
								0.5	
								0.4	
20.0	410.0		DP	100				0.2	
								0.2	
22.5	407.5							0.3	
					CL-ML		23.0 Gray, CLAY, with silt, medium plasticity, medium stiffness, saturated. 24.0	0.3	

Bottom of Boring @ 24.00 ft

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JS-B-013

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/10/2018 11:00:00 AM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 428.00 feet amsl
NORTHING: 1484141.21
EASTING: 799447.02
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
HA = Hand Auger
DP = Direct Push

GRAPHIC LOG LEGEND
Poorly-graded Gravel
Clayey and Silty Sand
Poorly-graded Sand
Silty Sand
Silt
Silty Gravel

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.5	Gray, GRAVEL, angular (0.5-1" diameter), loose, dry.	0.1
					SC-SM	1.5	Gray To Olive Gray, FINE TO MEDIUM CLAYEY SAND, some angular gravel, (0.5-1" diameter), loose, moist, brown mottling.	0.1
					SP	2.0	Brown, MEDIUM TO COARSE SAND, some subangular gravel, loose to medium dense, moist.	
		DP	11	46	SM	2.2	Dark Brown, SILTY SAND, some gravel, subangular (1" diameter), organic-rich, moist.	
2.5	425.5					4.0	NO RECOVERY.	0.0 0.0
5.0	423.0	DP	22	46	SM	5.5	Dark Brown, SILTY SAND, trace rounded fine gravel, (<0.25" diameter), glass fragments, moist.	0.0 0.0
					GP	7.0	Gray, GRAVEL, subangular (0.5-1" diameter), medium dense, dry.	0.0 0.0
7.5	420.5				ML	8.0	Gray Brown to Olive Brown, SILT, some fine sand, soft, low plasticity, moist, orange mottling.	0.2
10.0	418.0	DP	28	58	SP	10.0	Grayish Brown, FINE TO MEDIUM SAND, some subangular gravel, laminar shale gravel fragments (0.5" diameter), loose to medium dense, dry to moist.	0.1 0.0

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-013

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Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	28	58	SP		Brownish Gray, FINE SAND, fining downward sequence, loose, saturated, orange-brown mottling. *(continued)*	0.0
							11.0	
					GP-GM		Brown, SILTY GRAVEL, trace clay, subangular gravel (1" diameter), loose to medium dense, saturated.	0.0
							12.0	
					CL-ML		Light Brown, CLAY WITH SILT, soft to medium stiff, medium plasticity, wet.	
12.5	415.5						12.5	0.0
								0.0
		DP	36	75	CL-ML		Gray Brown, SILT AND CLAY, interbedded, soft to medium stiff, low plasticity, wet.	0.0
15.0	413.0							0.0
								0.0
							16.0	
								0.0
17.5	410.5							0.0
		DP	36	75	CL-ML		Gray, SILT AND CLAY, interbedded, soft to medium stiff, low plasticity, wet.	0.0
								0.0
20.0	408.0						20.0	
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-014

PAGE 1 OF 2

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/5/2018 4:20:00 PM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 428.00 feet amsl
NORTHING: 1484132.95
EASTING: 799442.53
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
- HA = Hand Auger
- DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Poorly-graded Sand
- Low Plasticity Clay
- Clayey and Silty Sand
- Poorly-graded Gravelly Sand
- Poorly-graded Sand with Silt

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.5	Gray, GRAVEL, angular (0.5-1" diameter), loose, dry.	0.2
					SC-SM	1.5	Gray To Olive Gray, FINE TO MEDIUM CLAYEY SAND, some gravel, angular (0.5-1" diameter), loose, moist.	0.1
					SP	2.0	Brown, MEDIUM TO COARSE SAND, some subrounded gravel, loose, moist.	
2.5	425.5	DP	19	79	SP	2.8	Brown, FINE TO MEDIUM GRAVELLY SAND, subangular (0.25-0.5" diameter), dry.	0.0
					SP	4.0	Black, FINE TO MEDIUM SAND, trace subangular gravel, (0.25" diameter), wood fragments, dry.	0.0
		DP	28	58	CL	4.8	Dark Brown, CLAY, trace fine sand, white flecks throughout, trace black flecks, low plasticity, moist.	0.0
5.0	423.0	JS-B-015 (5.5-7.5) for PFAS, TOC, pH			SP-SM	6.5	Dark Brown, SANDY SILT, interbedded gravel, laminar gray gravel layers, moist.	0.0 0.0
7.5	420.5				SP	8.0	Gray Brown, FINE TO MEDIUM SAND, trace silt and gravel, subangular (0.5" diameter), loose to medium dense, moist to wet, orange and brown mottling.	0.0 0.0
		DP	27	56	SP	9.5	Light Brown, FINE TO MEDIUM GRAVELLY SAND, laminar and subangular gravel (1" diameter), medium dense, dry.	0.0
10.0	418.0				GP		Light Brown, GRAVEL, some coarse sand, subangular, trace clay, red-brown oxidized surface at 9.5 feet bgs, loose, saturated.	0.0

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-014

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Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	27	56	GP		Light Brown, GRAVEL, some coarse sand, subangular, trace clay, red-brown oxidized surface at 9.5 feet bgs, loose, saturated. *(continued)*	0.0
						11.9		0.0
12.5	415.5	JS-B-014 (12-13) for VOCs, PFAS, TOC, pH			ML	12.8	Light Brown, SILT, some clay, soft, semi plastic, saturated.	0.0
		DP	36	75	CL-ML		Gray, CLAY, some silt, soft, low plasticity, saturated.	0.0
								0.0
15.0	413.0							0.0
		DP	24	50				0.0
17.5	410.5							0.0
								0.0
						20.0		0.0
20.0	408.0						Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-015

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/10/2018 10:15:00 AM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 428.20 feet amsl
NORTHING: 1484145.17
EASTING: 799438.97
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
- HA = Hand Auger
- DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Poorly-graded Sand
- Poorly-graded Gravelly Sand
- Clayey and Silty Sand
- Low Plasticity Clay
- Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.5	Gray, GRAVEL, angular (0.5-1" diameter), loose, dry.	0.0
					SC-SM	1.2	Gray, FINE TO MEDIUM CLAYEY SAND, some subangular gravel, (0.25-0.5" diameter), loose to medium dense, moist.	0.0
					SP	2.0	Light Yellow Brown, FINE TO MEDIUM SAND, some subangular quartz fragments (0.25" diameter).	
2.5	425.7	DP DP	13 27	54 56	SP	4.5	Light Brown, FINE TO MEDIUM SAND, some subangular gravel, (0.5" diameter), loose, dry.	0.0 0.0 0.9
5.0	423.2				CL	5.5	Dark Brown, CLAY, some silt, medium plasticity, wet, orange mottling.	1.0
7.5 10.0	420.7 418.2	JS-B-015 (6-7) for VOCs DP	22	46	SP	10.0	Brown, FINE TO MEDIUM GRAVELLY SAND, subangular (1-2" diameter), black "coal-like" layer at 7 feet bgs, loose to medium dense.	27.3 1.8 1.0 1.1

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-015

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	22	46	SP		Light Brown To Yellow, FINE TO MEDIUM GRAVELLY SAND, subangular (0.5-1" diameter), trace clay, loose to medium dense, wet. *(continued)* 12.0	0.5 0.2
12.5 15.0	415.7 413.2	DP	36	75	SP		Grayish Brown, FINE TO COARSE SAND, coarsening downward sequence, well rounded, well graded, saturated. 15.0	0.0 0.0 0.0
		JS-B-015 (15-17) for VOCs, PFAS, TOC, pH			CL-ML		Light Grayish Brown, SILTY CLAY, low plasticity, wet. 16.0	0.1
17.5 20.0	410.7 408.2	DP	38	79	CL-ML		Gray To Dark Gray, CLAY AND SILT, interbedded wet. 20.0	0.0 0.0 0.0 0.0
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-016

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/5/2018 11:40:00 AM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

GROUND ELEVATION: 427.90 feet amsl
NORTHING: 1484136.14
EASTING: 799434.99
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches

SAMPLE TYPE:
- HA = Hand Auger
- DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Clayey and Silty Sand
- Poorly-graded Sand
- Brick
- Poorly-graded Gravelly Sand
- Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.5	Gray, GRAVEL, angular (0.5-1" diameter), loose, dry.	0.9
					SC-SM	1.5	Gray, FINE TO MEDIUM CLAYEY SAND, some subangular gravel, (0.5" diameter), brick fragment from 1.5-1.6 feet bgs, loose to medium dense, moist.	0.1
					SP	2.0	Brown, FINE TO MEDIUM SAND, subrounded gravel (0.5-1" diameter), moist.	
		DP	8	33		2.2	BRICK.	0.0
2.5	425.4				SP	2.7	Light Yellow Brown, FINE TO MEDIUM GRAVELLY SAND, (0.25-0.5" diameter), moist.	
						4.0	NO RECOVERY.	0.0 0.0
5.0	422.9	DP	28	58	CL-ML	5.0	Brown, SILT AND CLAY, some organics, shell hash, green flecks, wet.	0.1
7.5	420.4				SP	9.0	Brown, FINE TO MEDIUM GRAVELLY SAND, subangular (0.5-1" diameter), poorly graded, medium dense, dry.	0.0 0.1 0.0 0.6
10.0	417.9	DP	19	40	GP		Light Brown, GRAVEL, some fine sand and clay, (0.5-1" diameter), loose, saturated.	0.5

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-016

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Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	19	40	GP		Light Brown, GRAVEL, some fine sand and clay, (0.5-1" diameter), loose, saturated. *(continued)*	0.0 0.0
						12.0		
12.5	415.4	DP	8	17	SP		Light Brown, COARSE SAND, some subrounded gravel, well rounded, trace clay, loose, saturated.	0.0 0.0 0.0
						14.5		
					SP-SC		Light Gray To Brown, FINE SAND, some clay, gray and orange mottling, soft, wet to saturated.	0.0
15.0	412.9					15.0		
							NO RECOVERY.	NM
						16.0		
17.5	410.4	JS-B-016 (16-18) for VOCs, PFAS, TOC, pH DP	36	75	CL		Gray, CLAY, some silt, low plasticity, saturated.	0.0 0.0 0.0 0.0
20.0	407.9					20.0		
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-017

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/5/2018 4:45:00 PM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 428.10 feet amsl
NORTHING: 1484127.71
EASTING: 799430.78
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
- HA = Hand Auger
- DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Clayey and Silty Sand
- Poorly-graded Sand
- Poorly-graded Gravelly Sand
- Silt
- Low Plasticity Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.3	Gray, GRAVEL, angular (0.5-1" diameter), loose, dry.	0.1
					SC-SM	1.0	Gray, FINE TO MEDIUM CLAYEY SAND, some angular gravel, (0.25" diameter), loose to medium dense, moist.	
					SP	2.0	Brown, MEDIUM TO COARSE SAND, some subangular and subrounded gravel, (0.25-1" diameter), loose, dry.	0.1
2.5	425.6	DP	19	79	SP	2.8	Brown, FINE TO MEDIUM GRAVELLY SAND, subangular (0.25-0.5" diameter), dry.	0.0
					SP	4.0	Black, FINE TO MEDIUM SAND, trace subangular gravel, wood fragments, (0.25" diameter), dry.	0.0
		DP	26	54	ML	4.5	Dark brown, SILT, some fine sand, moist to wet, orange and brown mottling.	0.0
5.0	423.1				GP	5.0	Quartz GRAVEL, subangular (1" diameter).	
7.5	420.6	DP	24	50	SP	9.0	Dark brown, FINE TO MEDIUM GRAVELLY SAND, subangular (0.5-1" diameter), slight black and orange oxidized surfaces, medium dense, dry.	0.5 0.1 0.2 0.0
10.0	418.1				GP		Light Brown, GRAVEL, some fine sand, subangular and subrounded (0.5-2" diameter), trace clay, saturated.	0.0

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-017

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Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	24	50	GP	11.7	Light Brown, GRAVEL, some fine sand, subangular and subrounded (0.5-2" diameter), trace clay, saturated. *(continued)*	0.0 0.0
					SP	12.0	Grayish Brown, MEDIUM TO COARSE SAND, rounded loose, saturated.	
12.5	415.6	DP	35	73	SP	13.8	Grayish Brown, FINE TO COARSE SAND, well rounded coarsening downwards sequence, loose, saturated.	0.0 0.0
					ML	14.5	Light Brown, SILT, some clay, soft to medium stiff, wet.	0.0
15.0	413.1				CL			0.0
		DP	48	100				0.0
17.5	410.6				CL		Gray, CLAY, some silt, soft to medium stiff, low plasticity, saturated.	0.0 0.0
20.0	408.1					20.0		0.0 0.0
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

ERM

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JS-B/TMW-018

PAGE 1 OF 3

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/4/2018 3:00:00 PM
DATE WELL INSTALLED: 4/4/2018 5:30:00 PM
DRILLING METHOD(S): Hand Auger/ Direct Push
LOGGED BY: H. Usle
CHECKED BY: J. Redden

GROUND ELEVATION: 427.90 feet amsl
TOC ELEVATION: 427.60 feet amsl
NORTHING: 1484150.5
EASTING: 799430.85
TOTAL DEPTH: 24 feet bgs
DIAMETER: 3.25 inches

SAMPLE TYPE:

- ▮ HA = Hand Auger
- ☒ DP = Direct Push

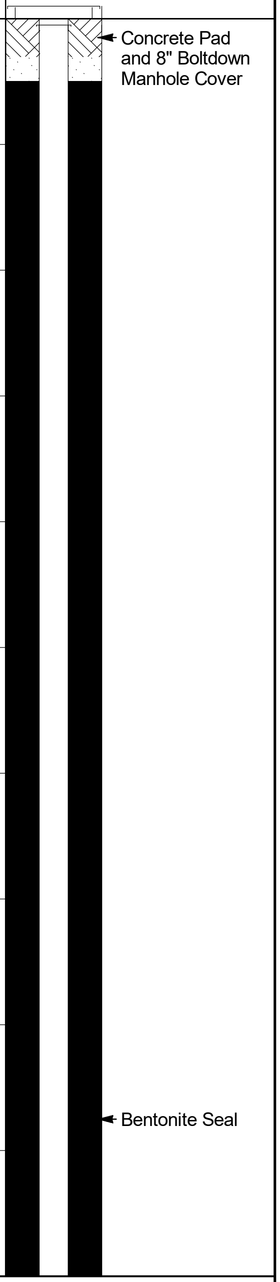
GRAPHIC LOG LEGEND

- Poorly-graded Gravel
- Clayey and Silty Sand
- Poorly-graded Sand
- Low Plasticity Sandy Clay
- Poorly-graded Sandy Gravel
- Poorly-graded Gravelly Sand

NOTES: Soil samples collected as part of the Interim Remedial Measure. Datum is NAD 1983 StatePlane New York East in US Survey Feet.

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.3	Gray, GRAVEL, angular (0.5-1" diameter), loose, dry.	0.1
					SC-SM	0.8	Gray, FINE TO MEDIUM CLAYEY SAND, some subrounded gravel, (0.25" diameter), some root mass, loose to medium dense, moist.	
					SP	2.0	Brown, MEDIUM TO COARSE SAND, some rounded gravel, (1-2" diameter), dry to moist.	0.1
2.5	425.4	DP	11	46	SP	3.0	Dark Brown, FINE TO MEDIUM SAND, some clay and gravel, subangular gravel (1-2" diameter), brick and coal fragments, loose, wet.	0.2
					CL	4.0	Brown, FINE SANDY CLAY, trace shell hash, soft, wet.	0.1
5.0	422.9	DP	20	42	CL	5.5	Brown, FINE SANDY CLAY, trace coarse sand, soft, wet.	0.9 0.6
7.5	420.4				GP	8.0	Dark Brown, COARSE SAND AND GRAVEL, subrounded quartz and shale gravels (2" diameter), loose to medium dense, dry to moist.	1.4 0.8
10.0	417.9	DP	26	54	GP		Brown, MEDIUM TO COARSE SAND AND GRAVEL, some clay, subangular gravel, orange oxidation, mottled gray and red layer at 10 feet bgs (1" thick).	0.5 0.4

WELL DIAGRAM



ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

JS-B/TMW-018

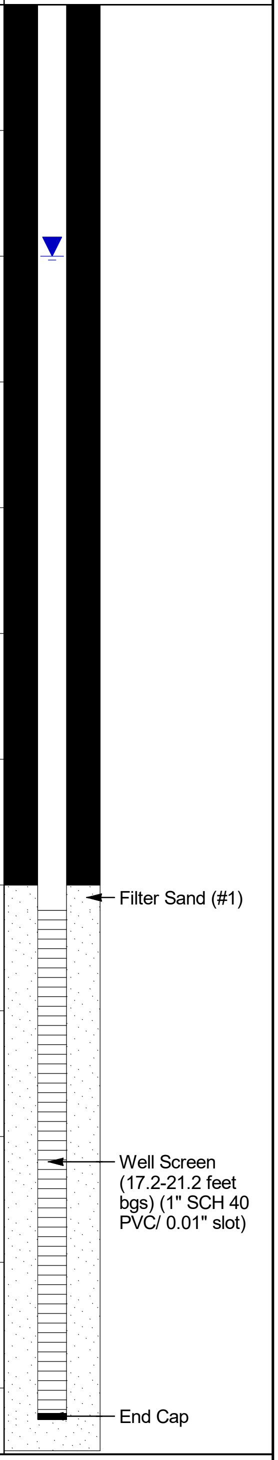
Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
		DP	26	54	GP	12.0	Brown, MEDIUM TO COARSE SAND AND GRAVEL, some clay, subangular gravel, orange oxidation, mottled gray and red layer at 10 feet bgs (1" thick). *(continued)*	0.3 0.5	
12.5 15.0	415.4 412.9	DP	27	56	SP	16.0	Brown To Gray, MEDIUM TO COARSE GRAVELLY SAND, subangular (0.5-1" diameter), poorly graded, loose, saturated.	0.2 0.1 0.0 0.1	
		DP JS-B-018 (19-20) for VOCs, PFAS, TOC, pH	45	94	GP	17.0	Brown To Gray, FINE GRAVEL, some rounded coarse sand, (0.25-1" diameter), loose, saturated.	0.6	
17.5	410.4				ML	17.8	Light Brown, SILT, some clay, soft, wet to saturated.	10.4	
					CL	19.0	Gray, CLAY, some silt, soft, wet.	5.1	
20.0	407.9	DP	48	100	CL		Gray, CLAY, soft, plastic, wet to saturated.	17.3 3.7	



ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

JS-B/TMW-018

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
		DP	48	100	CL	▨	Gray, CLAY, soft, plastic, wet to saturated. *(continued)*	0.7	
22.5	405.4							0.3	
							24.0	0.1	
							Bottom of Boring @ 24.00 feet bgs		
25.0	402.9								
27.5	400.4								
30.0	397.9								
32.5	395.4								

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-019

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.

DATE BORING COMPLETED: 4/4/2018 2:55:00 PM

LOGGED BY: H. Usle

CHECKED BY: J. Redden

DRILLING METHOD(S): Hand Auger/ Direct Push

GROUND ELEVATION: 427.60 feet amsl

NORTHING: 1484155.46

EASTING: 799421.99

TOTAL DEPTH: 24 feet bgs

DIAMETER: 2.25 inches

DATUM: NAD 1983 StatePlane New York East in US Survey Feet

NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:

- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND

- Poorly-graded Gravel
- Clayey and Silty Sand
- Poorly-graded Sand
- Silt
- Poorly-graded Gravelly Sand
- Poorly-graded Sandy Gravel

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.5	Gray, GRAVEL, angular (0.5-1" diameter), loose, dry.	0.0
					SC-SM	0.8	Gray, FINE TO MEDIUM CLAYEY SAND, some subrounded gravel, (0.5" diameter), loose, moist.	
					SP	2.0	Brown, MEDIUM TO COARSE SAND, some subrounded gravel, (1" diameter), loose, dry to moist.	0.0
2.5	425.1	DP	10	42	GP	3.5	Gray, GRAVEL, some medium sand, subangular gravel (1-2" diameter), trace clay, wet due to precipitation, sand is orange brown in color, wet.	0.0
					ML	4.0	Brown, SILT, some clay, soft, wet.	0.0
5.0	422.6	DP	21	44	SP	10.0	Brown, FINE TO MEDIUM SAND AND GRAVEL, little clay, subangular (1-2" diameter), gravel layer at 5.5 feet bgs, orange and oxidized coloration, laminar quartz and shale gravel, medium dense, dry to wet.	0.0 0.0 0.0 0.0
7.5	420.1	DP	29	60				0.0 0.0
10.0	417.6							

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

JS-B-019

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	29	60	SP		Grayish Brown, VERY FINE TO FINE SAND, trace silt, well graded, medium dense, wet, orange mottling. *(continued)* 10.5	0.0
					SP		Grayish Brown, MEDIUM TO COARSE SAND, fining upwards sequence, well graded, loose, wet. 12.0	0.0
12.5 15.0	415.1 412.6	DP	26	54	GP		Grayish Brown, GRAVEL, some coarse sand, subrounded (1-2" diameter), poorly graded, loose to medium dense, wet. 15.0	0.0 0.0 0.0
					SP		Grayish Brown, COARSE SAND, some rounded gravel, (0.5-1" diameter), poorly graded, loose, wet. 16.0	0.0
		JS-B-019 (16-16.5) for VOCs and JS-B-019 (16-17) for PFAS, TOP Assay PFAS, TOC, pH DP	48	100	ML		Light Brown, SILT, some clay, soft, saturated. 16.5	0.0
17.5 20.0	410.1 407.6				CL-ML		Gray, CLAY, some silt, very fine silty sand lenses from 20-21 feet bgs, soft, plastic, saturated.	0.0 0.0 0.0 0.0 0.0

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	48	100	CL-ML	▨	Gray, CLAY, some silt, very fine silty sand lenses from 20-21 feet bgs, soft, plastic, saturated. *(continued)*	0.0
22.5	405.1							0.0
							24.0	0.0
							Bottom of Boring @ 24.00 feet bgs	
25.0	402.6							
27.5	400.1							
30.0	397.6							
32.5	395.1							

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-020

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/4/2018 12:05:00 PM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 427.80 feet amsl
NORTHING: 1484145.44
EASTING: 799415.94
TOTAL DEPTH: 24 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND

Poorly-graded Gravel	Poorly-graded Sand
Poorly-graded Gravelly Sand	Silt
Low Plasticity Sandy Clay	Poorly-graded Sandy Gravel

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.5	Gray, GRAVEL, angular (0.5" diameter), loose, dry.	0.1
					SP	1.0	Gray, FINE TO MEDIUM SAND, trace clay and gravel, subangular (0.5-1" diameter), loose, moist.	
					SP	2.0	Brown, MEDIUM TO COARSE SAND AND GRAVEL, subrounded, loose, moist.	0.1
2.5	425.3	DP	15	63	SP	3.2	Dark Brown, MEDIUM TO COARSE GRAVELLY SAND, trace clay, subrounded (1" diameter), loose, moist.	0.0 0.0
					ML	4.0	Brown, SILT, some clay, trace shell hash and black oxidized surfaces, soft, wet.	0.0
5.0 7.5	422.8 420.3	DP	23	48	SP	8.0	Brown, MEDIUM TO COARSE SAND, some silt, clay and gravel, subangular (1-2" diameter), slight mottled surface at 6.5 feet bgs, white shell fragments at 4.5 feet bgs, loose to medium dense, wet.	0.0 0.0 0.0 0.0
		DP	23	48	CL	9.0	Brown, SANDY CLAY, trace gravel, (1" diameter), soft, wet.	0.0
10.0	417.8				GP		Brown, GRAVEL AND COARSE SAND, trace silt and clay, angular gravel, shale laminations (1-2" diameter), trace orange coarse sand seam at 10 feet bgs, loose to medium dense, wet.	0.0

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	23	48	GP	12.0	Brown, GRAVEL AND COARSE SAND, trace silt and clay, angular gravel, shale laminations (1-2" diameter), trace orange coarse sand seam at 10 feet bgs, loose to medium dense, wet. *(continued)*	0.0 0.0
12.5	415.3	DP	20	42	SP	12.5	Orange Brown, COARSE SAND, trace silt, rounded, loose, saturated.	0.0
					SP	14.0	Light Yellow Brown, GRAVELLY SAND, subangular (1" diameter), loose to medium dense, saturated.	0.0
15.0	412.8				SP	15.0	Greenish Gray, MEDIUM TO COARSE SAND, some gravel, subangular (0.5" diameter), darker surfaces around gravels, medium dense.	0.0
					SP	16.0	Light Yellow Brown, GRAVELLY SAND, subangular (1" diameter), loose to medium dense, saturated.	0.0
17.5 20.0	410.3 407.8	DP	32	67	CL-ML	20.0	Gray, CLAY, some silt, soft, plastic, saturated.	0.0 0.0 0.0 0.0

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JS-B-020

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	0	0				NM
22.5	405.3							
							Bottom of Boring @ 24.00 feet bgs	
25.0	402.8							
27.5	400.3							
30.0	397.8							
32.5	395.3							

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-021

PAGE 1 OF 2

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
GROUND ELEVATION: 427.90 feet amsl
DATE BORING COMPLETED: 4/4/2018 10:15:00 AM
NORTHING: 1484136.24
LOGGED BY: H. Usle
EASTING: 799411.5
CHECKED BY: J. Redden
TOTAL DEPTH: 20 feet bgs
DRILLING METHOD(S): Hand Auger/ Direct Push
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Poorly-graded Sand with Clay
- Poorly-graded Sand
- Silt
- Poorly-graded Gravelly Sand
- Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.5	Gray, GRAVEL, angular (0.5-1" diameter), loose, dry.	0.0
					SP-SC	1.0	Gray, CLAYEY SAND, some angular gravel, (0.5" diameter), brick fragments throughout, loose, moist.	
					SP	2.0	Grayish Brown, MEDIUM TO COARSE SAND, mixed with subangular gravel, (0.5" diameter), brick fragments throughout, loose, dry.	0.0
2.5	425.4	DP	16	67	SP	3.0	Brown, FINE TO MEDIUM SAND, trace gravel, coal ash, coal fragments, brick, trace laminar gravel (1" diameter), loose, dry.	0.0
					ML			0.0
5.0	422.9	DP	25	52			Light Olive Brown, SILT, some clay, shell hash present, rounded quartz gravel at 6 feet bgs (2" diameter), soft, wet to saturated.	0.0
						6.0		0.0
					SP			0.0
7.5	420.4						Brown To Yellow, FINE TO MEDIUM GRAVELLY SAND, trace silt and clay, rounded chert and quartz gravels (1-2" diameter), laminar shale fragments (1" diameter), slight mottled surface at 7 feet bgs, water table at 6.5 feet bgs, loose to medium dense, wet to saturated.	0.0
		DP	27	56				0.0
10.0	417.9							0.0

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	27	56				0.0
					SP		Brown To Yellow, FINE TO MEDIUM GRAVELLY SAND, trace silt and clay, rounded chert and quartz gravels (1-2" diameter), laminar shale fragments (1" diameter), slight mottled surface at 7 feet bgs, water table at 6.5 feet bgs, loose to medium dense, wet to saturated. *(continued)*	0.0
12.5	415.4							0.0
		DP	30	63			14.0	0.0
					CL-ML		Light Brown, CLAY, some silt, soft, wet to saturated.	0.0
15.0	412.9						15.5	0.0
								0.0
17.5	410.4	DP	48	100	CL		Light Gray, CLAY, trace silt, soft to medium stiff, wet to saturated.	0.0
								0.0
20.0	407.9						20.0	0.0
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-022

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/6/2018 3:15:00 PM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 428.10 feet amsl
NORTHING: 1484127.05
EASTING: 799406.43
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
- HA = Hand Auger
- DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Clayey and Silty Sand
- Poorly-graded Sand
- Silt
- Brick
- Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.5	Gray, GRAVEL, angular (0.5-1" diameter), loose, dry.	0.0
					SC-SM	1.5	Gray, FINE TO MEDIUM CLAYEY SAND, some subangular gravel, (0.25-0.5" diameter), loose to medium dense, moist.	0.0
					SP	2.0	Brown To Reddish Brown, MEDIUM TO COARSE SAND, some gravel, (1" diameter), laminar, loose to medium dense, moist.	
2.5	425.6	DP	0	0		4.0	NO RECOVERY.	NM
5.0	423.1	DP	26	54	SP	5.0	Dark Yellow Brown, FINE TO MEDIUM SAND, some silt, trace subangular gravel, loose to medium dense, wet, trace yellow mottling.	0.0
					ML	6.0	Dark Brown, SILT, trace rounded gravel, (0.25" diameter), soft, medium plasticity.	0.0
						6.2	BRICK.	
					SP	6.5	Dark Brown, MEDIUM SAND, some silt and gravel, subrounded gravel (0.5" diameter), moist.	0.0
					GP	7.0	Quartz GRAVEL, subangular (0.5-1.5" diameter), dry.	
7.5	420.6				SP		Dark Yellow Brown, FINE TO MEDIUM SAND, some silt and gravel, (0.5" diameter), medium dense, dry to moist.	0.0
		DP	30	63		9.0		0.0
10.0	418.1				SP		Gray Brown, FINE TO MEDIUM SAND, some subrounded gravel, (0.5-1" diameter), well graded, loose, saturated.	0.2

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-022

PAGE 2 OF 2

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION	PID (ppm)
		DP	30	63	SP		11.0	Gray Brown, FINE TO MEDIUM SAND, some subrounded gravel, (0.5-1" diameter), well graded, loose, saturated. *(continued)*	0.0
					SP		11.5	Light Brown To Reddish Brown, FINE SAND, some clay and gravel, subrounded (0.5" diameter), medium dense, saturated.	0.0
12.5	415.6	DP	29	60	SP		14.7	Gray Brown, MEDIUM TO COARSE SAND, some angular quartz gravel present from 13.5-14.7 feet bgs, loose to medium dense, wet to saturated.	0.0
									0.1
									0.0
15.0	413.1	JS-B-022 (14.7-16.7) for VOCs, PFAS, TOC, pH			ML		15.0	Light Brown, SILT, some clay, low plasticity, wet.	0.0
			33	69	CL-ML		20.0	Gray, SILT AND CLAY, low plasticity, wet.	0.0
17.5	410.6	DP							0.0
									0.0
									0.0
20.0	408.1							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-023

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/6/2018 10:40:00 AM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

GROUND ELEVATION: 428.00 feet amsl
NORTHING: 1484122.78
EASTING: 799415.29
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches

SAMPLE TYPE:
- HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Clayey and Silty Sand
- Poorly-graded Sand
- Boulders and Cobbles
- Poorly-graded Gravelly Sand
- Low Plasticity Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.5	Gray, GRAVEL, angular (0.5-1" diameter), loose, dry.	0.3
					SC-SM	0.8	Gray, MEDIUM TO COARSE CLAYEY SAND, subangular gravel, (0.5" diameter), medium dense, moist.	
					SP	2.0	Brown, MEDIUM TO COARSE SAND, some rounded to subangular gravel, (0.5-1" diameter), medium dense, moist.	0.0
		DP	3	13	SP	2.3	Brown, FINE TO MEDIUM SAND, subangular gravel, (0.5" diameter), moist.	0.0
2.5	425.5					4.0	Quartzite ROCK stuck in drilling shoe, (1-2" diameter).	NM
5.0 7.5	423.0 420.5	DP	14	29	SP	8.0	Dark Brown, FINE TO MEDIUM GRAVELLY SAND, trace clay, subangular (0.5-1" diameter), black fragments, shell hash near 4.5 feet bgs, orange and black oxidation, medium dense, moist.	0.0 0.1 0.1 0.0
10.0	418.0	DP	22	46	SP		Light Brown, FINE TO COARSE GRAVELLY SAND, trace clay, subangular to rounded (0.25-0.5" diameter), loose, saturated.	0.1 0.0

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	22	46	SP	12.0	Light Brown, FINE TO COARSE GRAVELLY SAND, trace clay, subangular to rounded (0.25-0.5" diameter), loose, saturated. *(continued)*	0.1 0.2
12.5 15.0	415.5 413.0	DP	10	21	SP	16.0	Gray Brown, MEDIUM TO COARSE SAND, trace rounded gravel, (0.5" diameter), well sorted, loose, saturated.	0.0 0.0 0.0 0.0
17.5 20.0	410.5 408.0	JS-B-023 (16-18) for VOCs, PFAS, TOC, pH DP	27	56	CL	20.0	Gray, CLAY, some silt, soft, saturated.	0.1 0.2 0.1 0.2

Bottom of Boring @ 20.00 feet bgs

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-024

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Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.

DATE BORING COMPLETED: 4/5/2018 3:00:00 PM

LOGGED BY: H. Usle

CHECKED BY: J. Redden

DRILLING METHOD(S): Hand Auger/ Direct Push

GROUND ELEVATION: 428.20 feet amsl

NORTHING: 1484118.46

EASTING: 799425.7

TOTAL DEPTH: 20 feet bgs

DIAMETER: 2.25 inches

DATUM: NAD 1983 StatePlane New York East in US Survey Feet

NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:

- HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND

- Poorly-graded Gravel
- Clayey Sand
- Poorly-graded Sand
- Poorly-graded Gravelly Sand
- Boulders and Cobbles
- Sandy Silt

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.5	Gray, GRAVEL, (0.5-1" diameter), loose, dry.	0.0
					SC	1.0	Gray, FINE TO MEDIUM CLAYEY SAND, some subrounded gravel, (0.5" diameter), dry.	
					SP	2.0	Brown, MEDIUM TO COARSE SAND, subangular gravel (1" diameter), dry.	0.0
2.5	425.7	DP	7	29	SP	4.0	Dark Brown, FINE TO MEDIUM GRAVELLY SAND, subangular shale gravel (0.5" diameter), dry.	0.0 0.0
						4.1	Gray, pulverized ROCK (1" thick), dry.	
5.0	423.2	DP	27	56	ML	5.0	Dark Brown, FINE SANDY SILT, with gravel, subangular (1" diameter), moist to wet.	0.0
7.5	420.7				SP	8.0	Dark Brown, FINE TO MEDIUM GRAVELLY SAND, white quartzite gravel (0.5-1" diameter) at 7 feet bgs, dry to moist.	0.0 0.0 0.0
10.0	418.2	DP	29	60	SP-SC		Light Brown, FINE SAND, some clay, gravel (0.25-0.5" diameter), greenish gray fine-grained sand layer (2" thick) at 10.5 feet bgs, saturated.	0.0 0.0

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION	PID (ppm)
		DP	29	60	SP-SC			Light Brown, FINE SAND, some clay, gravel (0.25-0.5" diameter), greenish gray fine-grained sand layer (2" thick) at 10.5 feet bgs, saturated. *(continued)*	0.0
							12.0		0.0
12.5	415.7				ML		13.0	Light Brown, SILT, soft, wet to saturated.	0.0
									0.0
		DP	48	100					0.0
15.0	413.2								0.0
					CL			Gray, CLAY, soft to medium stiff, low plasticity, saturated.	0.0
17.5	410.7								0.0
		DP	48	100					0.0
20.0	408.2						20.0		0.0
								Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-025

PAGE 1 OF 2

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/6/2018 1:45:00 PM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 428.20 feet amsl
NORTHING: 1484114.7
EASTING: 799435.03
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND

▨ Poorly-graded Gravel	▨ Clayey Sand
▨ Poorly-graded Gravelly Sand	▨ Low Plasticity Sandy Clay
▨ Poorly-graded Sand with Clay	▨ Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.5	Gray, GRAVEL, angular (0.5-1" diameter), loose, dry.	0.1
					SC	1.2	Gray, FINE TO MEDIUM CLAYEY SAND, some angular gravel, (1" diameter), moist.	
					SP	2.0	Brown, MEDIUM TO COARSE SAND, some subrounded gravel, (1" diameter), loose, dry to moist.	0.1
2.5	425.7	DP	14	58	SP	3.0	Dark Brown, MEDIUM TO COARSE GRAVELLY SAND, subangular (0.5-1" diameter), slight reddish-brown, loose, dry.	0.0
5.0	423.2	DP	24	50	SP	6.0	Brown, FINE TO MEDIUM GRAVELLY SAND, subrounded quartz gravels (0.5-1.5" diameter), some wet silty clay, loose to medium dense, dry.	0.0 0.0 0.0 0.0
		JS-B-025 (6-8) for VOCs, PFAS, TOC, pH			CL	7.0	Gray Brown, SANDY CLAY, some subangular gravel, (0.5" diameter), non-plastic, wet.	0.2
7.5	420.7				SP-SC	8.5	Dark Brown, MEDIUM TO COARSE SAND, some clay and gravel, subangular (0.5" diameter), orange oxidized surfaces, loose, saturated.	0.3
		DP	30	63	CL-ML	9.0	Light Brown, SILT AND CLAY, wet.	0.0
10.0	418.2				CL-ML		Gray, CLAY, some silt, low plasticity, wet.	0.0

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-025

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	30	63	CL-ML	▨	Gray, CLAY, some silt, low plasticity, wet. *(continued)*	0.1
								0.1
12.5	415.7	DP	48	100				0.0
								0.0
								0.0
15.0	413.2							0.0
		DP	46	96	CL-ML	▨	16.0 Gray To Brown, SILTY CLAY, soft, saturated.	0.0
17.5	410.7							0.0
								0.0
20.0	408.2						20.0	0.0
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-026

PAGE 1 OF 2

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/6/2018 9:45:00 AM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 428.10 feet amsl
NORTHING: 1484113.27
EASTING: 799410.95
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravelly Sand
- Poorly-graded Sand with Clay
- Silty Sand
- Poorly-graded Sand
- Low Plasticity Gravelly Clay
- Poorly-graded Sandy Gravel

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100			Soils not logged from 0-2 feet bgs.	NM
							2.0	
2.5	425.6	DP	5	21	SP		Dark Brown, FINE TO MEDIUM SAND, some subangular gravel, (1" diameter), trace clay, white flecks, loose, wet.	0.1
								0.1
							4.0	
					SP-SC		Dark Brown, MEDIUM TO COARSE SAND, some clay, angular gravel (1" diameter), moist.	0.1
							4.5	
5.0	423.1	DP	6	13			NO RECOVERY, quartzite rock stuck in drilling shoe.	NM
7.5	420.6							
							8.0	
		DP	31	65	SM		Gray Brown, FINE SILTY SAND, medium dense, moist to wet, orange and gray mottling.	0.1
							9.5	
					SP		Brown To Reddish Brown, FINE TO MEDIUM SAND, some angular gravel, (0.5-1" diameter), black and red oxidized surfaces, medium dense, moist.	0.1
10.0	418.1						10.0	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	31	65	SP	10.5	Grayish Brown, FINE SAND, some angular gravel, well sorted, loose, wet. *(continued)*	0.2
					CL	10.8	Light Brown, GRAVELLY CLAY, subangular gravel (0.5" diameter), well sorted, soft, saturated.	
					GP	11.7	Light Brown, GRAVEL, some medium sand, subangular (0.5-1" diameter), trace clay, well graded, loose, saturated.	0.1
					SP	12.0	Grayish Brown, MEDIUM TO COARSE SAND, well rounded, loose, saturated.	
12.5	415.6	DP	41	85	SP	14.0	Grayish Brown, FINE TO MEDIUM SAND, coarsening upwards sequence, loose, saturated.	0.0 0.0
					CL-ML	15.0	Light Brown, SILTY CLAY, soft, saturated.	0.2
15.0	413.1	JS-B-026 (14-16) for VOCs, PFAS, TOC, pH			CL-ML	15.4	Dark Gray, SILT, some clay, soft, saturated.	0.2
17.5 20.0	410.6 408.1	DP	32	67	CL-ML	20.0	Gray, CLAY, some silt, soft, low plasticity, saturated.	0.1 0.1 0.1 0.1
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-027
PAGE 1 OF 2

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/6/2018 12:35:00 PM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 428.40 feet amsl
NORTHING: 1484100.75
EASTING: 799417.07
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Poorly-graded Sand
- Poorly-graded Gravelly Sand
- Poorly-graded Sandy Gravel
- ▨ Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)
2.5	425.9
5.0	423.4
7.5	420.9
10.0	418.4

SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %
HA	24	100
DP	17	71
JS-B-027 (4-6) for VOCs, PFAS, TOC, pH	24	50
DP		
DP	31	65

U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION
GP		0.3	Gray, GRAVEL, subangular (0.5" diameter), loose, dry.
SP		0.5	Gray Brown, FINE TO MEDIUM SAND, (0.5" diameter), loose, dry.
SP		4.0	Brown, FINE TO MEDIUM SAND, some subrounded gravel, (0.5" diameter), loose, dry to moist.
SP		6.0	Brown, FINE TO MEDIUM SAND, some gravel, subangular to angular (0.5-1" diameter), trace clay, gravel content increasing with depth, loose to medium dense, moist.
GP		7.0	Brown, GRAVEL, some medium sand, subangular (1-2" diameter), medium dense, dry.
GP		8.5	Light Brown, SANDY GRAVEL, trace clay, subangular, medium to coarse-grained sands, higher silt and clay content (~35%) from 8-8.5 ft bgs, loose, saturated.
CL-ML		9.0	Light Brown, SILT AND CLAY, soft, saturated.
CL-ML			Gray, CLAY, some silt, soft, low plasticity, wet to saturated.

PID (ppm)
0.0
0.0
0.0
0.0
0.0
0.1
0.2
0.2
0.1
0.2

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-027

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Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	31	65	CL-ML	▨	Gray, CLAY, some silt, soft, low plasticity, wet to saturated. *(continued)*	0.3
								0.3
12.5	415.9	DP	24	50				0.0
								0.1
								0.1
15.0	413.4							0.1
		DP	48	100				0.2
17.5	410.9							0.1
								0.1
								0.1
20.0	408.4						20.0 Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-028

PAGE 1 OF 2

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/10/2018 2:00:00 PM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 428.00 feet amsl
NORTHING: 1484118.98
EASTING: 799443.28
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:

- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND

- Poorly-graded Gravel
- Poorly-graded Sand
- Poorly-graded Gravelly Sand
- Poorly-graded Sand with Silt
- Low Plasticity Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	48	100	GP	0.5	Gray, GRAVEL, angular (0.5" diameter), loose, dry.	0.0
					SP	1.0	Dark Gray, FINE TO MEDIUM SAND, subangular gravel (1-2" diameter), loose to medium dense, moist.	
					SP	2.0	Dark Brown, MEDIUM SAND, some subangular and subrounded gravel, (2" diameter), brick fragments, medium dense, dry to moist.	0.0
2.5	425.5				SP-SM	3.0	Dark Brown, MEDIUM TO COARSE SAND, some silt and clay, trace subrounded gravel (1-2" diameter), trace white flecks, moist to wet.	0.0
5.0	423.0				SP-SM	5.0	Dark Gray, MEDIUM SAND, some silt, trace rounded gravel (0.5" diameter), wet, trace yellow mottling.	0.0 0.0
		DP JS-B-028 (5-7) for VOCs, PFAS, TOC, pH	20	42	SP-SM	7.0	Brown To Gray, FINE SAND, some silt, moist to wet, orange and brown mottling.	0.0 0.0
7.5	420.5				SP-SM	8.0	Reddish Brown, FINE TO COARSE SAND, some silt, little subrounded gravel (0.5" diameter), moist to wet.	0.0
10.0	418.0	DP	7	15	GP	10.0	Brown, GRAVEL, some clay, subangular and subrounded (0.5-1" diameter), medium dense, saturated.	0.0 0.0

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	7	15			NO RECOVERY. *(continued)*	NM
							12.0	
12.5	415.5	DP	38	79	CL	▨	Gray, CLAY, slight silt bedding present from 14-15 feet bgs, soft to medium stiff, low plasticity, wet.	0.0
								0.0
								0.0
15.0	413.0							0.0
		DP	30	63				0.0
17.5	410.5							0.0
								0.0
								0.0
20.0	408.0						20.0	
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-029

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/10/2018 3:40:00 PM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 427.90 feet amsl
NORTHING: 1484131.09
EASTING: 799420.37
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:

- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND

- Poorly-graded Gravel
- Poorly-graded Sand
- Poorly-graded Gravelly Sand
- Silt
- Poorly-graded Sand with Silt
- Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.5	Gray, GRAVEL, angular (0.5" diameter), loose, dry.	0.0
					SP	2.0	Brown, MEDIUM TO COARSE SAND, trace gravel, gray subangular gravels (1-2" diameter), large shale fragments (5-6" diameter), dry to moist.	0.0
2.5	425.4	DP	6	25	SP	2.5	Dark Brown, FINE TO MEDIUM SAND, subangular gravel, (1" diameter), reddish gravel fragments, loose to medium dense, dry to moist.	0.0
						4.0	No Recovery; quartz gravel stuck in drilling shoe.	NM
5.0	422.9	DP	29	60	SP	5.0	Dark Brown, FINE TO MEDIUM SAND, subangular gravel, (1" diameter), reddish gravel fragments, loose to medium dense, dry to moist.	0.0
					ML	6.0	Dark Brown, SILT, trace fine sand, soft, medium plasticity, moist to wet.	0.2
7.5	420.4				SP	8.0	Yellowish Brown, FINE TO MEDIUM SAND, some gravel, subangular (1" diameter) of reddish, white and yellow coloration, medium dense, dry to moist.	0.5 0.4
		DP	32	67	SP-SM	9.5	Olive Brown, FINE SAND, some silt and gravel, subrounded (0.5" diameter), slight brown oxidized surface, medium dense, moist to wet.	0.0
10.0	417.9				SP		Brown, FINE TO MEDIUM SAND, trace silt, subangular, laminar shale gravel fragments (1" diameter), medium dense, wet.	0.0

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-029
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Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION	PID (ppm)
		DP	32	67	SP		10.5	Brown, FINE TO MEDIUM SAND, trace silt, subangular, laminar shale gravel fragments (1" diameter), medium dense, wet. *(continued)*	0.0
					SP		12.0	Gray Brown, FINE TO MEDIUM SAND, loose, wet.	0.0
12.5	415.4	DP	14	29	SP		16.0	Gray Brown, MEDIUM TO COARSE SAND, well rounded, well sorted, loose, saturated.	0.1
									0.0
15.0	412.9								NM
		JS-B-029 (16-18) for VOCs, PFAS, TOC, pH DP	38	79	CL-ML		20.0	Gray, CLAY, some silt, soft, low plasticity, wet.	0.0
17.5	410.4								0.0
									0.0
20.0	407.9								0.0
								Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B/TMW-030

PAGE 1 OF 3

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/11/2018 9:30:00 AM
DATE WELL INSTALLED: 4/13/2018 11:50:00 AM
DRILLING METHOD(S): Hand Auger/ Direct Push
LOGGED BY: H. Usle
CHECKED BY: J. Redden

GROUND ELEVATION: 431.20 feet amsl
TOC ELEVATION: 431.03 feet amsl
NORTHING: 1484022.82
EASTING: 799371.49
TOTAL DEPTH: 32 feet bgs
DIAMETER: 3.25 inches

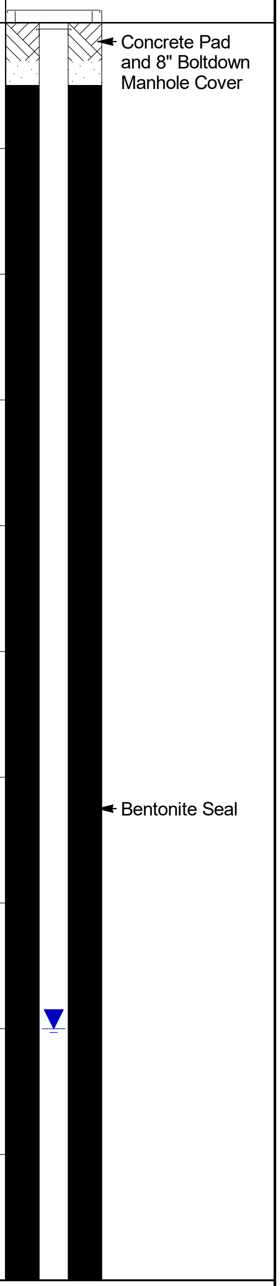
SAMPLE TYPE:
▮ HA = Hand Auger
☒ DP = Direct Push

GRAPHIC LOG LEGEND
▨ Poorly-graded Gravel
▨ Poorly-graded Sand
▨ Silty Clay
▥ Silt

NOTES: Soil samples collected as part of the Interim Remedial Measure. Datum is NAD 1983 StatePlane New York East in US Survey Feet.

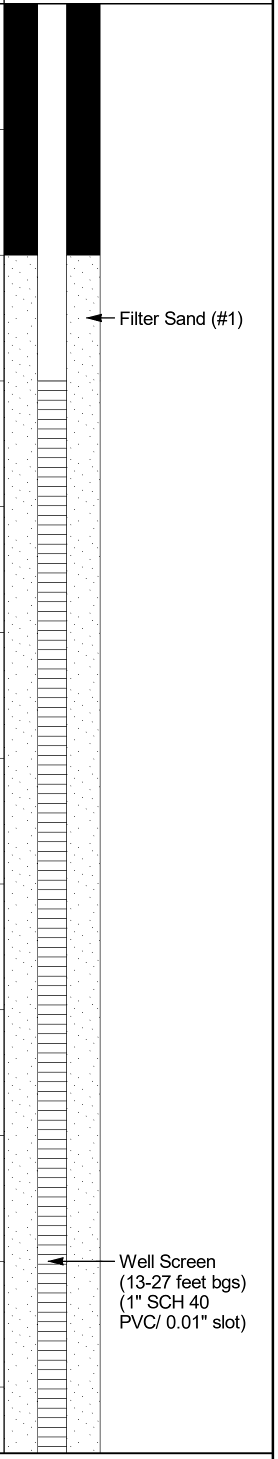
DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP		0.3 Gray, GRAVEL, subangular (0.5" diameter), loose, dry.	0.6
					SP		Dark Brown To Black, FINE TO MEDIUM SAND, some subangular gravel, (1-2" diameter), trace white flecks, some coal and brick fragments, loose, dry to moist. 2.0	1.0
2.5	428.7	DP	16	67	SP		Dark Brown, FINE TO MEDIUM SAND, some subangular gravel, subangular slate fragments at 4 feet bgs (1-2" diameter), black and orange oxidized surfaces, medium dense, dry to moist. 4.0	0.1 0.5
5.0 7.5	426.2 423.7	DP	26	54	SP		Dark Brown, FINE TO MEDIUM SAND, some subangular gravel, pulverized coal fragments at 6 and 7.5 feet bgs, loose, moist. 8.0	0.0 0.1 0.2 0.1
10.0	421.2	DP	26	54	GP		Brown To Red Brown, GRAVEL, some coarse sand and silt, subangular (0.5" diameter), red brown coloration from brick fragments at 9.8-10 feet bgs, loose, saturated. 10.0	0.0 0.1

WELL DIAGRAM



ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

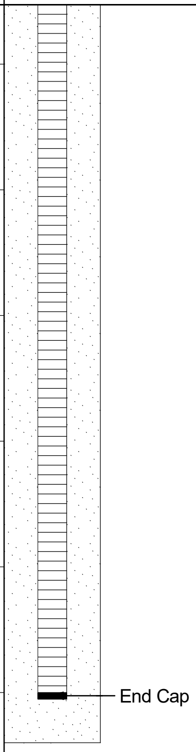
Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
		DP	26	54	CL-ML		Brown, CLAY, some silt, soft, plastic, saturated. *(continued)*	0.2	
							11.0	0.2	
12.5	418.7	DP	38	79	CL-ML		Gray, CLAY, interbedded with silt, "musty and sweet-like" odor noted at 17 and 25 feet bgs (based on olfactory), low plasticity, saturated.	0.0	
								1.7	
								20.5	
15.0	416.2							74.5	
		DP JS-B-030 (16-18) for VOCs, PFAS, TOC, pH	46	96				382.7	
17.5	413.7							236.2	
								193.6	
								166.3	
20.0	411.2							13.2	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
		DP	38	79				3.4	
22.5	408.7							0.8	
								0.4	
								128.8	
25.0	406.2							22.2	
		DP	34	71	CL-ML		Gray, CLAY, interbedded with silt, "musty and sweet-like" odor noted at 17 and 25 feet bgs (based on olfactory), low plasticity, saturated. *(continued)*	5.0	
									End Cap
27.5	403.7							1.4	
								2.5	
								0.7	
30.0	401.2	DP	34	71		30.5		0.6	
					ML	32.0	Gray To Dark Gray, SILT, some clay, soft to medium stiff, saturated.	0.3	
32.5	398.7						Bottom of Boring @ 32.00 feet bgs		



ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-031

PAGE 1 OF 2

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.

DATE BORING COMPLETED: 4/11/2018 9:15:00 AM

LOGGED BY: H. Usle

CHECKED BY: J. Redden

DRILLING METHOD(S): Hand Auger/ Direct Push

GROUND ELEVATION: 430.30 feet amsl

NORTHING: 1484033.87

EASTING: 799376.57

TOTAL DEPTH: 20 feet bgs

DIAMETER: 2.25 inches

DATUM: NAD 1983 StatePlane New York East in US Survey Feet

NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:

- HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND

- Poorly-graded Gravel
- Poorly-graded Sand
- Poorly-graded Gravelly Sand
- Silt
- ▨ Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.3	Gray, GRAVEL, subangular (0.5" diameter), loose, dry.	
					SP	2.0	Dark Brown, FINE TO MEDIUM SAND, trace subangular gravel, (1-2" diameter), trace brick fragments and some concrete fragments, loose, dry to moist.	0.0 0.2
2.5	427.8	DP	18	75	SP	4.0	Dark Brown To Black, MEDIUM TO COARSE SAND, with subangular gravel, (1-1.5" diameter), "ash-like" layer of alternating black and white deposits, trace brick fragments (more prevalent from 2-3 feet bgs), loose, dry to moist.	0.0 0.3
5.0	425.3	DP	22	46	SP	5.0	Brown, MEDIUM TO COARSE SAND, with subangular gravel, (1-1.5" diameter), medium dense, moist.	0.0
					GP	7.5	Gray To White, GRAVEL, subangular (1-2" diameter), medium dense, dry.	0.2 0.0
7.5	422.8				GP	8.0	Light Brown, GRAVEL, some silt and fine sand, angular and rounded (0.5" diameter), loose, saturated.	0.3
10.0	420.3	DP	48	100	GP	10.0	Light Brown, GRAVEL, some clay, subangular to subrounded (0.5" diameter), coarsening downward sequence, loose, saturated.	0.0 0.0

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	48	100	ML		Light Brown, SILT, some clay, low plasticity, wet. *(continued)*	0.2
10.5					CL-ML	▨	Gray, CLAY, some silt, low plasticity, wet.	0.0
12.5	417.8	DP	24	50		▨		0.0
						▨		0.0
						▨		0.0
15.0	415.3					▨		0.0
		JS-B-031 (15-17) for VOCs, PFAS, TOC, pH	30	63		▨		0.0
17.5	412.8	DP				▨		0.0
						▨		0.0
20.0	410.3					▨	20.0	0.0
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-032

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.

DATE BORING COMPLETED: 4/11/2018 9:40:00 AM

LOGGED BY: H. Usle

CHECKED BY: J. Redden

DRILLING METHOD(S): Hand Auger/ Direct Push

GROUND ELEVATION: 429.90 feet amsl

NORTHING: 1484043.41

EASTING: 799380.66

TOTAL DEPTH: 20 feet bgs

DIAMETER: 2.25 inches

DATUM: NAD 1983 StatePlane New York East in US Survey Feet

NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
- HA = Hand Auger
- DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Poorly-graded Gravelly Sand
- Boulders and Cobbles
- Silt
- Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.3	Gray, GRAVEL, subangular (0.5" diameter), loose, dry.	4.6
					SP	1.0	Gray Brown, FINE TO MEDIUM SAND, some subangular gravel, (0.5-1" diameter), brick fragments, loose, moist.	
					SP	2.0	Gray, MEDIUM TO COARSE SAND, some subangular gravel, (0.5-1" diameter), loose, moist.	0.3
2.5	427.4	DP	16	67	SP	4.0	Dark Brown To Black, MEDIUM TO COARSE SAND, some gravel, (1" diameter), "ash-like" layers, coal fragments, reddish brown sands and brick fragments from 3-4 feet bgs, trace clay from 2-3 feet bgs, loose.	1.3 1.3
5.0	424.9	DP	23	48	SP	6.0	Dark Brown, MEDIUM TO COARSE SAND, some gravel, dark gray shale and quartz gravel (1" diameter), light brown sand seams, loose, dry to moist.	0.7 1.3
						7.0	Gray, ROCK FRAGMENTS, (1-2" diameter), dry.	1.0
7.5	422.4				GP	8.0	Light Brown, GRAVEL, trace subangular coarse sand, (1-2" diameter), loose, dry.	0.3
		DP JS-B-032 (9-11) for VOCs, PFAS, TOC, pH	44	92	ML	8.5	Light Brown, SILT, little gravel, soft, wet.	0.5
					CL-ML	9.0	Brown To Gray, SILT AND CLAY, soft, wet.	
10.0	419.9				CL-ML		Gray, SILT AND CLAY, low plasticity, wet.	2.8

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

JS-B-032

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	44	92		▨		3.9
						▨		2.8
12.5	417.4					▨		0.0
						▨		0.0
		DP	35	73		▨		0.0
15.0	414.9				CL-ML	▨	Gray, SILT AND CLAY, low plasticity, wet. *(continued)*	0.0
						▨		0.0
17.5	412.4					▨		0.0
		DP	28	58		▨		0.1
						▨		0.1
20.0	409.9						20.0	
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B/TMW-033

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/11/2018 10:30:00 AM
DATE WELL INSTALLED: 4/13/2018 10:30:00 AM
DRILLING METHOD(S): Hand Auger/ Direct Push
LOGGED BY: H. Usle
CHECKED BY: J. Redden

GROUND ELEVATION: 430.10 feet amsl
TOC ELEVATION: 429.87 feet amsl
NORTHING: 1484039.22
EASTING: 799389.29
TOTAL DEPTH: 32 feet bgs
DIAMETER: 3.25 inches

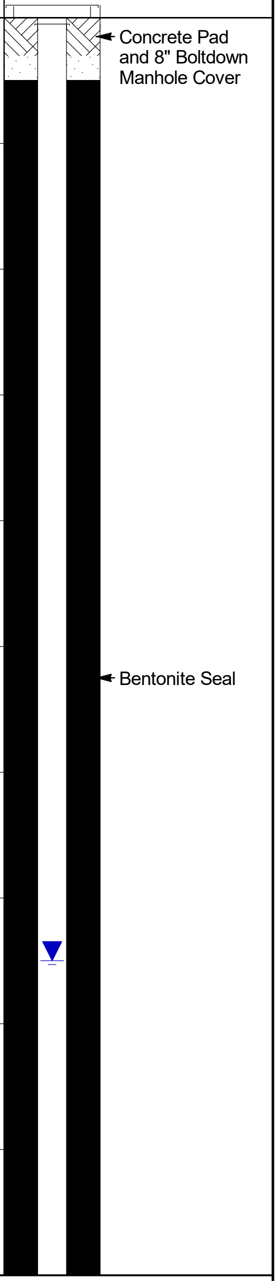
SAMPLE TYPE:
- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Poorly-graded Sand
- Poorly-graded Gravelly Sand
- Poorly-graded Gravel with Silt
- ▨ Low Plasticity Clay

NOTES: Soil samples collected as part of the Interim Remedial Measure. Datum is NAD 1983 StatePlane New York East in US Survey Feet.

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.3	Gray, GRAVEL, subangular (0.5" diameter), loose, dry.	
2.5	427.6	DP	10	42	SP	4.0	Grayish Brown, FINE TO MEDIUM SAND, some subangular gravel, (0.5-1" diameter), wet at 3 feet bgs, trace clay and yellow mottling 3-4 feet bgs, loose to medium dense, moist.	0.0 0.0 0.0 0.0
5.0	425.1	DP	28	58	SP	7.5	Dark Brown To Gray Brown, FINE SAND AND GRAVEL, (0.5-1" diameter), trace black fragments, brick layer at 6.5 feet bgs (2" thick) followed by a gray angular gravel layer (2.5" thick), medium dense, dry to moist.	0.0 0.0 0.0
7.5	422.6				GP-GM	8.5	Light Brown, GRAVEL, some silt and fine sand, (0.5" diameter), loose, saturated.	0.6
10.0	420.1	DP	25	52	CL		Gray, CLAY, some fine sand, sands in upper 3 inches only, low plasticity, saturated.	0.1 0.8

WELL DIAGRAM

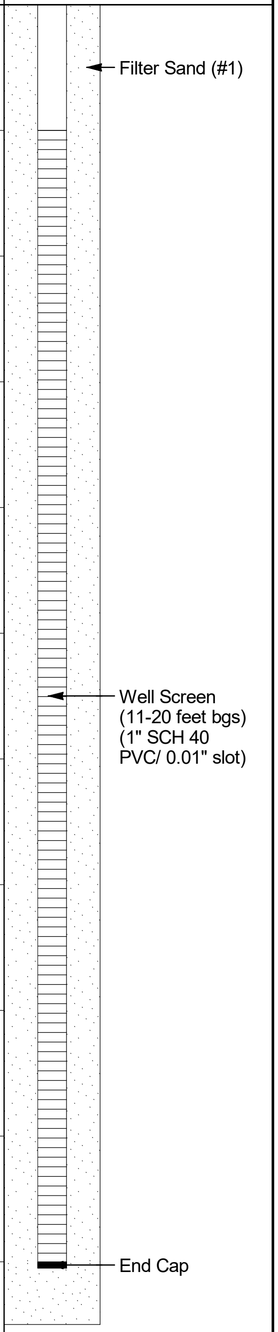


ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	25	52	CL	▨	Gray, CLAY, some fine sand, sands in upper 3 inches only, low plasticity, saturated. *(continued)*	2.4 5.1
							12.0	
12.5	417.6	DP JS-B-033 (14-16) for PFAS, TOC, pH JS-B-033 (15-16) for VOCs	30	63	CL	▨	Gray, CLAY, possible fall through from 24-28 feet bgs (little recovery), low plasticity, saturated.	56.3 316.0 239.8 440.0
15.0	415.1							
17.5	412.6	DP	40	83		▨		116.5 61.3 39.5 2.0
20.0	410.1	DP	10	21		▨		7.1

WELL DIAGRAM



ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B/TMW-033

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
22.5	407.6	DP	10	21	CL	▨	Gray, CLAY, possible fall through from 24-28 feet bgs (little recovery), low plasticity, saturated. *(continued)*	7.1	
25.0	405.1	DP	6	13				NM	
27.5	402.6								
30.0	400.1	DP	48	100			32.0	0.3 0.3 0.1 0.1	
32.5	397.6						Bottom of Boring @ 32.00 feet bgs		

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-034

PAGE 1 OF 2

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/11/2018 11:00:00 AM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 430.50 feet amsl
NORTHING: 1484026.87
EASTING: 799362.18
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:

- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND

- Poorly-graded Gravel
- Poorly-graded Sand
- ☒ Brick
- ▨ Silty Clay
- ▨ Low Plasticity Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.3	Gray, GRAVEL, subangular (0.5" diameter), loose, dry.	0.0
					SP	2.0	Dark Brown, MEDIUM TO COARSE SAND, trace gravel, (0.5-1.5" diameter), loose, dry.	0.0
2.5	428.0	DP	19	79	SP		Dark Brown, FINE TO MEDIUM SAND, some gravel, quartz gravels (0.5" diameter), brick fragments at 7 feet bgs, trace black oxidation, loose, dry to moist.	0.2
								0.2
5.0	425.5	DP	33	69				0.3
								0.4
						6.5		0.3
						7.0	BRICK.	
7.5	423.0				GP		Light Brown, GRAVEL, some coarse sand, (0.5" diameter), trace silt, loose, saturated.	1.6
		DP	18	38				0.2
10.0	420.5							0.1

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	18	38	GP		Light Brown, GRAVEL, some coarse sand, (0.5" diameter), trace silt, loose, saturated. *(continued)*	0.1
						12.0		0.3
12.5	418.0	DP	34	71	CL-ML	13.0	Dark gray to gray, SILTY CLAY, low plasticity, soft to medium stiff, saturated.	0.1
					CL		Gray, CLAY, low plasticity, soft to medium stiff, saturated.	0.2
								0.1
15.0	415.5	JS-B-034 (14-16) for VOCs, PFAS, TOC, pH						0.0
		DP	38	79				0.1
17.5	413.0							0.1
								0.1
20.0	410.5					20.0		0.1
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B/TMW-035

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/12/2018 11:15:00 AM
DATE WELL INSTALLED: 4/26/2018 2:00:00 PM
DRILLING METHOD(S): Hand Auger/ Direct Push
LOGGED BY: H. Usle
CHECKED BY: J. Redden

GROUND ELEVATION: 431.20 feet amsl
TOC ELEVATION: 430.83 feet amsl
NORTHING: 1484012.53
EASTING: 799366.89
TOTAL DEPTH: 24 feet bgs
DIAMETER: 3.25 inches

SAMPLE TYPE:
- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Poorly-graded Sand
- Poorly-graded Gravelly Sand
- Poorly-graded Sandy Gravel
- ▨ Low Plasticity Clay

NOTES: Soil samples collected as part of the Interim Remedial Measure. Datum is NAD 1983 StatePlane New York East in US Survey Feet.

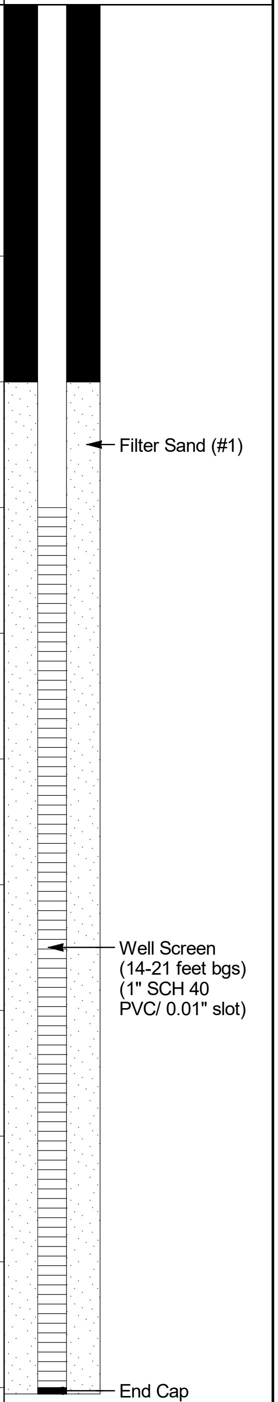
DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.3	Gray, GRAVEL, subangular (0.5" diameter), loose, dry.	
					SP	2.0	Dark Brown, MEDIUM TO COARSE SAND, trace gravel, (0.5-1.5" diameter), trace brick fragments and white laminar flecks from 1-2 feet bgs, creosote soaked wood fragments from 0-1 feet bgs, loose, dry.	23.8 0.2
2.5 5.0	428.7 426.2	DP DP	10 26	42 54	SP	5.0	Black to Brown, MEDIUM TO COARSE SAND, trace gravel, (1" diameter), white laminar flecks, loose, dry to moist.	0.4 0.2 0.0
7.5	423.7				SP	8.0	Dark Brown, MEDIUM TO COARSE SAND, some gravel, (0.5-1" diameter), trace white specks, trace brick and coal fragments from 7-8 feet bgs, wet at 7.8 feet bgs, loose, moist.	0.1 0.1 0.1
		DP	11	23	SP	9.0	Brown, MEDIUM TO COARSE SAND, trace gravel, (1-2" diameter), loose, wet.	0.2
10.0	421.2				GP	10.0	Light Brown, GRAVEL, some coarse sand, subangular (0.5-1.5" diameter), trace silt, loose, saturated.	0.2

WELL DIAGRAM

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	11	23			NO RECOVERY, rock lodged in drilling shoe. *(continued)*	NM
							12.0	
12.5	418.7	DP	38	79	CL	▨	Gray, CLAY, soft, low plasticity, saturated.	0.2 0.0 1.2
15.0	416.2							20.4
		DP JS-B-035 (16-18) for VOCs, PFAS, TOC, pH	34	71				91.8
17.5	413.7							120.6 85.7 74.7
20.0	411.2							4.2



ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

JS-B/TMW-035

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
		DP	38	79		▨		0.6	
22.5	408.7				CL	▨	Gray, CLAY, soft, low plasticity, saturated. *(continued)*	0.3	
						▨	24.0	0.2	
							Bottom of Boring @ 24.00 feet bgs		
25.0	406.2								
27.5	403.7								
30.0	401.2								
32.5	398.7								

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B/TMW-036

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/12/2018 11:30:00 AM
DATE WELL INSTALLED: 4/26/2018 1:30:00 PM
DRILLING METHOD(S): Hand Auger/ Direct Push
LOGGED BY: H. Usle
CHECKED BY: J. Redden

GROUND ELEVATION: 431.40 feet amsl
TOC ELEVATION: 431.11 feet amsl
NORTHING: 1484008.66
EASTING: 799375.07
TOTAL DEPTH: 24 feet bgs
DIAMETER: 3.25 inches

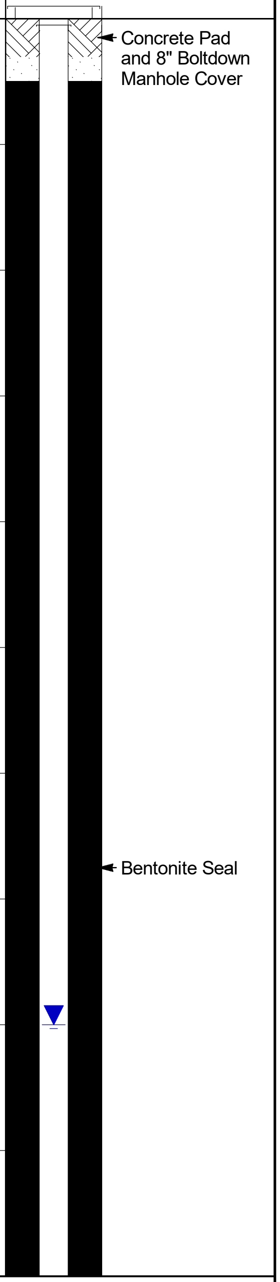
SAMPLE TYPE:
- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Poorly-graded Sand
- ☒ Brick
- Poorly-graded Gravelly Sand
- Poorly-graded Sandy Gravel
- ▨ Silty Clay

NOTES: Soil samples collected as part of the Interim Remedial Measure. Datum is NAD 1983 StatePlane New York East in US Survey Feet.

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.3	Gray, GRAVEL, subangular (0.5" diameter), loose, dry.	0.1
					SP	2.0	Dark Brown, MEDIUM TO COARSE SAND, trace gravel, (0.5-1.5" diameter), coarser from 1-2 feet bgs with trace gravels (2" diameter), loose, dry.	0.1
2.5	428.9	DP	12	50	SP	3.5	Dark Brown To Gray Brown, FINE TO MEDIUM SAND, trace gravel, (0.5" diameter), loose, moist.	0.3 0.2
						3.8	BRICK.	
					SP	4.0	Black To Brown, MEDIUM SAND, white flecks throughout, orange staining, coal fragments, loose, moist.	
5.0 7.5	426.4 423.9	DP	24	50	SP	8.0	Dark Brown, FINE TO MEDIUM SAND, some gravel, (0.5-1" diameter), coal and brick fragments near 5.5 feet bgs, gray laminar gravel at 5 feet bgs, brick fragments at 7.8 feet bgs, trace white flecks, loose, dry to moist.	0.1 0.2 0.0 0.2
		DP	32	67	GP	9.0	Light Brown, GRAVEL, some coarse sand, (0.5-1.5" diameter), loose, saturated.	0.0
10.0	421.4				CL-ML	10.0	Light Brown, CLAY AND SILT, low plasticity, soft, saturated.	0.0

WELL DIAGRAM

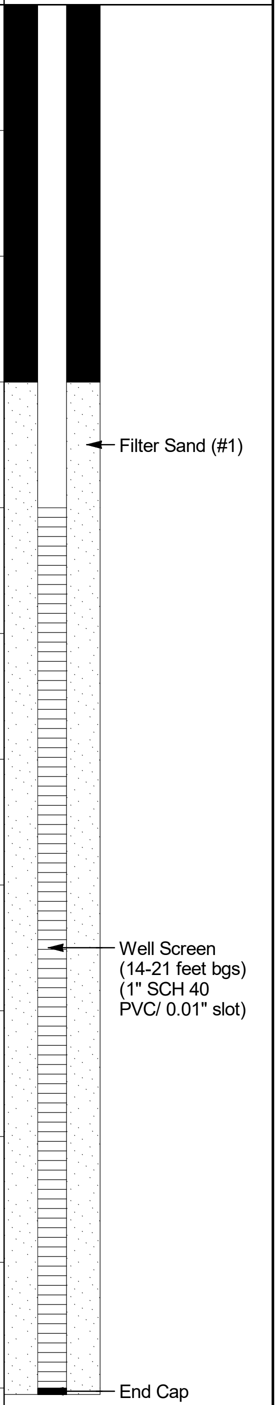


ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	32	67	CL-ML		Gray, CLAY AND SILT, low plasticity, soft, wet to saturated. *(continued)*	0.0 0.0
							12.0	
12.5 15.0	418.9 416.4	DP JS-B-036 (14-15) for VOCs, PFAS,	34	71	CL-ML		Gray, CLAY, some silt, low plasticity, soft, wet to saturated.	0.0 0.0 1.3 24.5
							16.0	
17.5 20.0	413.9 411.4	JS-B-036 (17-19) for PFAS DP JS-B-036 (18-19) for VOCs, TOC, pH JS-B-036 (19-20) for VOCs and PFAS	40	83	CL-ML		Gray, CLAY, little silt, "musty-like odor" (based on olfactory), soft to medium stiff, low plasticity, wet.	67.6 107.2 153.7 46.9
							20.0	
		DP	32	67	CL-ML		Gray, CLAY, interbedded silt, soft to medium stiff, wet.	0.2

WELL DIAGRAM



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PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
		DP	32	67	CL-ML	▨	Gray, CLAY, interbedded silt, soft to medium stiff, wet. *(continued)*	0.1	
22.5	408.9							0.0	
							24.0	0.0	
							Bottom of Boring @ 24.00 feet bgs		
25.0	406.4								
27.5	403.9								
30.0	401.4								
32.5	398.9								

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B/TMW-037

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/16/2018 1:45:00 PM
DATE WELL INSTALLED: 4/26/2018 11:15:00 AM
DRILLING METHOD(S): Hand Auger/ Direct Push
LOGGED BY: H. Usle
CHECKED BY: J. Redden

GROUND ELEVATION: 431.30 feet amsl
TOC ELEVATION: 431.07 feet amsl
NORTHING: 1484017.31
EASTING: 799391.11
TOTAL DEPTH: 32 feet bgs
DIAMETER: 3.25 inches

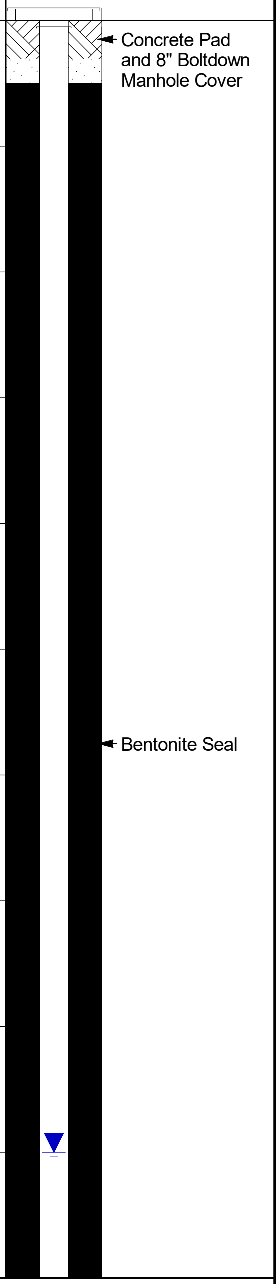
SAMPLE TYPE:
- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Poorly-graded Gravelly Sand
- Poorly-graded Sand
- Poorly-graded Sand with Silt
- ▨ Low Plasticity Clay

NOTES: Soil samples collected as part of the Interim Remedial Measure. Datum is NAD 1983 StatePlane New York East in US Survey Feet.

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.3	Gray, GRAVEL, subangular (0.5" diameter), moist due to precipitation, loose, moist.	
					SP	0.8	Grayish Brown, FINE TO MEDIUM SAND, some gravel, (0.5-1" diameter), loose.	0.2
2.5	428.8				SP	3.0	Dark Brown, FINE TO MEDIUM SAND, trace gravel, (1-2" diameter), loose, moist.	0.2 0.2
5.0	426.3	DP	18	75	SP-SM	5.0	Brown, FINE TO MEDIUM SAND, and silt and clay, trace gravel (0.5" diameter), few coal fragments, medium dense, moist.	0.2 0.2 0.3
		DP	14	29	SP	6.0	Brown, FINE TO COARSE SAND, and angular gravel, (0.5-1.5" diameter), brick fragments, loose.	0.5
7.5	423.8					8.0	NO RECOVERY, gravel in drilling shoe.	0.0 0.0
		DP	36	75	SP	9.0	Brown, FINE TO MEDIUM SAND, trace silt and gravel, (1" diameter), brick fragments, loose, moist.	0.5
10.0	421.3				SP	10.0	Brown, MEDIUM TO COARSE SAND AND GRAVEL, trace clay, (0.25-1" diameter), loose to medium dense, wet.	0.2

WELL DIAGRAM

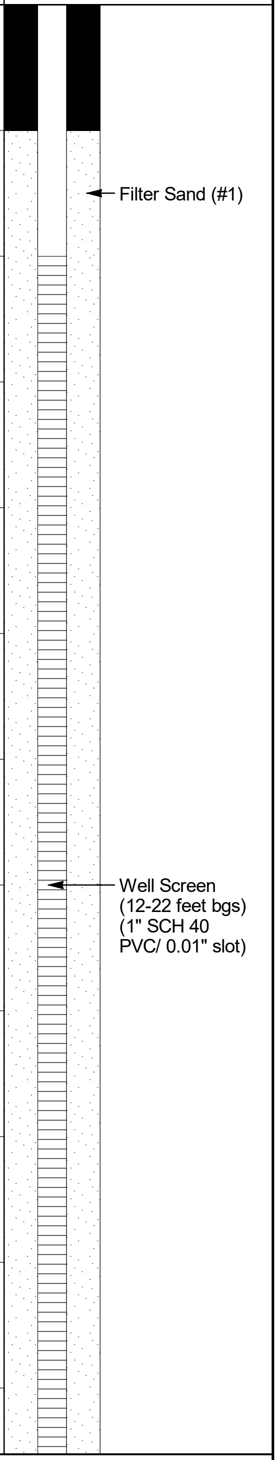


ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	36	75		▨		0.7 0.8
12.5 15.0	418.8 416.3	DP JS-B-037 (15-16) for VOCs JS-B-037 (15-17) for PFAS, TOC, pH	36	75	CL	▨	Gray, CLAY, low plasticity, soft, wet. *(continued)*	1.6 7.8 28.3 74.7
17.5 20.0	413.8 411.3	DP	36	75		▨		51.2 72.4 43.4 27.0
		DP	30	63		▨		11.7

WELL DIAGRAM



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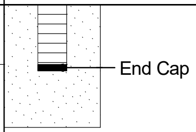
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
		DP	30	63		▨		1.0	
22.5	408.8				CL	▨	Gray, CLAY, low plasticity, soft, wet. *(continued)*	0.3	
						▨	24.0	0.3	
25.0	406.3	DP	0	0				NM	
27.5	403.8						NO RECOVERY, CLAY too soft to enable capture in liner.		
30.0	401.3	DP	0	0				NM	
							32.0		
32.5	398.8						Bottom of Boring @ 32.00 feet bgs		

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

ERM
105 Maxess Road; Suite 316
Melville, New York 11747
Telephone: (631) 756-8900

JS-B/TMW-038

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/16/2018 1:45:00 PM
DATE WELL INSTALLED: 4/25/2018 1:30:00 PM
DRILLING METHOD(S): Hand Auger/ Direct Push
LOGGED BY: H. Usle
CHECKED BY: J. Redden

GROUND ELEVATION: 430.60 feet amsl
TOC ELEVATION: 430.29 feet amsl
NORTHING: 1484026.06
EASTING: 799393.79
TOTAL DEPTH: 28 feet bgs
DIAMETER: 3.25 inches

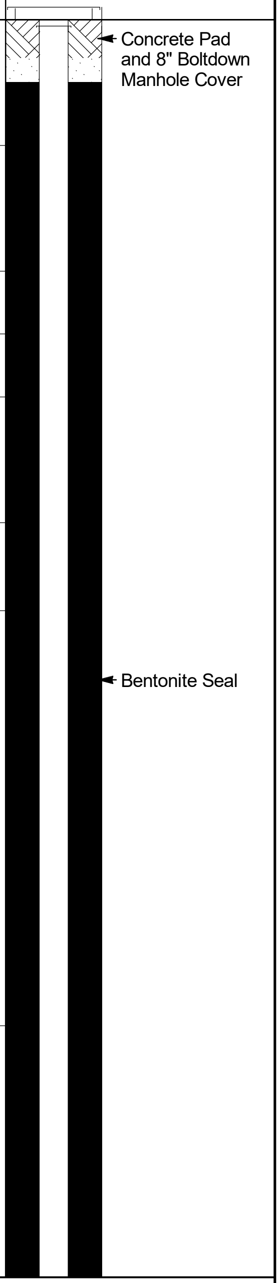
SAMPLE TYPE:
- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND
- ▨ Poorly-graded Gravel
- ▨ Poorly-graded Sand with Clay
- ▨ Low Plasticity Sandy Clay
- ▨ Silty Clay

NOTES: Soil samples collected as part of the Interim Remedial Measure. Datum is NAD 1983 StatePlane New York East in US Survey Feet.

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.3	Gray, GRAVEL, sub-angular (0.5" diameter), moist due to precipitation, loose, moist.	0.1 0.4 0.1
2.5	428.1				SP-SC	2.5	Grayish Brown, FINE TO MEDIUM SAND, some clay and gravel, (0.5-1" diameter), loose, wet.	
		DP	6	25		4.0	NO RECOVERY.	NM
		DP	7	15	SP-SC	4.7	Brown To Gray, FINE TO MEDIUM SAND, some clay and gravel, (0.5-1" diameter), loose, moist.	0.3
5.0 7.5	425.6 423.1					8.0	NO RECOVERY.	NM
10.0	420.6	DP	0	0			NO RECOVERY.	NM

WELL DIAGRAM



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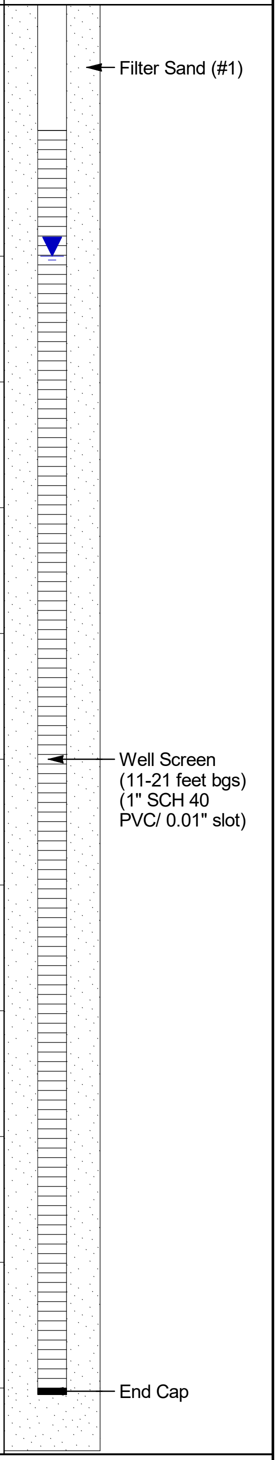
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	0	0			NO RECOVERY. *(continued)*	NM
							12.0	
12.5	418.1	DP	42	88	CL	▨	Gray, CLAY, some sand, sand in upper 3 inches only, soft, low plasticity, wet.	113.6 161.4
		JS-B-038 (14-15) for VOCs						1396.0
15.0	415.6	JS-B-038 (14-16) for PFAS, TOC, pH						308.1
							16.0	
17.5	413.1	DP	27	56	CL-ML	▨	Gray, CLAY, some silt from 19 to 20 feet bgs, soft, low plasticity, wet.	193.8 254.9 92.6 74.2
20.0	410.6	DP	30	63				67.8

WELL DIAGRAM



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PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
		DP	30	63	CL-ML	▨	Gray, CLAY, some silt from 19 to 20 feet bgs, soft, low plasticity, wet. *(continued)*	2.5	
22.5	408.1							0.2	
								0.2	
		DP	17	35				0.1	
25.0	405.6							0.0	
								0.0	
27.5	403.1						28.0	0.0	
							Bottom of Boring @ 28.00 feet bgs		
30.0	400.6								
32.5	398.1								

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B/TMW-039

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/16/2018 2:15:00 PM
DATE WELL INSTALLED: 4/20/2018 1:30:00 PM
DRILLING METHOD(S): Hand Auger/ Direct Push
LOGGED BY: H. Usle
CHECKED BY: J. Redden

GROUND ELEVATION: 430.20 feet amsl
TOC ELEVATION: 430.09 feet amsl
NORTHING: 1484034.86
EASTING: 799398.06
TOTAL DEPTH: 32 feet bgs
DIAMETER: 3.25 inches

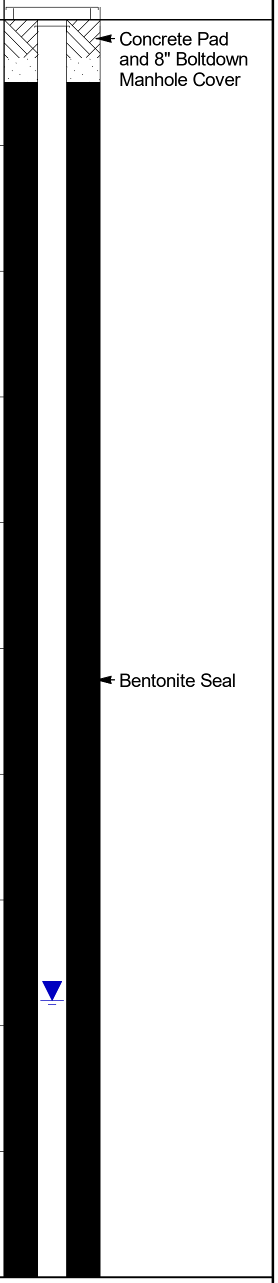
SAMPLE TYPE:
- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Poorly-graded Gravelly Sand
- Concrete
- Poorly-graded Gravel with Silt
- Silty Clay

NOTES: Soil samples collected as part of the Interim Remedial Measure. Datum is NAD 1983 StatePlane New York East in US Survey Feet.

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.3	Gray, GRAVEL, subangular (0.5" diameter), moist from precipitation, loose, moist.	0.0
					SP	2.0	Grayish Brown, MEDIUM TO COARSE SAND AND GRAVEL, little clay, (0.25-0.5" diameter), loose, wet.	0.0
		DP	21	88	SP	2.2	Brown, MEDIUM GRAVELLY SAND, (1" diameter), loose, dry.	0.5
2.5	427.7					4.0	Gray, pulverized CONCRETE fragments, black coarse-grained material at 3 ft bgs (2" thick), "organic-like" odor, dense, dry.	0.8
		DP	32	67	GP			0.3
5.0	425.2					7.8	Gray, GRAVEL, rock dust, (0.5-1" diameter), olive brown medium dense silty sand layers at 5.5 and 6.5 feet bgs, dense, dry to moist.	0.0 0.2 0.6
7.5	422.7				GP-GM	10.0	Brown To Light Brown, GRAVEL, some coarse sand and silt, loose to medium dense, saturated.	0.3 0.2
10.0	420.2							

WELL DIAGRAM



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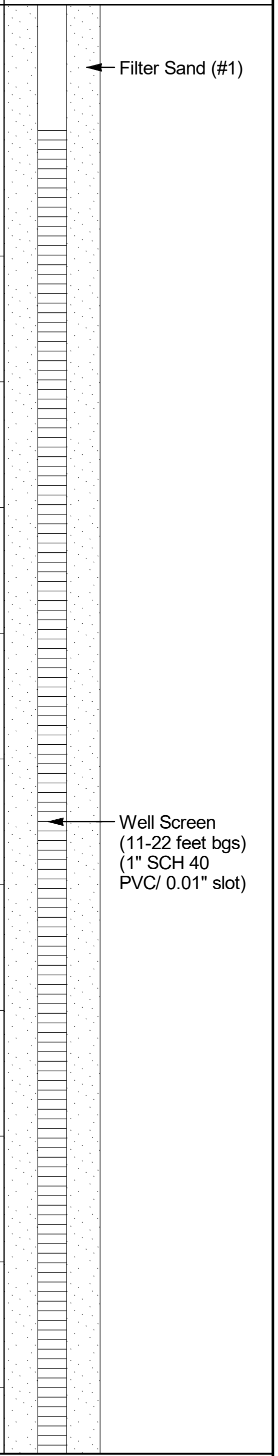
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	19	40	CL-ML	▨	Gray, CLAY AND SILT, silt parting with some resistance during cross-cut at 13.8 feet bgs, strong "musty-like" odor, slight visual of bedding planes 24-28 feet bgs, appreciable silts near 27 feet bgs, very soft drilling results in little recovery, soft, low plasticity, saturated. *(continued)*	16.9
12.5	417.7	JS-B-039 (12-13) for VOCs, PFAS, TOC, pH	44	92				391.1
		JS-B-039 (13-14) for VOCs						> 2,000
		DP JS-B-039 (13-15) for PFAS, TOP Assay PFAS, TOC, pH , Flash Point, Metals, Mercury, and Cyanide						455.7
15.0	415.2							486.7
		DP	46	96				408.3
17.5	412.7							343.1
								193.0
		JS-B-039 (19-20) for VOCs, PFAS, TOC, pH						91.1
20.0	410.2							64.8

WELL DIAGRAM



ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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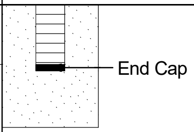
JS-B/TMW-039

PAGE 3 OF 3

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
		DP	42	88	CL-ML		Gray, CLAY AND SILT, silt parting with some resistance during cross-cut at 13.8 feet bgs, strong "musty-like" odor, slight visual of bedding planes 24-28 feet bgs, appreciable silts near 27 feet bgs, very soft drilling results in little recovery, soft, low plasticity, saturated. *(continued)*	7.9	
22.5	407.7							4.8	
								8.6	
		DP	34	71				301.3	
25.0	405.2							54.5	
								12.1	
27.5	402.7							1.7	
							28.0		
		DP	36	75	CL-ML		Gray, CLAY AND SILT, soft to medium stiff, low plasticity, saturated.	0.5	
								0.2	
30.0	400.2							0.0	
								0.7	
							32.0		
32.5	397.7						Bottom of Boring @ 32.00 feet bgs		

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-040

PAGE 1 OF 1

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/16/2018 2:35:00 PM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 429.90 feet amsl
NORTHING: 1484039.48
EASTING: 799398.97
TOTAL DEPTH: 7 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Poorly-graded Gravelly Sand
- Poorly-graded Sand

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.3	Gray, GRAVEL, subangular (0.5" diameter), moist from precipitation, loose, moist.	
					SP	2.5	Grayish Brown, MEDIUM TO COARSE SAND, and gravel, (0.25-0.5" diameter), loose.	0.0 0.0
2.5	427.4	DP	14	58	SP	4.0	Brown To Red Brown, FINE TO MEDIUM SAND, trace gravel, trace coal fragments, loose, moist.	0.1 0.8
		DP	21	58	SP	5.0	Gray, MEDIUM TO COARSE SAND AND GRAVEL, (0.5" diameter), loose, wet.	0.2
5.0	424.9				SP	7.0	Gray Brown, FINE TO COARSE SAND, trace gravel, (0.5-1" diameter). Refusal at 7 feet bgs, medium dense, moist.	0.9 0.5
7.5	422.4						Bottom of Boring @ 7.00 feet bgs	
10.0	419.9							

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-041

PAGE 1 OF 2

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/16/2018 3:15:00 PM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 430.30 feet amsl
NORTHING: 1484009.42
EASTING: 799354.39
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Poorly-graded Gravelly Sand
- Poorly-graded Sand
- Poorly-graded Sand with Silt
- ▨ Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.3	Gray, GRAVEL, subangular (0.5" diameter), moist from precipitation, loose, moist.	
					SP	1.0	Grayish Brown, MEDIUM TO COARSE SAND AND GRAVEL, litte clay, (0.25-0.5" diameter), loose, wet.	0.0
					SP	2.0	Brown, FINE TO COARSE SAND, little clay and gravel, (0.5-1" diameter), loose, wet.	0.1
2.5	427.8	DP	22	92	SP	3.0	Light Grayish Brown, FINE TO COARSE SAND, some gravel, (0.5" diameter), saturated due to precipitation, loose, saturated.	0.0
					SP	4.0	Dark Brown, FINE TO MEDIUM SAND, some gravel, (0.5-1" diameter), dark brown to black interval from 3-3.2 feet bgs with white plastic fragments, gray laminar gravel layer (2" thick) at 4.5 feet bgs, loose, dry to moist.	0.1
5.0	425.3	DP	30	63	SP	5.0	Gray Brown, COARSE SAND, some fine sand, saturated due to precipitation, loose, saturated.	0.0
					SP-SM	6.0	Olive Brown, SILT, some fine sand, soft, moist to wet.	0.0
7.5	422.8				SP	8.5	Brown, FINE TO MEDIUM SAND, some gravel, reddish brown gravel from 7.5-7.6 feet bgs, white quartz gravel from 7.6-7.8 feet bgs (1" diameter), medium dense, dry to moist.	0.0 0.0 0.0
		DP	27	56	CL-ML	9.2	Light Brown, CLAY AND SILT, low plasticity, soft, wet.	
10.0	420.3				CL-ML		Gray, CLAY AND SILT, non-plastic from 12-20 feet bgs, soft to medium stiff, low plasticity, wet.	0.0

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	27	56	CL-ML	▨	Gray, CLAY AND SILT, non-plastic from 12-20 feet bgs, soft to medium stiff, low plasticity, wet. *(continued)*	0.0
								0.0
12.5	417.8	DP	4	8				0.0
								0.0
								0.0
15.0	415.3							0.0
		DP JS-B-041 (16-18) for VOCs, PFAS, TOC, pH	22	46				0.0
17.5	412.8							0.0
								0.0
								0.0
20.0	410.3						20.0	
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-042

PAGE 1 OF 2

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.

DATE BORING COMPLETED: 4/16/2018 3:50:00 PM

LOGGED BY: H. Usle

CHECKED BY: J. Redden

DRILLING METHOD(S): Hand Auger/ Direct Push

GROUND ELEVATION: 431.00 feet amsl

NORTHING: 1483991.55

EASTING: 799364.4

TOTAL DEPTH: 20 feet bgs

DIAMETER: 2.25 inches

DATUM: NAD 1983 StatePlane New York East in US Survey Feet

NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:

- HA = Hand Auger
- DP = Direct Push

GRAPHIC LOG LEGEND

- Poorly-graded Gravel
- Poorly-graded Sand
- Poorly-graded Sand with Silt
- Poorly-graded Gravelly Sand
- Poorly-graded Gravel with Silt
- Silt

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0.3		HA	24	100	GP		Gray, GRAVEL, subangular (0.5" diameter), moist from precipitation, loose, moist.	
1.0					SP		Brown, FINE TO COARSE SAND, little clay and gravel, (0.5-1" diameter), loose.	0.0
2.5 3.0	428.5	DP	24	100	SP		Gray Brown, FINE TO COARSE SAND, little clay and gravel, (0.25-0.5" diameter), loose to medium dense, wet.	0.3 0.2
4.0					SP		Brown To Dark Brown, FINE TO MEDIUM SAND, trace rock fragments, angular, glass and black flaky solids, medium dense, moist.	0.9
5.0 5.5	426.0	DP	30	63	SP		Brown To Dark Brown, MEDIUM TO COARSE SAND, trace gravel, (0.25-0.5" diameter).	0.1
6.5					SP-SM		Brown, FINE SAND AND SILT, medium dense, wet.	0.4
7.5 8.0	423.5				SP		Brown, FINE TO COARSE SAND, and gravel, (0.5-1" diameter), oxidized rock.	0.1 0.4
9.5		DP	36	75	SP		Dark Brown, MEDIUM TO COARSE SAND, trace gravel, (0.25-0.5" diameter), coarsening downwards, loose, wet.	0.2
10.0	421.0				GP-GM		Brown, SAND, GRAVEL, AND SILT, (1-1.5" diameter), loose, wet.	0.3

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-042

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	36	75	ML		Brown, SILT, soft, wet. *(continued)* 10.8	0.2
					CL		Gray, CLAY, soft, wet.	0.2
12.5	418.5	DP	36	75				0.1
								0.2
15.0	416.0							0.2
								0.0
		DP	23	48				0.1
17.5	413.5							0.2
								0.1
20.0	411.0						20.0	0.1
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-043

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/18/2018 1:30:00 PM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 431.10 feet amsl
NORTHING: 1484001.25
EASTING: 799388.63
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
- HA = Hand Auger
- DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Sand
- Brick
- Sandy Silt
- Poorly-graded Gravelly Sand
- Silt
- Poorly-graded Gravel

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	SP		Dark Brown, FINE TO MEDIUM SAND, little subangular gravel, (1-2" diameter), coarser with trace gravel from 3-4 feet bgs, dark brown soft organic layer at 4.5 feet bgs (1" thick), loose, dry.	0.1
								0.2
2.5	428.6	DP	24	100				0.2
								0.1
		DP	24	50		4.5		0.1
5.0	426.1						BRICK.	0.1
						5.5		
					ML		Olive Brown, SILT, some fine sand and trace gravel, (0.25" diameter), soft, moist to wet.	0.2
						7.0		
7.5	423.6				SP		Dark Brown To Black, FINE TO MEDIUM GRAVELLY SAND, (0.5-1" diameter), glass fragments, trace brick fragments 8-9 feet bgs, loose to medium dense, moist to wet.	0.4
		DP	45	94				0.3
						9.0		
					SP	9.2	Gray Brown, COARSE SAND, little gravel, (0.25" diameter), loose, saturated.	
					ML	9.8	Dark Gray, SILT, trace fine sand, medium plasticity, soft, wet.	0.3
10.0	421.1				GP	10.0	Yelllowish Brown, GRAVEL, (1-2" diameter), loose, saturated.	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-043

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP JS-B-043 (10-12) for VOCs, PFAS, TOC, pH	45	94	CL-ML		Gray, CLAY AND SILT, soft, low plasticity, wet. *(continued)*	0.4
								0.5
12.5	418.6	DP	48	100				0.1
								0.0
								0.0
15.0	416.1							0.0
							16.0	
		DP	14	29	CL		Gray, CLAY, soft, saturated.	0.0
17.5	413.6							0.0
								0.0
								0.0
20.0	411.1						20.0	
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B/TMW-044

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/19/2018 8:30:00 AM
DATE WELL INSTALLED: 4/27/2018 9:40:00 AM
DRILLING METHOD(S): Hand Auger/ Direct Push
LOGGED BY: H. Usle
CHECKED BY: J. Redden

GROUND ELEVATION: 428.00 feet amsl
TOC ELEVATION: 427.73 feet amsl
NORTHING: 1484159.83
EASTING: 799436.89
TOTAL DEPTH: 24 feet bgs
DIAMETER: 3.25 inches

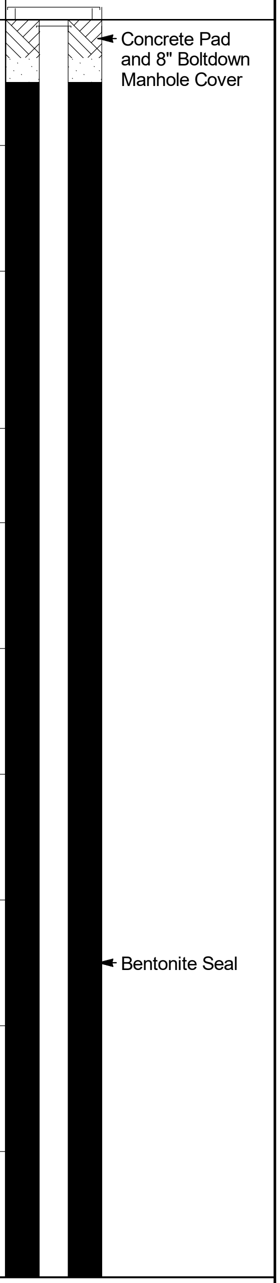
SAMPLE TYPE:
- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND
- ⁘ Poorly-graded Gravelly Sand
- ⁘ Poorly-graded Gravel
- ▥ Silt
- ▨ Silty Clay

NOTES: Soil samples collected as part of the Interim Remedial Measure. Datum is NAD 1983 StatePlane New York East in US Survey Feet.

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	SP	Brown, FINE TO MEDIUM SAND, some gravel, (1-2" diameter), brick fragments, white flecks, medium dense, dry to moist. 2.0	0.0 0.0
2.5	425.5	DP	16	67	SP	Gray Brown, FINE TO MEDIUM SAND AND GRAVEL, some silt, (1" diameter), medium dense, moist to wet. 3.3	0.2
						NO RECOVERY. 4.0	NM
5.0	423.0	DP	48	100	ML	Brown To Olive Brown, SILT, some fine sand, laminar gray gravel layer (2" thick) at 4.9 feet bgs, trace subangular gravels (0.5" diameter), medium stiff, moist to wet. 5.3	0.3
					GP	Gray, GRAVEL, trace fine sand, (0.5-1" diameter), dense, dry. 7.0	1.0 0.8
7.5	420.5				SP	Brown, FINE TO MEDIUM SAND, with gravel, quartz gravels (0.5-1" diameter), medium dense to dense, dry. 8.5	0.9
		DP	36	75	GP	Gray, GRAVEL, (0.25-0.5" diameter), pulverized rock, dense, dry. 9.5	1.1
10.0	418.0				SP	Brown, MEDIUM SAND, some gravel, (0.5" diameter), trace brick and coal fragments (0.25" diameter), medium dense, moist.	1.4

WELL DIAGRAM

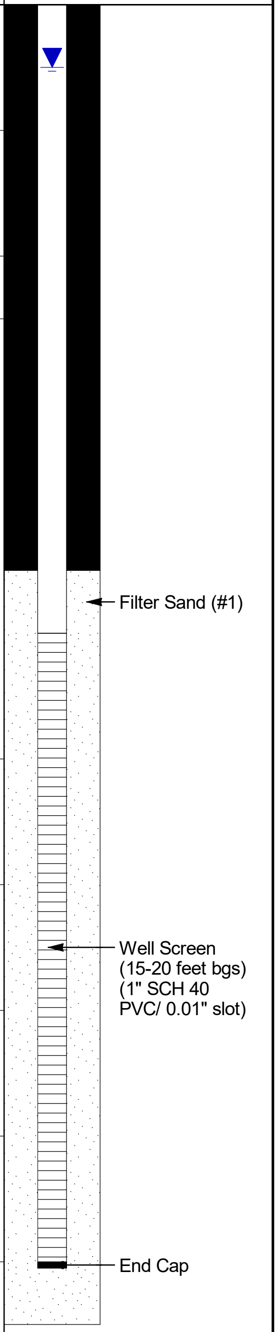


ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	36	75	SP	10.5	Brown, MEDIUM SAND, some gravel, (0.5" diameter), trace brick and coal fragments (0.25" diameter), medium dense, moist. *(continued)*	0.3
					SP	12.0	Yellowish Light Brown, FINE TO MEDIUM SAND, some gravel and trace silt, (0.5-1" diameter), saturated at 11.8 feet bgs, medium dense, wet.	0.6
12.5	415.5	DP	6	13	SP	12.5	Light Brown, FINE SAND AND GRAVEL, sand (3" thick), subangular quartz gravel (1-1.5" diameter) (2" thick), followed by rock lodged in drilling shoe, loose, wet.	0.3
15.0	413.0					16.0	NO RECOVERY.	NM
		DP	42	88	ML	16.2	Light Brown, SILT, some coarse sand, soft, saturated.	
17.5	410.5	JS-B-044 (17-19) for PFAS, TOP Assay PFAS, TOC, pH JS-B-044 (18-19) for VOCs, Metals, Mercury, Cyanide, pH			CL-ML	18.0	Brownish Gray, CLAY AND SILT, soft, low plasticity, saturated.	12 9.1
20.0	408.0	DP	45	94	CL-ML		Gray, CLAY, some silt, soft to medium stiff, low plasticity, saturated.	20.3 5.0 0.0

WELL DIAGRAM



ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

JS-B/TMW-044

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
		DP	45	94		▨		0.0	
22.5	405.5				CL-ML	▨	Gray, CLAY, some silt, soft to medium stiff, low plasticity, saturated. *(continued)*	0.0	
						▨		0.0	
							24.0		
							Bottom of Boring @ 24.00 feet bgs		
25.0	403.0								
27.5	400.5								
30.0	398.0								
32.5	395.5								

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-045

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.

DATE BORING COMPLETED: 4/19/2018 9:15:00 AM

LOGGED BY: H. Usle

CHECKED BY: J. Redden

DRILLING METHOD(S): Hand Auger/ Direct Push

GROUND ELEVATION: 428.30 feet amsl

NORTHING: 1484156.06

EASTING: 799446.77

TOTAL DEPTH: 2.5 feet bgs

DIAMETER: 2.25 inches

DATUM: NAD 1983 StatePlane New York East in US Survey Feet

NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:

▮ HA = Hand Auger

GRAPHIC LOG LEGEND

- ☰ Organic Silt or Clay
- ░ Poorly-graded Sand
- ▨ Poorly-graded Gravelly Sand

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION	PID (ppm)
		HA	18	60	OL	☰	0.3	Dark Brown, TOPSOIL.	
					SP	░	1.0	Black To Brown, FINE TO MEDIUM SAND, trace subrounded brick fragments (1" diameter), trace coal fragments (0.25" diameter), white laminar flecks, loose, dry.	0.0
2.5	425.8				SP	▨	2.5	Olive Brown, MEDIUM SAND AND GRAVEL, trace silt, (0.5-1" diameter), black oxidized surfaces around gravels. Refusal at 2.5 feet bgs, loose, moist to wet.	0.0 0.0
								Bottom of Boring @ 2.50 feet bgs	
5.0	423.3								
7.5	420.8								
10.0	418.3								

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-046

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/19/2018 1:10:00 PM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 429.10 feet amsl
NORTHING: 1484057.02
EASTING: 799376.24
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Poorly-graded Gravelly Sand
- Boulders and Cobbles
- Sandy Silt
- Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.3	Gray, GRAVEL, subangular (0.5" diameter), loose, dry.	0.2
					SP	1.0	Gray, MEDIUM TO COARSE SAND, some gravel, (0.5-1" diameter), loose, moist.	
					SP	2.0	Dark Brown To Black, MEDIUM TO COARSE SAND, some gravel, (1-3" diameter), loose, moist.	5.6
2.5	426.6	DP	13	54	SP	4.8	Dark Brown, FINE TO MEDIUM SAND AND GRAVEL, trace brick fragments (1" diameter), black oxidized surfaces, loose, dry to moist.	1.0 0.5 1.1
5.0	424.1	DP	30	63		6.0	Gray, GRAVEL, crushed rock fragments, dense, dry.	1.5
					ML	6.3	Brown To Olive Brown, SILT, some fine sand and gravel, medium stiff, moist to wet.	
7.5	421.6				SP	8.0	Dark Brown, FINE TO MEDIUM SAND, and gravel, (0.5" diameter), medium dense, dry to moist.	0.3 0.6
10.0	419.1	DP	12	25	SP	10.0	Light Brown, GRAVELLY SAND, trace silt, (0.5-1" diameter), oxidized surfaces on gravel, loose, saturated.	0.2 0.4

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-046
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Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	12	25			NO RECOVERY, CLAY and SILT fell out of core upon retraction. *(continued)*	NM
							12.0	
12.5	416.6	DP JS-B-046 (12-14) for VOCs, PFAS, TOC, pH	37	77		▨		0.2
						▨		0.1
15.0	414.1					▨		0.0
						▨		0.0
		DP	30	63	CL-ML	▨	Gray, CLAY AND SILT, soft to medium stiff, low plasticity, saturated.	0.0
17.5	411.6					▨		0.0
						▨		0.0
20.0	409.1					▨	20.0	0.0
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-047

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.

DATE BORING COMPLETED: 4/19/2018 1:30:00 PM

LOGGED BY: H. Usle

CHECKED BY: J. Redden

DRILLING METHOD(S): Hand Auger/ Direct Push

GROUND ELEVATION: 429.20 feet amsl

NORTHING: 1484060.46

EASTING: 799388.25

TOTAL DEPTH: 20 feet bgs

DIAMETER: 2.25 inches

DATUM: NAD 1983 StatePlane New York East in US Survey Feet

NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:

- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND

- Poorly-graded Gravel
- Poorly-graded Gravelly Sand
- Poorly-graded Sand
- Poorly-graded Sandy Gravel
- ▨ Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP		0.3 Gray, GRAVEL, subangular (0.5" diameter), loose, dry.	0.0
					SP		2.0 Gray, MEDIUM TO COARSE SAND, some gravel, (0.5-1" diameter), loose, moist.	0.1
2.5	426.7	DP	15	63	SP		3.2 Light Gray, FINE TO MEDIUM SAND, some gravel and silt, (0.25-0.5" diameter), medium dense, wet.	0.0
					SP		4.0 Yellowish Brown, FINE SAND, little gravel, (0.25" diameter), loose, moist.	0.2
		JS-B-047 (4-6) for VOCs, PFAS, TOP Assay PFAS, TOC, pH			SP		5.0 Light Gray, FINE TO MEDIUM SAND, some gravel and silt, (0.25-0.5" diameter), medium dense, wet.	3.2
5.0	424.2				SP		6.0 Dark Brown, FINE TO MEDIUM SAND, some gravel, (0.5-1" diameter), black oxidation, medium dense, dry to moist.	2.9
		DP	15	31	GP		6.5 Gray, GRAVEL, (0.5-1" diameter), laminar, pulverized, dense, dry.	0.5
					SP		7.0 Dark Brown, FINE TO MEDIUM SAND, with gravel, (0.5-1" diameter), pink angular gravels, loose to medium dense, dry to moist.	
7.5	421.7				GP		8.0 Light Brown, GRAVEL, some coarse sand, (0.5-2" diameter), loose, saturated.	0.0
10.0	419.2	DP	22	46	SP		10.0 Light Brown, GRAVELLY SAND, trace silt, (0.5-1" diameter), loose, saturated.	0.3 0.4

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP JS-B-047 (10-12) for VOCs, PFAS, TOC, pH	22	46	CL-ML	▨	Light Brown, CLAY AND SILT, soft, low plasticity, saturated. *(continued)*	
10.5								0.7
								0.6
12.5	416.7	DP	42	88	CL-ML	▨	Gray, CLAY AND SILT, appreciable silts near 14 feet bgs, soft, low plasticity, saturated.	0.1
								0.0
								0.1
15.0	414.2							0.0
		DP	23	48				0.0
17.5	411.7							0.0
								0.0
								0.0
20.0	409.2						Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-048

PAGE 1 OF 2

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/19/2018 1:45:00 PM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 429.60 feet amsl
NORTHING: 1484050.77
EASTING: 799397.25
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Poorly-graded Gravelly Sand
- Poorly-graded Sand with Clay
- Poorly-graded Sand
- Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.3	Gray, GRAVEL, subangular (0.5" diameter), loose, dry.	
					SP	2.0	Gray, MEDIUM TO COARSE SAND, some gravel, (0.5-1" diameter), loose, moist.	0.0 0.0
2.5	427.1	DP	6	25	SP-SC	2.5	3" Light Gray, CLAYEY SAND, medium-grained, subrounded gravels throughout (0.5" diameter), loose, wet. 2" Gray, GRAVEL, (1" diameter), laminar, medium dense, dry. 1" Gray Brown, MEDIUM SAND, loose, dry.	0.0
						4.0	NO RECOVERY.	NM
5.0	424.6	DP	24	50	SP	5.0	Brown, MEDIUM SAND, some gravel, (0.5" diameter), silty sand layer with trace brick from 4.8-5 feet bgs, loose, dry to wet.	0.4
					GP	6.0	Gray, GRAVEL, (0.5" diameter), pulverized rock, dense, dry.	0.4
					GP	7.0	Gray, GRAVEL, (0.5-1" diameter), trace brown sand and brick fragments, dense, dry.	0.0
7.5	422.1				SP	8.0	Brown And Gray, MEDIUM SAND, subangular gravel fragments (0.25-0.5" diameter), shale fragments, dry to moist.	2.1
		DP	45	94	GP	9.0	Dark Gray, GRAVEL, trace coarse sand, (0.25-1.5" diameter), with light brown silt and clay, poorly graded, loose, saturated.	0.5
10.0	419.6				CL-ML		Gray, CLAY, some silt, soft, low plasticity, saturated.	0.6

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP JS-B-048 (10-11) for VOCs	45	94	CL-ML	▨	Gray, CLAY, some silt, soft, low plasticity, saturated. *(continued)*	2.6
		JS-B-048 (10-12) for PFAS, TOC, pH				▨		1.9
						▨	12.0	
12.5	417.1	DP	40	83	CL-ML	▨	Gray, CLAY AND SILT, silt layers at 12.5 feet bgs and from 15-15.2 feet bgs, soft, saturated.	0.0
						▨		0.1
						▨		0.1
15.0	414.6					▨		0.2
		DP	27	56		▨		0.2
17.5	412.1					▨		0.0
						▨		0.1
						▨		0.0
20.0	409.6						20.0	
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B/TMW-049

PAGE 1 OF 3

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/23/2018 1:45:00 PM
DATE WELL INSTALLED: 4/25/2018 2:30:00 PM
DRILLING METHOD(S): Hand Auger/ Direct Push
LOGGED BY: H. Usle
CHECKED BY: J. Redden

GROUND ELEVATION: 430.40 feet amsl
TOC ELEVATION: 430.14 feet amsl
NORTHING: 1484028.44
EASTING: 799403.89
TOTAL DEPTH: 32 feet bgs
DIAMETER: 3.25 inches

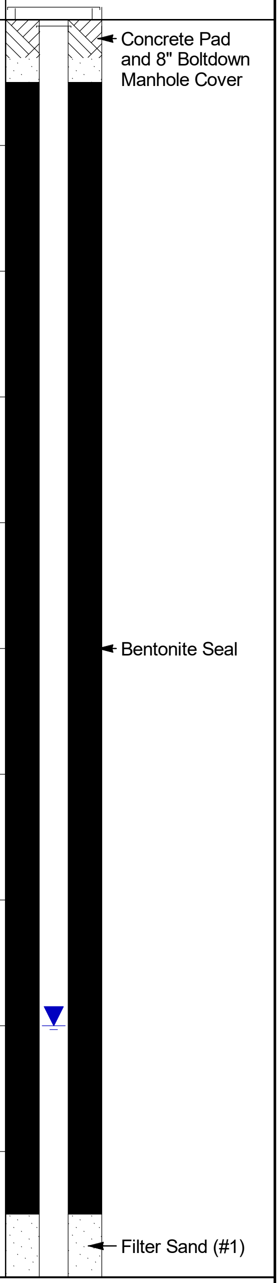
SAMPLE TYPE:
- HA = Hand Auger
- DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravelly Sand
- Concrete
- Poorly-graded Sand
- Poorly-graded Sandy Gravel
- Silty Clay

NOTES: Soil samples collected as part of the Interim Remedial Measure. Datum is NAD 1983 StatePlane New York East in US Survey Feet.

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	SP	1.0	Gray Brown, FINE SAND, some gravel and trace silt, (0.5-1" diameter), loose, dry.	0.0
					SP	2.0	Gray, MEDIUM TO COARSE SAND, some gravel and clay, (0.5-1" diameter), loose, moist to wet.	0.0
2.5	427.9	DP	12	50		3.0	Gray, (1" diameter), pulverzied CONCRETE and GRAVEL, dense, dry.	1.0
					SP	3.2	Black, MEDIUM TO COARSE SAND, white flecks, loose, moist to wet.	
5.0	425.4				SP	5.0	Dark Brown, MEDIUM SAND, trace gravel, brick fragments (1-2" diameter), loose, dry to moist.	1.1 0.2
7.5	422.9	DP	18	38	SP	8.0	Brown, MEDIUM TO COARSE SAND, some silt from 5-6 feet bgs (wet), trace white flecks, brick and coal fragments from 6-8 feet bgs, wood fragment near 7.8 feet bgs with black oxidation, saturated at 7.7 feet bgs, very loose.	0.4 0.9 1.4
		DP	26	54	GP	9.0	Gray Brown, GRAVEL, some coarse sand, quartz gravels, loose, saturated.	0.9
10.0	420.4				CL-ML		Gray, CLAY, some silt, low to medium plasticity, soft, saturated.	2.7

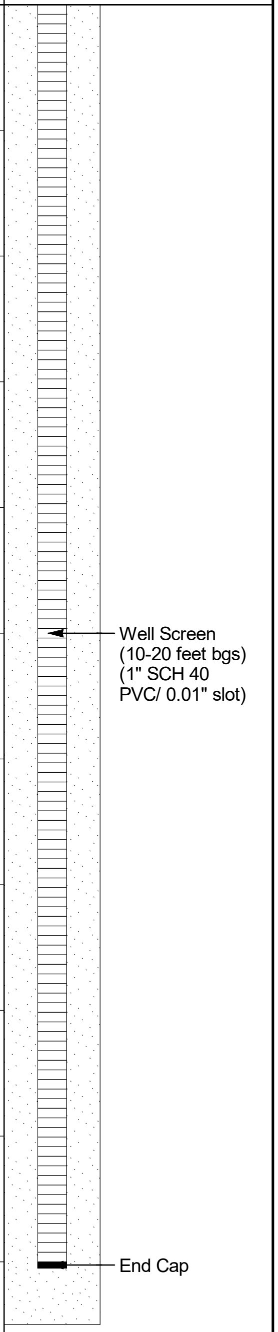
WELL DIAGRAM



ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
		DP	26	54	CL-ML	▨	Gray, CLAY, some silt, low to medium plasticity, soft, saturated. *(continued)*	12.9	
						▨		40.4	
12.5	417.9	DP	18	38		▨		33.4	
						▨		40.2	
		JS-B-049 (14-16) for PFAS, TOC, pH				▨		92.5	
15.0	415.4	JS-B-049 (15-16) for VOCs				▨		101.5	
						▨	16.0		
		DP	46	96	CL-ML	▨	Gray, CLAY AND SILT, low plasticity, slight angled bedding planes visible during material removal from 19-20 feet bgs, soft, saturated to wet.	71.1	
17.5	412.9					▨		44.7	
						▨		32.5	
						▨		4.0	
20.0	410.4						20.0		
		DP	0	0			NO RECOVERY, formation is very soft and not allowing material to be captured in liner.	NM	



ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B/TMW-049
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Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
		DP	0	0				NM	
22.5	407.9								
25.0	405.4						NO RECOVERY, formation is very soft and not allowing material to be captured in liner. *(continued)*		
		DP	0	0				NM	
27.5	402.9								
							28.0		
						▨		28.6	
						▨		0.6	
30.0	400.4	DP	39	81	CL-ML	▨	Gray To Dark Gray, CLAY AND SILT, soft to medium stiff, low plasticity, saturated.		
						▨		0.4	
						▨		0.2	
							32.0		
32.5	397.9						Bottom of Boring @ 32.00 feet bgs		

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B/TMW-050

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Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/24/2018 8:10:00 AM
DATE WELL INSTALLED: 4/25/2018 3:30:00 PM
DRILLING METHOD(S): Hand Auger/ Direct Push
LOGGED BY: H. Usle
CHECKED BY: J. Redden

GROUND ELEVATION: 430.10 feet amsl
TOC ELEVATION: 429.87 feet amsl
NORTHING: 1484036.63
EASTING: 799409.36
TOTAL DEPTH: 40 feet bgs
DIAMETER: 3.25 inches

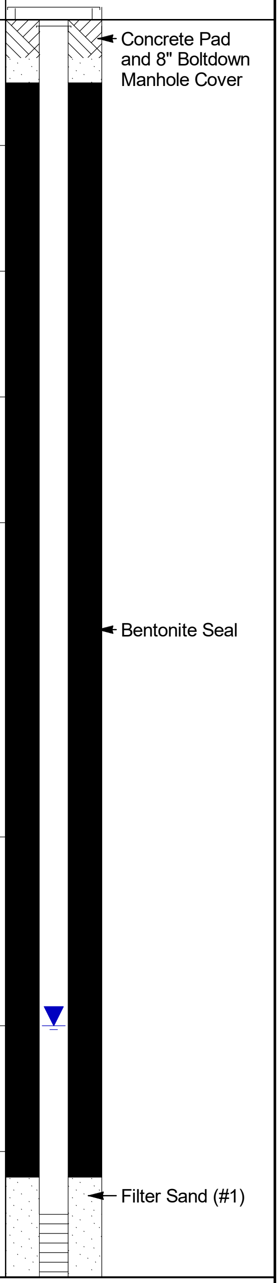
SAMPLE TYPE:
▮ HA = Hand Auger
☒ DP = Direct Push

GRAPHIC LOG LEGEND
Poorly-graded Gravel
Concrete
Brick
Poorly-graded Gravelly Sand
Poorly-graded Sand
Poorly-graded Sandy Gravel

NOTES: Soil samples collected as part of the Interim Remedial Measure. Datum is NAD 1983 StatePlane New York East in US Survey Feet.

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.3	Gray, GRAVEL, loose, dry.	0.0
					SP	2.0	Gray, FINE TO MEDIUM SAND, some gravel and trace silt, (0.5-1" diameter), loose, dry.	0.0
2.5	427.6	DP	16	67		2.5	Gray, (0.5" diameter), pulverzied CONCRETE and GRAVEL, dry.	0.0
					SP	3.0	Black, MEDIUM SAND, loose, dry.	
						3.7	Red, BRICK.	0.6
					SP	4.0	Brown, MEDIUM SAND, white fibrous-like flecks, trace black fragments (<0.25" diameter), loose, dry.	
5.0	425.1	DP	18	38	GP	6.5	Gray, GRAVEL, trace medium sand, (1-2" diameter), brick fragments, loose, dry.	0.8
7.5	422.6				SP	8.0	Brown, FINE TO MEDIUM SAND, some gravel and trace silt, (0.5" diameter), loose, wet.	0.5
		DP	24	50	GP	9.2	Brown, FINE GRAVEL, some coarse sand, little silt, loose, saturated.	0.5
10.0	420.1				CL-ML		Gray, CLAY, some silt, trace fine sand from 9.2-10.2 feet bgs, silt layer from 23.25-23.5 feet bgs, low to medium plasticity, soft, saturated.	8.6

WELL DIAGRAM

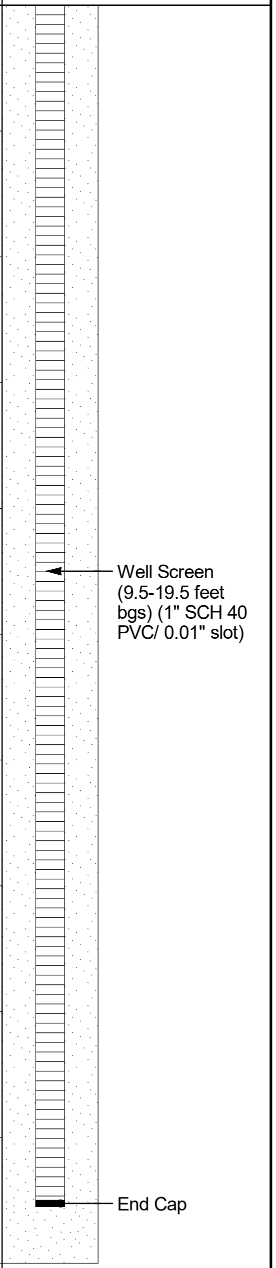


ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	24	50	CL-ML	▨	Gray, CLAY, some silt, trace fine sand from 9.2-10.2 feet bgs, silt layer from 23.25-23.5 feet bgs, low to medium plasticity, soft, saturated. *(continued)*	26.0
								18.0
12.5	417.6							97.0
		JS-B-050 (13-14) for VOCs, PFAS, TOC, pH						211.6
		DP	48	100				186.5
15.0	415.1							111.6
								18.1
17.5	412.6							21.7
		DP	44	92				7.9
								0.1
20.0	410.1	DP	38	79				45.6

WELL DIAGRAM



ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
		DP	38	79	CL-ML		Gray, CLAY, some silt, trace fine sand from 9.2-10.2 feet bgs, silt layer from 23.25-23.5 feet bgs, low to medium plasticity, soft, saturated. *(continued)*	35.7	
22.5	407.6							9.0	
								5.4	
		DP	45	94				25.7	
25.0	405.1					25.3			
					CL-ML		Dark Gray, SILT, some clay, soft to medium stiff, saturated.	4.7	
						26.0			
					CL-ML		Gray To Dark Gray, CLAY AND SILT, soft to medium stiff, low plasticity, saturated.	0.6	
27.5	402.6							0.5	
		DP	48	100				45.1	
								26.2	
30.0	400.1							1.1	
								2.0	
						32.0			
32.5	397.6				CL-ML		Gray To Dark Gray, CLAY AND SILT, interbedded soft, saturated.	3.6	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)	WELL DIAGRAM
		DP	48	100	CL-ML		Gray To Dark Gray, CLAY AND SILT, interbedded soft, saturated. *(continued)*	1.1	
35.0	395.1							1.1	
								1.6	
		DP	48	100			37.0	12.2	
37.5	392.6				ML		Dark Gray, SANDY SILT, sands very fine-grained, medium stiff, saturated.	2.9	
								0.9	
40.0	390.1						40.0	2.9	
42.5	387.6						Bottom of Boring @ 40.00 feet bgs		

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-051

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Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/24/2018 8:20:00 AM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 430.80 feet amsl
NORTHING: 1483999.21
EASTING: 799358.16
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:

- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND

- Poorly-graded Gravel
- Poorly-graded Gravelly Sand
- Poorly-graded Sand
- ▨ Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.5	Gray, GRAVEL, subangular loose, dry.	0.0
					SP	2.0	Dark Brown, FINE TO MEDIUM SAND, some subangular gravel, (0.5-1" diameter), trace subrounded cobbles from 1-2 feet bgs (3" diameter), trace red flecks, loose, dry.	0.3
2.5	428.3	DP	24	100	SP	2.5	Light Brown, FINE TO MEDIUM SAND, some subrounded gravel, (0.5" diameter), trace clay, wet due to precipitation, loose, wet.	0.3
					SP	3.6	Dark Brown To Black, FINE SAND, little subrounded gravel, (1" diameter), trace clay, organic rich layers, white and black "ash-like" material, loose, dry.	0.2
					SP	4.0	Yellowish Brown, FINE TO MEDIUM SAND, trace silt and gravel, subrounded gravel (0.5" diameter), loose, dry to moist.	
5.0	425.8	DP	26	54	SP	5.0	Light Grayish Brown, GRAVELLY SAND, trace subangular clay, (1" diameter), saturated due to precipitation, loose, saturated.	0.1
					GP	6.0	Gray, GRAVEL, (1-2" diameter), loose, dry.	0.0
7.5	423.3				SP	8.0	Olive Brown, FINE TO MEDIUM SAND, coarsening downward sequence, subangular gravels present 7-8 feet bgs (0.5" diameter), orange mottling 6-7 feet bgs, saturated at 7 feet bgs, loose.	0.1 0.1
10.0	420.8	DP	33	69	SP	10.0	Light Brown, GRAVELLY SAND, subrounded (0.5-1" diameter), sands well rounded, loose, saturated.	0.1

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-051

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	33	69	CL-ML		Light Brown, SILT AND CLAY, soft, low plasticity, saturated. *(continued)*	0.2
							10.6	
					CL-ML		Gray, SILTY CLAY, soft, low plasticity, saturated.	0.1
							12.0	
12.5	418.3							0.1
								0.1
		DP	48	100				
								0.0
15.0	415.8							0.1
					CL-ML		Gray Brown, SILTY CLAY, soft, plastic, saturated.	
								0.1
17.5	413.3							
		DP	15	31				
								0.1
20.0	410.8						20.0	
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-052

PAGE 1 OF 2

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/24/2018 8:50:00 AM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 430.40 feet amsl
NORTHING: 1484018.21
EASTING: 799358.46
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
HA = Hand Auger
DP = Direct Push

GRAPHIC LOG LEGEND
Poorly-graded Gravel
Poorly-graded Gravelly Sand
Poorly-graded Sand
Silty Sand
Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.5	Gray, GRAVEL, subangular loose, dry.	0.7
					SP	1.0	Brown, FINE TO MEDIUM SAND, some subrounded gravel, (1-1.5" diameter), loose, dry.	
					SP	2.0	Black/brown, FINE TO MEDIUM SAND, little subangular gravel, (0.5-1" diameter), brick and glass fragments (3" diameter), trace white flecks, loose, dry.	0.1
2.5	427.9	DP	4	17	SP	2.5	Light Brown, FINE TO MEDIUM SAND, some subangular gravel, (0.5" diameter), trace red flecks, wet due to precipitation, loose, wet.	0.2
						4.0	NO RECOVERY, rock lodged in drilling shoe.	NM
5.0 7.5	425.4 422.9	DP	15	31	SP	8.0	Olive Brown, FINE TO MEDIUM SAND, some subangular gravel, (0.5" diameter), trace clay, laminar shale fragments near 5.5 feet bgs, orange oxidation from 4-4.5 feet bgs, black oxidation from 6-6.5 feet bgs, trace white flecks from 7-8 feet bgs, loose, moist to wet.	0.3 0.3 0.3 0.4
10.0	420.4	JS-B-052 (8-9) for VOCs DP JS-B-052 (8-10) for PFAS, TOC, pH	26	54	SM	10.0	Dark Brown To Dark Gray, SILTY SAND, little subrounded gravel, (0.5" diameter), oxidized surfaces, orange fragment near 8 feet bgs with "creosote-like" odor, saturated at 9 feet bgs, loose, wet to saturated.	43.7 2.3

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP JS-B-052 (10-12) for VOCs, PFAS, TOC, pH	26	54	CL-ML		Light Brown, SILT AND CLAY, soft, low plasticity, saturated. *(continued)*	0.7
							10.5	
					CL-ML		Gray, SILTY CLAY, soft, low plasticity, saturated.	0.5
							12.0	
12.5	417.9							0.2
		DP	27	56				0.2
								0.2
15.0	415.4							0.1
					CL-ML		Gray Brown, SILTY CLAY, soft, plastic, saturated.	0.0
17.5	412.9	DP	29	60				0.0
								0.0
								0.0
20.0	410.4						20.0	
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B/TMW-053

PAGE 1 OF 2

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 4/24/2018 2:30:00 PM
DATE WELL INSTALLED: 4/26/2018 10:00:00 AM
DRILLING METHOD(S): Hand Auger/ Direct Push
LOGGED BY: H. Usle
CHECKED BY: J. Redden

GROUND ELEVATION: 429.80 feet amsl
TOC ELEVATION: 429.52 feet amsl
NORTHING: 1484052.02
EASTING: 799412.36
TOTAL DEPTH: 20 feet bgs
DIAMETER: 3.25 inches

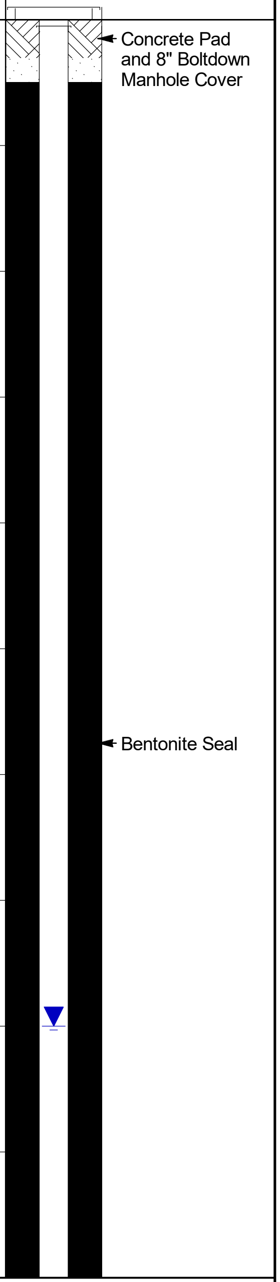
SAMPLE TYPE:
- HA = Hand Auger
- DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Poorly-graded Gravelly Sand
- Poorly-graded Sandy Gravel
- Sandy Silt
- Silty Clay

NOTES: Soil samples collected as part of the Interim Remedial Measure. Datum is NAD 1983 StatePlane New York East in US Survey Feet.

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.5	Gray, GRAVEL, subangular loose, dry.	0.0
					SP	2.0	Gray, MEDIUM TO COARSE SAND, some gravel and clay, subangular gravel (0.5-1" diameter), trace brick fragments from 1.5-1.75 feet bgs.	0.0
2.5	427.3	DP	32	133	SP	4.0	Brown, FINE TO MEDIUM SAND, mixed with subangular gravel, quartz gravels (0.5-1" diameter), brick, coal, and glass fragments from 3-4 feet bgs, loose, dry.	0.0 0.1
5.0	424.8	DP	29	60	GP	6.0	Gray, GRAVEL, and subangular fine sand, (1" diameter) alternating layers of gray gravel and brown sand, medium dense, dry.	0.3 0.1
					ML	7.0	Light Brown, SANDY SILT, some subrounded gravel, (0.5" diameter), sands fine-grained, soft, wet.	0.1
7.5	422.3				SP	8.0	Light Brown, MEDIUM TO COARSE SAND, some subrounded gravel, (0.5" diameter), coarsening downward, well sorted, loose, wet.	1.0
		DP	7	15	SP	9.0	Light Brown, GRAVELLY SAND, some silt, fine to medium-grained sand, gravels (0.25-0.5" diameter), loose, saturated.	0.3
10.0	419.8						NO RECOVERY, possible gravel lodged in drilling shoe or top of soft clay.	

WELL DIAGRAM

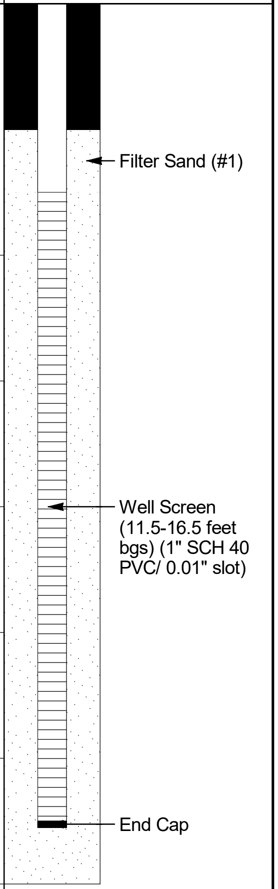


ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	7	15			NO RECOVERY, possible gravel lodged in drilling shoe or top of soft clay. *(continued)*	NM
12.5 15.0	417.3 414.8	JS-B-053 (13-14) for VOCs, PFAS, TOC, pH DP	38	79	CL-ML	▨	12.0 Gray, SILTY CLAY, soft, plastic, saturated.	65.7 123 81.6 51.9
17.5 20.0	412.3 409.8	DP	48	100	CL-ML	▨	16.0 Gray To Dark Gray, SILTY CLAY, higher silt content than remaining locations, soft to medium stiff, low plasticity, saturated. 20.0	1.0 0.3 0.0 0.0
							Bottom of Boring @ 20.00 feet bgs	

WELL DIAGRAM



ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-054

PAGE 1 OF 2

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
GROUND ELEVATION: 429.40 feet amsl
DATE BORING COMPLETED: 4/25/2018 8:50:00 AM
NORTHING: 1484060.57
LOGGED BY: H. Usle
EASTING: 799416.15
CHECKED BY: J. Redden
TOTAL DEPTH: 20 feet bgs
DRILLING METHOD(S): Hand Auger/ Direct Push
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
HA = Hand Auger
DP = Direct Push

GRAPHIC LOG LEGEND
Poorly-graded Gravel
Poorly-graded Gravelly Sand
Sandy Silt
Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	36	100	GP	0.5	Gray, GRAVEL, subangular loose, dry.	0.0
					SP	2.0	Gray, MEDIUM TO COARSE SAND, some gravel and clay, subangular gravel (0.5-1" diameter), less gravel from 1-2 feet bgs, wet from precipitation, wet.	0.0
2.5	426.9				SP	3.0	Dark Brown, FINE TO MEDIUM SAND, some subangular gravel, (0.5-1" diameter), trace brick fragments, loose, dry.	0.0
		DP	0	0		4.0	NO RECOVERY.	NM
5.0	424.4	DP	31	65	SP	6.5	Light Brown, FINE TO COARSE SAND, some subangular and subrounded gravel, (0.5-2" diameter), trace clay, black surfaces at 5.5 feet bgs, loose to medium dense, wet.	0.0 0.0 0.1
					ML	7.0	Light Brown, SANDY SILT, fine-grained sand, gravel layer at 7 feet bgs (2" thick), soft, wet.	
7.5	421.9				SP	8.0	Light Brown, MEDIUM TO COARSE SAND, some subrounded gravel, (0.5" diameter), well sorted, loose, wet.	0.3
10.0	419.4	DP	48	100	SP	10.0	Light Brown, GRAVELLY SAND, fine to medium sand, gravels (0.25-0.5" diameter), some silts near 9.8 feet bgs, fining downward sequence, loose, saturated.	0.1 0.1

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION	PID (ppm)
		DP	48	100	CL-ML	▨	10.2	Light Brown, SILT AND CLAY, soft, low plasticity, saturated. *(continued)*	0.3
		JS-B-054 (11-12) for VOCs			CL-ML	▨		Gray, CLAY AND SILT, soft, medium plasticity, saturated.	1.7
12.5	416.9	JS-B-054 (10-12) for PFAS, TOC, pH				▨	12.0		0.0
		DP	32	67	CL-ML	▨		Gray To Dark Gray, CLAY, some silt, soft, medium plasticity, saturated.	0.0 0.0 0.0
15.0	414.4					▨			0.0
17.5	411.9	DP	0	0			16.0	NO RECOVERY, CLAY fell out of liner during retraction.	NM
20.0	409.4						20.0	Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-055

PAGE 1 OF 2

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 5/1/2018 9:00:00 AM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 428.50 feet amsl
NORTHING: 1484105.63
EASTING: 799430.66
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
HA = Hand Auger
DP = Direct Push

GRAPHIC LOG LEGEND
Poorly-graded Gravel
Poorly-graded Gravelly Sand
Sandy Silt
Poorly-graded Sandy Gravel
Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP	0.5	Gray, GRAVEL, subangular (0.5" diameter), loose, dry.	0.0
					SP	1.0	Light Gray, FINE SAND AND GRAVEL, trace subangular clay, (0.5" diameter), loose, moist.	
								0.0
2.5	426.0	DP	13	54	SP		Brown, FINE TO MEDIUM SAND, some subrounded gravel, (1-2" diameter), loose, dry to moist.	0.1
								0.5
			18	38		5.0		0.4
5.0	423.5	JS-B-055 (5-7) for VOCs, PFAS, TOP Assay PFAS, DP			ML	7.0	Brown To Olive Brown, SANDY SILT, some subangular gravel, (1-2" diameter), sands predominantly fine-grained, trace coarse-grained sands, black oxidation near gravels, soft, wet, orange mottling.	0.2
7.5	421.0				GP	8.0	Gray Brown, SANDY GRAVEL, little clay, subangular gravel (0.5-1" diameter), sands coarse-grained, trace white flecks, loose, saturated.	0.0
		DP	34	71	SP	9.0	Light Brown, COARSE SAND, some subrounded gravel, (0.5" diameter), loose, saturated.	0.0
					CL-ML	9.3	Light Brown, CLAY AND SILT, soft, low plasticity, saturated.	0.1
10.0	418.5				CL-ML		Gray, CLAY, some silt, low to medium plasticity, soft, saturated.	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	34	71	CL-ML	▨	Gray, CLAY, some silt, low to medium plasticity, soft, saturated. *(continued)*	0.2 0.1
12.5 15.0	416.0 413.5	DP	48	100	CL-ML	▨	12.0 Gray, SILTY CLAY, low plasticity, soft, low plasticity, saturated.	0.2 0.1 0.0 0.0
17.5 20.0	411.0 408.5	DP	23	48	CL-ML	▨	16.0 Gray, CLAY, some silt, soft, plastic, saturated. 20.0	0.0 0.0 0.0 0.0
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-056

PAGE 1 OF 2

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.

DATE BORING COMPLETED: 5/1/2018 1:20:00 PM

LOGGED BY: H. Usle

CHECKED BY: J. Redden

DRILLING METHOD(S): Direct Push

GROUND ELEVATION: 428.93 feet amsl

NORTHING: 1484082.4

EASTING: 799409.5395

TOTAL DEPTH: 48 feet bgs

DIAMETER: 2.25 inches

DATUM: NAD 1983 StatePlane New York East in US Survey Feet

NOTES: Soil samples collected as part of the Clay Remedial Investigation.

SAMPLE TYPE:

☒ DP = Direct Push

GRAPHIC LOG LEGEND

⁚ Poorly-graded Sand

▥ Silt

▨ Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
5	424	DP	0	0			Direct-push closed piston drilling to 8 feet bgs; soils not logged.	NM
							8.0	
		DP	44	92	SP	⁚	8.5 Light Brown, COARSE SAND, some silt, well rounded, saturated.	0.0
10	419				ML	▥	Light Brown, SILT, some clay, trace fine-grained sand, soft to medium stiff, wet. 10.0	0.0
					CL-ML	▨	Gray, SILTY CLAY, soft, low plasticity, saturated. 12.0	0.0 NM
15 20	414 409	DP	0	0			Direct-push closed piston drilling from 12 to 44 feet bgs; soils not logged.	NM

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
25	404							
		DP	0	0				NM
30	399							
							Direct-push closed piston drilling from 12 to 44 feet bgs; soils not logged. *(continued)*	
35	394							
		DP	0	0				NM
40	389							
		DP	0	0				NM
							44.0	
		DP	48	100	CL-ML	▨	44.5 Gray, SILT AND CLAY, soft to medium stiff, low plasticity, saturated.	0.1
45	384							
					SP	░	Dark Gray, FINE SAND, trace silt, well sorted, loose, saturated.	0.0
							48.0	
							Bottom of Boring @ 48.00 feet bgs	
50	379							

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-057

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 5/1/2018 3:40:00 PM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 431.01 feet amsl
NORTHING: 1484000.103
EASTING: 799358.1088
TOTAL DEPTH: 44 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil descriptions and details from 0-20 ft bgs from adjacent JS-B-051 boring. Soil samples collected as part of the Clay Remedial Investigation.

SAMPLE TYPE:
- ▮ HA = Hand Auger
- ☒ DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Poorly-graded Gravelly Sand
- Poorly-graded Sand
- ▨ Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION	PID (ppm)
		HA	24	100	GP		0.5	Gray, GRAVEL, subangular loose, dry.	0.0
					SP		2.0	Dark Brown, FINE TO MEDIUM SAND, some subangular gravel, (0.5-1" diameter), trace subrounded cobbles from 1-2 feet bgs (3" diameter), trace red flecks, loose, dry.	0.3
		DP	24	100	SP		2.5	Light Brown, FINE TO MEDIUM SAND, some subrounded gravel, (0.5" diameter), trace clay, wet due to precipitation, loose.	0.3
					SP		3.6	Dark Brown To Black, FINE SAND, little subrounded gravel, (1" diameter), trace clay, organic rich layers, white and black "ash-like" material, loose, dry.	0.2
					SP		4.0	Yellowish Brown, FINE TO MEDIUM SAND, trace silt and gravel, subrounded gravel (0.5" diameter), loose, dry to moist.	
5	426	DP	26	54	SP		5.0	Light Grayish Brown, GRAVELLY SAND, trace clay, subangular gravel (1" diameter), saturated due to precipitation, loose.	0.1
					GP		6.0	Gray, GRAVEL, subangular (1-2" diameter), loose, dry.	0.0
					SP		8.0	Olive Brown, FINE TO MEDIUM SAND, coarsening downward sequence, subangular gravels present 7-8 ft bgs (0.5" diameter), orange mottling 6-7 ft bgs, saturated at 7 ft bgs, loose.	0.1 0.1
10	421	DP	33	69	SP		10.0	Light Brown, GRAVELLY SAND, subrounded (0.5-1" diameter), sands well rounded, loose, saturated.	0.1
					CL-ML		10.6	Light Brown, SILT AND CLAY, soft, low plasticity, saturated.	0.2
					CL-ML		12.0	Gray, SILTY CLAY, soft, low plasticity, saturated.	0.3 0.3
15 20	416 411	DP DP	48 15	100 31	CL-ML		20.0	Gray Brown, SILTY CLAY, soft, plastic, saturated.	0.1 0.1 0.0 0.1 0.1 0.1
		DP	0	0				Direct-push closed piston drilling from 20 to 40 feet bgs; soils not logged.	NM

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
25	406							
30	401	DP	0	0			Direct-push closed piston drilling from 20 to 40 feet bgs; soils not logged. *(continued)*	NM
35	396							
40	391						40.0	
		DP	46	96	CL-ML	▨	Dark Gray, SILTY CLAY, little fine sand, soft, saturated.	NM
							44.0	
45	386						Bottom of Boring @ 44.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-058

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 5/2/2018 10:20:00 AM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Direct Push
GROUND ELEVATION: 431.92 feet amsl
NORTHING: 1483940.493
EASTING: 799319.3333
TOTAL DEPTH: 52 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Clay Remedial Investigation.

SAMPLE TYPE:
☒ DP = Direct Push

GRAPHIC LOG LEGEND
⁙ Poorly-graded Sand
▨ Silty Clay
▨ Low Plasticity Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
5	427	DP	0	0			Direct-push closed piston drilling to 8 feet bgs; soils not logged.	NM
							8.0	
10	422	DP	28	58	SP	⁙	Brown, COARSE SAND, some subangular gravel, (1" diameter), some clay, loose, saturated.	NM
							10.0	
					CL-ML	▨	10.3 Light Brown, SILT AND CLAY, soft, low plasticity, wet.	0.6
					CL-ML	▨	Gray, SILTY CLAY, soft to medium stiff, medium plasticity, wet.	0.5
							12.0	
15	417							
20	412	DP	0	0			Direct-push closed piston drilling from 12 to 40 feet bgs; soils not logged.	NM
25	407							

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
30	402	DP	0	0			Direct-push closed piston drilling from 12 to 40 feet bgs; soils not logged. *(continued)*	NM
35	397							
40	392						40.0	
		DP	0	0	CL	▨	Gray, CLAY, 8-inches of material fell out of core barrel, soft, saturated.	NM
45	387	DP	8	17				NM
							48.0	0.4
50	382	DP	0	0			NO RECOVERY.	NM
							52.0	
							Bottom of Boring @ 52.00 feet bgs	
55	377							

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

ERM
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JS-B-059
PAGE 1 OF 2

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 5/2/2018 10:50:00 AM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 429.20 feet amsl
NORTHING: 1484064.76
EASTING: 799401.07
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
☒ DP = Direct Push

GRAPHIC LOG LEGEND
Poorly-graded Gravel
Poorly-graded Gravel with Clay
Poorly-graded Gravelly Sand
▨ Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	26	54	GP	0.5	Gray, GRAVEL, subangular (0.5" diameter), loose, dry.	0.8
					GP-GC	1.0	Light Gray, CLAYEY GRAVEL, some fine to medium sand, subangular gravel (0.25-0.5" diameter), loose, moist.	
2.5	426.7				SP	3.5	Gray Brown, FINE TO MEDIUM SAND, some subangular gravel, (0.5" diameter), loose, dry.	0.5 0.5
					GP-GC	4.3	Light Gray, CLAYEY GRAVEL, some fine to medium sand, subangular gravel (0.5" diameter), loose, wet.	0.7
					GP	4.5	Gray/white, GRAVEL, subangular loose, dry.	0.7
5.0 7.5	424.2 421.7	JS-B-059 (4-6) for VOCs, PFAS, TOC, pH DP	29	60	SP	7.8	Brown To Dark Brown, FINE TO MEDIUM GRAVELLY SAND, subangular (0.5-1.5" diameter), black oxidized surfaces, orange oxidation, loose, dry to moist.	0.7 0.8 1.0
					SP	8.5	Yelllowish Brown, COARSE SAND, and subangular gravel, (0.5" diameter), some clay, overlain by white fine gravel (0.5" thick), loose, saturated.	0.5
10.0	419.2	DP	5	10			No Recovery.	NM

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION	PID (ppm)
		DP	5	10				No Recovery. *(continued)*	NM
							12.0		
12.5	416.7	DP	48	100	CL-ML	▨		Gray, SILTY CLAY, soft, medium plasticity, saturated.	0.5
									0.7
									0.7
15.0	414.2								0.6
		DP	29	60					0.3
17.5	411.7								0.6
									0.6
									0.6
20.0	409.2						20.0		
								Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-060

PAGE 1 OF 2

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.

DATE BORING COMPLETED: 5/2/2018 2:00:00 PM

LOGGED BY: H. Usle

CHECKED BY: J. Redden

DRILLING METHOD(S): Hand Auger/ Direct Push

GROUND ELEVATION: 429.00 feet amsl

NORTHING: 1484071.78

EASTING: 799409.03

TOTAL DEPTH: 20 feet bgs

DIAMETER: 2.25 inches

DATUM: NAD 1983 StatePlane New York East in US Survey Feet

NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:

☒ DP = Direct Push

GRAPHIC LOG LEGEND

- Poorly-graded Gravel
- Poorly-graded Gravel with Clay
- Poorly-graded Gravelly Sand
- Sandy Silt
- Poorly-graded Sand with Clay
- Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	13	27	GP	0.5	Gray, GRAVEL, subangular (0.5" diameter), loose, dry.	0.9
					GP-GC	1.0	Light Gray, CLAYEY GRAVEL, some fine to medium sand, subangular gravel (0.25-0.5" diameter), loose, moist.	
2.5	426.5				SP	3.0	Light Brown, FINE SAND, some subrounded gravel, (0.25" diameter), loose, dry.	0.9 0.4
5.0	424.0				SP	5.0	Brown, FINE TO MEDIUM SAND, subangular gravel, (0.5-1" diameter), mauve-colored gravel, black oxidation, white quartz from 3.8-4 feet bgs, loose, moist to wet.	1.1 1.2
		DP	18	38	ML	6.0	Olive Brown, SANDY SILT, orange and black oxidized surfaces, trace white flecks, "ash-like" layers, soft, wet.	1.6
7.5	421.5				SP	7.8	Brown To Dark Brown, FINE TO MEDIUM GRAVELLY SAND, subangular (0.5-1.5" diameter), black oxidized surfaces, orange oxidation, trace quartz fragments, wet to saturated at 7.8 feet bgs, loose.	0.8 1.6
		DP	34	71	SP-SC	9.0	Light Brown, COARSE SAND AND GRAVEL, some clay, subangular (0.5" diameter), fining downwards sequence 7.8-8 feet bgs, fining upwards sequence 8-9 feet bgs, loose, saturated.	0.8
					CL-ML	9.3	Brown, SILT AND CLAY, soft to medium stiff, low plasticity, wet.	
10.0	419.0				CL-ML		Gray, SILTY CLAY, soft, medium plasticity, saturated.	1.1

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-060

PAGE 2 OF 2

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP JS-B-060 (10-12) for VOCs, PFAS, TOC, pH	34	71	CL-ML		Gray, SILTY CLAY, soft, medium plasticity, saturated. *(continued)*	2.2
								1.2
12.5	416.5	DP	48	100	CL-ML		12.0 Gray Brown, CLAY, some silt, soft, medium plasticity, saturated.	0.9
							13.0	1.0
15.0	414.0							0.4
								0.9
		DP	23	48	CL-ML		Gray, SILTY CLAY, soft, medium plasticity, saturated.	0.9
17.5	411.5							0.7
								0.7
20.0	409.0						20.0	0.7
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

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JS-B-061

Client: Arnold & Porter
Project Name: Hoosick
Project Number: 0378075
Project Location: Hoosick, New York

DRILLING CONTRACTOR: Parratt Wolff, Inc.
DATE BORING COMPLETED: 5/2/2018 1:05:00 PM
LOGGED BY: H. Usle
CHECKED BY: J. Redden
DRILLING METHOD(S): Hand Auger/ Direct Push
GROUND ELEVATION: 429.30 feet amsl
NORTHING: 1484068.54
EASTING: 799420.44
TOTAL DEPTH: 20 feet bgs
DIAMETER: 2.25 inches
DATUM: NAD 1983 StatePlane New York East in US Survey Feet
NOTES: Soil samples collected as part of the Interim Remedial Measure.

SAMPLE TYPE:
☒ DP = Direct Push

GRAPHIC LOG LEGEND
- Poorly-graded Gravel
- Poorly-graded Gravel with Clay
- Poorly-graded Gravelly Sand
- Sandy Silt
- Silty Clay

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	33	69	GP	0.5	Gray, GRAVEL, subangular (0.5" diameter), loose, dry.	0.8
					GP-GC	1.0	Light Gray, CLAYEY GRAVEL, some fine to medium sand, subangular gravel (0.25-0.5" diameter), loose, moist.	
					SP	2.0	Light Brown, FINE SAND, some subrounded gravel, (0.25" diameter), black oxidized surfaces, loose, dry.	1.0
2.5	426.8				SP	4.5	Brown, FINE TO MEDIUM SAND, subangular gravel, (0.5-1" diameter), brick fragments near 3.5 feet bgs, black oxidation, trace white flecks, loose, moist.	1.0 1.0 1.5
5.0	424.3	DP	27	56	ML	6.0	Olive Brown, SANDY SILT, orange and black oxidized surfaces, trace white flecks, "ash-like" layers, soft, wet.	0.8
7.5	421.8				SP	8.0	Brown To Dark Brown, FINE TO MEDIUM GRAVELLY SAND, trace brick fragments, (0.5-1.5" diameter), black oxidized surfaces, orange oxidation, wet to saturated at 7.5 feet bgs, loose.	1.2 1.0
10.0	419.3	DP	12	25	SP	10.0	Light Brown, COARSE SAND AND GRAVEL, some clay, subangular gravel (0.5" diameter), fining downwards sequence, loose, saturated.	1.2 1.0

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Client: Arnold & Porter

Project Name: Hoosick

Project Number: 0378075

Project Location: Hoosick, New York

DEPTH (feet)	ELEVATION (feet amsl)	SAMPLE TYPE/ NUMBER	RECOVERY (inches)	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
		DP	12	25			NO RECOVERY, CLAY too soft to allow penetration into liner. *(continued)*	NM
							12.0	
12.5	416.8	JS-B-061 (12-14) for VOCs, PFAS, TOC, pH DP	48	100	CL-ML	▨	Gray Brown, CLAY, some silt, soft, medium plasticity, saturated.	0.6
						▨	13.0	0.8
						▨		0.8
15.0	414.3					▨		1.0
		DP	30	63	CL-ML	▨	Gray, SILTY CLAY, soft, medium plasticity, saturated.	0.4
17.5	411.8					▨		0.8
						▨		0.9
						▨		0.9
20.0	409.3						20.0	
							Bottom of Boring @ 20.00 feet bgs	

ACRONYM LEGEND: amsl = above mean sea level; bgs = below ground surface; NM = not measured; ppm = parts per million; PID = photoionization detector
PFAS = per- and polyfluoroalkyl substances; TOP = total oxidizable precursor; TOC = total organic carbon; VOCs = volatile organic compounds

Appendix A-2

Groundwater Sampling Logs

Low-Flow Groundwater Sampling Form

ERM

Site Name: A+P
Project No.: 0378075

Monitoring Well: JS-MW-001A	Area: 88
Date: 5/1/2018	Sampling Device: Peri Pump
Sampling Personnel: MF	
Weather Conditions: 75°F Sunny	
Time: ~~1440~~ MF 1500	

Total Depth (TD)[1]: 17.09	Screen Length: 5'
Depth to Water (DTW): 11.70	Well Diameter: 1"
Total Volume Purged: 3.5 gal	Casing Type: PVC
Purge Rate: 200	PID Headspace (ppm): 0.4
Tubing Type: HDPE	Measuring Point: TOC
Pump Intake (feet below MP): ~~1.0~~ MF ~~10.5~~ MF 16.00	Color: Clear Odor: NONE

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm³)	DO (mg/L)	pH (std units)	Turb NTU	ORP mV	Flow (mL/min)
Stabilization Criteria[2]			+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10%[3]	+/- 10 mV	100-400
1505	11.71		9.0	822	10.05	6.97	11.67	-6.8	150
1510	11.72		8.7	795	8.89	6.89	11.64	11.5	150
1515	11.72		8.5	795	8.99	6.90	0	7.2	150
1520	11.71		8.5	795	8.89	6.92	6	3.3	200
1525	11.72		8.5	795	9.02	6.92	0	-0.3	200
1530	11.72		8.4	795	9.12	6.93	0	-3.9	200
1535	11.72		8.5	793	8.98	6.92	0	-3.9	200
1540	11.72		8.3	791	9.01	6.93	0	-2.8	200

MF

Mike Fox
05/01/2018
Sample @ 1550

MF

Sampling Time: 1550

Sample ID:	Analysis Requested:	Filtered Y/N:	Preservative:
JS-MW-001A(05012018)	VOC, TOC, PFAS-21 Metals ETH, Meth,	N	HCL HNO3 NaOH

Additional Field Measurements
JS-MW-001A(05012018)MSD
JS-MW-001A(05012018MS

Notes:
[1] = Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
[2] = Stabilization criteria based on three most recent consecutive measurements.
[3] = Plus or minus 10-percent when turbidity is over 10 NTUs.

Biofitek @

Low-Flow Groundwater Sampling Form

Site Name:
Project No.: 0378075

Monitoring Well: JS-MW-002A
Area: ~~M~~ MF JS
Date: 5/2/2018
Sampling Device: Peri Pump
Sampling Personnel: MF
Weather Conditions: 70°F Sunny
Time: 0820

Total Depth (TD)[1]: 8.59
Screen Length: 5'
Depth to Water (DTW): 5.26
Well Diameter: 1"
Total Volume Purged: 4
Casing Type: PVC
Purge Rate: 200
PID Headspace (ppm): 0.0
Tubing Type: HDPE
Measuring Point: TOC
Pump Intake (feet below MP): ~~4.5~~ MF 8.00
Color: Clear
Odor: NONE

Time: (min)	**DTW:** (feet)	**Comments:**	**Temp** (°C)	**SpC** (uS/cm³)	**DO** (mg/L)	**pH** (std units)	**Turb** NTU	**ORP** mV	**Flow** (mL/min)
Stabilization Criteria[2]			+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10%[3]	+/- 10 mV	100-400
825	5.39		7.4	1103	3.30	6.48	36.32	-9.9	200
830	5.41		7.4	1052	3.27	6.59	7.32	-8.5	200
835	5.42		7.3	1015	2.77	6.66	6.18	-7.4	200
840	5.44		7.4	986	2.56	6.70	0	-6.2	200
845	5.45		7.3	975	2.40	6.71	0	-5.5	200
850	5.45		7.3	960	2.20	6.74	0	-4.4	200
855	5.46		7.4	946	1.96	6.76	0	-2.8	200
900	5.46		7.4	939	1.84	6.78	0	-2.2	200
905	5.46		7.5	932	1.76	6.78	0	-0.9	200
MF		Sample @ 0915							

M Fox
05/02/2018

MF

Sampling Time:

Sample ID:	Analysis Requested:	Filtered Y/N:	Preservative:
JS-MW-002A(05022018)	VOC, TOC, PFAS-21 Metals Eth, Meth	N	HNO3 HCl NaOH

Additional Field Measurements

Biofilter

Notes:

[1] = Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.

[2] = Stabilization criteria based on three most recent consecutive measurements.

[3] = Plus or minus 10-percent when turbidity is over 10 NTUs.

Low-Flow Groundwater Sampling Form

Site Name: A+P
Project No.: 0378075

ERM

Monitoring Well: JS-MW-003A	Area: JS - Hoosick
Date: 5/2/2018	Sampling Device: Peri Pump
Sampling Personnel: MF	
Weather Conditions: 80°F Sunny	
Time: 1025	

Total Depth (TD)[1]: 8.98	Screen Length: 5'
Depth to Water (DTW): 7.45	Well Diameter: 1"
Total Volume Purged: 4	Casing Type: PVC
Purge Rate: 200	PID Headspace (ppm): 0.8
Tubing Type: HDPE	Measuring Point: TOC
Pump Intake (feet below MP): ~~6.5~~ MF 8.00	Color: Clear Odor: NONE

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm³)	DO (mg/L)	pH (std units)	Turb NTU	ORP mV	Flow (mL/min)
Stabilization Criteria[2]			+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10%[3]	+/- 10 mV	100-400
1030	7.55		7.6	311.2	9.43	7.45	28.78	80.6	150
1035	7.56		6.8	302.2	8.51	7.25	12.42	58.1	200
1040	7.59		6.6	303.5	8.39	7.21	0	49.5	200
1045	7.58		6.8	304.1	8.35	7.20	0	39.2	200
1050	7.58		6.7	305.8	8.47	7.21	0	45.4	200
1055	7.59		6.7	304.8	8.39	7.17	0	53.7	200
1100	7.59		6.7	304.3	8.44	7.15	0	58.1	200
1105	7.59		6.9	303.8	8.45	7.18	0	59.9	200
MF		sample @ 1115							

TOC
05/02/2018
MF

Sampling Time: 1115

Sample ID:	Analysis Requested:	Filtered Y/N:	Preservative:
JS-MW-003A(05022018)	VOC, TOC, PFAS-21 Metals, Alk, Meth	N	HCl HNO3 NaOH

Additional Field Measurements

BioFilter

Notes:

[1] = Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.

[2] = Stabilization criteria based on three most recent consecutive measurements.

[3] = Plus or minus 10-percent when turbidity is over 10 NTUs.

Low-Flow Groundwater Sampling Form

ERM

Site Name: A+P
Project No.: 0378075

Monitoring Well: JS-MW-004A	Area: JS
Date: 5/2/2018	Sampling Device: Peri Pump
Sampling Personnel: MF	
Weather Conditions: 80°F Partly Cloudy	
Time: 1305	

Total Depth (TD)[1]: 9.50	Screen Length: 5'
Depth to Water (DTW): 6.79	Well Diameter: 1"
Total Volume Purged: 3.5 gal	Casing Type: PVC
Purge Rate: 200	PID Headspace (ppm): 0.1
Tubing Type: HDPE	Measuring Point: TOC
Pump Intake (feet below MP): 8.56	Color: clear Odor: NONE

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm^3)	DO (mg/L)	pH (std units)	Turb NTU	ORP mV	Flow (mL/min)
Stabilization Criteria[2]			+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10%[3]	+/- 10 mV	100-400
1310	6.80		8.6	1080	10.07	7.31	23.05	86.1	200
1315	6.81		7.6	793	10.17	7.17	0	61.6	200
1320	6.81		7.5	786	10.16	7.16	0	61.0	300
1325	6.82		7.4	760	9.84	7.14	0	58.6	300
1330	6.81		7.4	745.1	9.43	7.14	0	56.4	300
1335	6.83		7.3	744.0	9.52	7.15	0	55.5	300
1340	6.83		7.3	741.9	9.05	7.16	0	52.9	300
1345									
MF		Sample @ 1350							

Fox
05/02/2018

MF

Sampling Time: 1350

Sample ID:	Analysis Requested:	Filtered Y/N:	Preservative:
JS-MW-004A(05022018)	VOCs, PFAS-21 TOC Metals Meth, Eth	N	HCl, HNO3 NaOH

Additional Field Measurements

Notes:

[1] = Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.

[2] = Stabilization criteria based on three most recent consecutive measurements.

[3] = Plus or minus 10-percent when turbidity is over 10 NTUs.

Low-Flow Groundwater Sampling Form

Site Name:
Project No.: 0378075

ERM

Monitoring Well: JS-MW-005A
Area: JS
Date: 5/2/2018
Sampling Device: Peri Pump
Sampling Personnel: MF
Weather Conditions: 80°F Sunny
Time: 1455

Total Depth (TD)¹: 11.98
Screen Length: 5'
Depth to Water (DTW): 8.15
Well Diameter: 1"
Total Volume Purged:
Casing Type: PVC
Purge Rate: 300
PID Headspace (ppm): 0.0
Tubing Type: HDPE
Measuring Point: TOC
Pump Intake (feet below MP): 11.00
Color: Clear
Odor: NONE

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm³)	DO (mg/L)	pH (std units)	Turb NTU	ORP mV	Flow (mL/min)
Stabilization Criteria²			+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10%³	+/- 10 mV	100-400
1560	8.24		8.9	291.4	7.91	7.60	0	68.3	300
1505	8.24		8.2	286.8	7.20	7.35	0	58.9	300
1510	8.25		8.4	285.1	6.73	7.27	0	56.1	300
1515	8.25		8.5	286.4	6.38	7.29	0	55.8	300
1520	8.24		8.4	286.1	6.22	7.25	0	54.6	300
1525	8.25		8.5	285.9	6.19	7.23	0	54.6	300
1530	8.25		8.4	285.5	5.34	7.23	0	54.8	300
1535	8.25		8.4	286.1	5.27	7.26	0	52.5	300
1540	8.25		8.3	285.6	5.23	7.24	0	53.2	300
MF		Sample @ 1550							

Fox
05/02/2018

MF

Sampling Time: 1550

Sample ID:	Analysis Requested:	Filtered Y/N:	Preservative:
JS-MW-005A(05022018)	VOCs, PFAS-21 TOCs Metals Eth, Meth		HCl, HNO3 NaOH

Additional Field Measurements
DUP(05022018)1200

Notes: JS-MW-005A(05022018) MS/MSD for PFAS-21 Compound List only.

¹ = Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
² = Stabilization criteria based on three most recent consecutive measurements.
³ = Plus or minus 10-percent when turbidity is over 10 NTUs.

Low-Flow Groundwater Sampling Form

Site Name: A+P
Project No.: 0378075

ERM

Monitoring Well: JS-TMW-018
Area: JS
Date: 3/15/2018
Sampling Device: Peristaltic Pump
Sampling Personnel: M. FOX
Weather Conditions: 60°F Overcast
Time: ~~1530~~ MF 1540

Total Depth (TD)[1]: 20.31
Screen Length: 5'
Depth to Water (DTW): 10.84
Well Diameter: 1"
Total Volume Purged: 1.00 gal
Casing Type: PVC
Purge Rate: 100
PID Headspace (ppm): 214.4
Tubing Type: HDPE
Measuring Point: TOC
Pump Intake (feet below MP):
Color: Grey - Black
Odor: yes

Time: (min) Stabilization Criteria[2]	**DTW:** (feet)	**Comments:**	**Temp** (°C) +/- 3%	**SpC** (uS/cm³) +/- 3%	**DO** (mg/L) +/- 10%	**pH** (std units) +/- 0.1 unit	**Turb** NTU +/- 10%[3]	**ORP** mV +/- 10 mV	**Flow** (mL/min) 100-400
1545	12.65		14.2	656	3.17	8.59	OR	89.8	100
1550	11.04		11.4	627.6	3.32	7.84	94	9.6	100
1555	DRY	1. gal purged							
5/16/2018 1130	17.81								
1230	17.81								
1330	17.80								
1430	17.80		12.3	630.8	3.91	7.88	OR	13.7	100
MF									

Fox
5/16/2018

MF

Sampling Time: 1500

Sample ID:	Analysis Requested:	Filtered Y/N:	Preservative:
JS-TMW-018(05162018)	VOC TOC pH PFAS	N	HCL

Additional Field Measurements

Notes:

[1] = Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.

[2] = Stabilization criteria based on three most recent consecutive measurements.

[3] = Plus or minus 10-percent when turbidity is over 10 NTUs.

Low-Flow Groundwater Sampling Form

Site Name: A+P
Project No.: 0378075

ERM

Monitoring Well: JS-TMW-030
Date: 5/16/2019
Sampling Personnel: M. Fox
Weather Conditions: 75°F Sunny
Time: 1545
Area: JS
Sampling Device: Peristaltic Pump

Total Depth (TD)[1]: 26.39
Depth to Water (DTW): 9.77
Total Volume Purged: 1.25 gal
Purge Rate: 100
Tubing Type: HDPE
Pump Intake (feet below MP): 25.80
Screen Length: 5'
Well Diameter: 1"
Casing Type: PVC
PID Headspace (ppm): 26.3
Measuring Point: TOC
Color: Dark Gray
Odor: N

Time: (min)	**DTW:** (feet)	**Comments:**	**Temp** (°C)	**SpC** (uS/cm³)	**DO** (mg/L)	**pH** (std units)	**Turb** NTU	**ORP** mV	**Flow** (mL/min)
Stabilization Criteria[2]			+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10%[3]	+/- 10 mV	100-400
1550	11.21		14.7	344.6	1.73	7.88	OR	20.1	100
1655	18.02		13.8	325.5	0.76	7.77	OR	7.3	100
1600	20.09		12.9	305.0	1.12	7.85	OR	15.1	100
1605	Well DRY								
0755	9.83		13.0	310.1	0.95	7.80	OR	10.1	100
MF									

Fox
5/24/2018
MF

Sampling Time: 0800

Sample ID:	Analysis Requested:	Filtered Y/N:	Preservative:
JS-TMW-030(05242018)	VOC TOC pH PFAS	N	HCL

Additional Field Measurements

Notes:
[1] = Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
[2] = Stabilization criteria based on three most recent consecutive measurements.
[3] = Plus or minus 10-percent when turbidity is over 10 NTUs.

Low-Flow Groundwater Sampling Form

Site Name: A+P
Project No.: 0378075

Monitoring Well: JS-TMW-033
Area: JS
Date: 5/16/2018
Sampling Device: Peristaltic Pump
Sampling Personnel: M.Fox
Weather Conditions: 68°F Partly Cloudy
Time: 1540

Total Depth (TD)[1]: 19.51
Screen Length: 5'
Depth to Water (DTW): 7.95
Well Diameter: 1"
Total Volume Purged: .5 gal
Casing Type: PVC
Purge Rate:
PID Headspace (ppm): 746.4
Tubing Type: HDPE
Measuring Point: TOC
Pump Intake (feet below MP):
Color: Dark Gray
Odor: Organic-like

Time: (min)	**DTW:** (feet)	**Comments:**	**Temp** (°C)	**SpC** (uS/cm³)	**DO** (mg/L)	**pH** (std units)	**Turb** NTU	**ORP** mV	**Flow** (mL/min)
Stabilization Criteria[2]			+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10%[3]	+/- 10 mV	100-400
1545	10.03		12.1	1193	0.80	7.94	OR	94.6	100
1550		Low Flow Stopped due to M.Fox observing free product							

Sampling Time: 1620

Sample ID:
Analysis Requested:
Filtered Y/N:
Preservative:

Additional Field Measurements

Interface probe used. No measureable detections.

Notes:

[1] = Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.

[2] = Stabilization criteria based on three most recent consecutive measurements.

[3] = Plus or minus 10-percent when turbidity is over 10 NTUs.

Low-Flow Groundwater Sampling Form

Site Name: A+P
Project No.: 0378075

Monitoring Well: JS-TMW-035	Area: JS
Date: 5/23/2018	Sampling Device: Peristaltic Pump
Sampling Personnel: M. Fox	
Weather Conditions: 75°F Sunny	
Time: 1515	

Total Depth (TD)[1]: 19.69	Screen Length: 5'
Depth to Water (DTW): 9.10	Well Diameter: 1"
Total Volume Purged: .75 gal	Casing Type: PVC
Purge Rate: 100	PID Headspace (ppm): 1781
Tubing Type: HDPE	Measuring Point: TOC
Pump Intake (feet below MP):	Color: Dark Gray Odor:

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm^3)	DO (mg/L)	pH (std units)	Turb NTU	ORP mV	Flow (mL/min)
Stabilization Criteria[2]			+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10%[3]	+/- 10 mV	100-400
1530	9.69		13.4	328.3	1.41	7.35	OR	67.0	150
15.36	18.71		15.3	296.5	1.46	7.25	OR	45.7	100
1540	19.44	Well Dry	14.3	322.3	1.97	7.51	OR	33.0	–
0830	10.21								

Sampling Time: 0900

Sample ID:	Analysis Requested:	Filtered Y/N:	Preservative:
JS-TMW-035(05 2018)	TOC VOC pH PFAS	N ↓	HCL

Additional Field Measurements

Notes:

[1] = Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.

[2] = Stabilization criteria based on three most recent consecutive measurements.

[3] = Plus or minus 10-percent when turbidity is over 10 NTUs.

Low-Flow Groundwater Sampling Form

Site Name: A+P
Project No.: 0378075

ERM

Monitoring Well: JS-TMW-036
Date: 5/16/2018
Sampling Personnel: M. Fox
Weather Conditions: 65°F partly cloudy
Time: 1000

Area: JS
Sampling Device: Peristaltic Pump

Total Depth (TD)[1]: 20.60
Depth to Water (DTW): 9.10
Total Volume Purged: 1.5 gal
Purge Rate: 100
Tubing Type: HDPE
Pump Intake (feet below MP): 20.00

Screen Length: 5'
Well Diameter: 1"
Casing Type: PVC
PID Headspace (ppm): 713.6
Measuring Point: TOC
Color: Dark Gray
Odor: Organic-Like

Time: (min) Stabilization Criteria[2]	DTW: (feet)	Comments:	Temp (°C) +/- 3%	SpC (uS/cm³) +/- 3%	DO (mg/L) +/- 10%	pH (std units) +/- 0.1 unit	Turb NTU +/- 10%[3]	ORP mV +/- 10 mV	Flow (mL/min) 100-400
1005	14.51		10.9	339.3	4.96	7.55	OR	109.3	100
1010	16.62		11.9	331.7	4.69	7.89	OR	24.1	100
1015	17.73		12.1	321.4	3.12	8.01	OR	3.4	100
1020	19.91		12.2	294.0	1.67	8.06	OR	-20.6	100
1025	DRY		12.8	288.3	1.11	8.07	OR	-15.1	100
1500	9.68		10.9	310.1	3.11	7.91	OR	-10.1	100

MF

TOC
5/17/2018

MF

Sampling Time: 1510

Sample ID:	Analysis Requested:	Filtered Y/N:	Preservative:
JS-TMW-036(05172018)	TOC VOC pH PFAS	N	HCL

Additional Field Measurements

Notes:
[1] = Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
[2] = Stabilization criteria based on three most recent consecutive measurements.
[3] = Plus or minus 10-percent when turbidity is over 10 NTUs.

Low-Flow Groundwater Sampling Form

Site Name: A+P
Project No.: 0378075

ERM

Monitoring Well: JS-TMW-037
Area: JS
Date: 5/15/2018
Sampling Device: Peristaltic Pump
Sampling Personnel: M.Fox
Weather Conditions: 60°F Cloudy Calm
Time: 1215

Total Depth (TD)[1]: 21.22
Screen Length: 5'
Depth to Water (DTW): 8.61
Well Diameter: 1''
Total Volume Purged: 1.25
Casing Type: PVC
Purge Rate: 100
PID Headspace (ppm): 95.4
Tubing Type: HDPE
Measuring Point: TOC
Pump Intake (feet below MP): 20.80
Color: Black-grey
Odor: NONE

Time: (min) Stabilization Criteria[2]	DTW: (feet)	Comments:	Temp (°C) +/- 3%	SpC (uS/cm³) +/- 3%	DO (mg/L) +/- 10%	pH (std units) +/- 0.1 unit	Turb NTU +/- 10%[3]	ORP mV +/- 10 mV	Flow (mL/min) 100-400
1220	12.25		12.5	419.3	3.18	8.22	OR	30.4	100
1225	13.59		13.1	416.7	2.58	7.71	OR	29.1	100
1230	16.41		12.8	466.7	2.70	7.69	OR	16.8	100
1235	17.66		14.0	441.1	1.90	7.92	OR	-5.1	100
1240	18.41		14.6	420.6	1.73	7.99	OR	-14.0	100
1245	Well	DRY 1.25 gal purged					OR		
0825	9.31		19.9	3956	~~7.9~~ MF 1.24	7.89	OR	206.6	100

MF

M Fox
5/16/2018

MF

Sampling Time: 0830

Sample ID: JS-TMW-037(05162018)
Analysis Requested: VOC TOC pH PFAS
Filtered Y/N: N
Preservative: HCL

Additional Field Measurements

Notes:

[1] = Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.

[2] = Stabilization criteria based on three most recent consecutive measurements.

[3] = Plus or minus 10-percent when turbidity is over 10 NTUs.

Low-Flow Groundwater Sampling Form

Site Name: A+P
Project No.: 0378075

ERM

Monitoring Well: JS - TMW - 038
Date: 5/15/2018
Sampling Personnel: M. Fox
Weather Conditions: 65°F Rain
Time: 1050
Area: JS
Sampling Device: Peristaltic Pump

Total Depth (TD)[1]: 20.18
Depth to Water (DTW): 8.67
Total Volume Purged: 1.5 gal
Purge Rate: 200
Tubing Type: HDPE
Pump Intake (feet below MP): 19.80
Screen Length: 5'
Well Diameter: 1"
Casing Type: PVC
PID Headspace (ppm): 1201
Measuring Point: TOC
Color: Gray - Dark
Odor: Organic-like

Time: (min)	**DTW:** (feet)	**Comments:**	**Temp** (°C)	**SpC** (uS/cm³)	**DO** (mg/L)	**pH** (std units)	**Turb** NTU	**ORP** mV	**Flow** (mL/min)
Stabilization Criteria[2]			+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10%[3]	+/- 10 mV	100-400
1055	9.88		11.7	559.2	4.92	7.38	OR	27.5	200
1100	10.07		10.9	584.3	2.11	7.63	1395	23.4	200
1105	10.77		11.2	561.8	1.81	7.70	1174	16.0	200
1110	11.01		11.8	627.1	2.17	7.73	950	10.3	200
1115	11.20		11.8	531.3	2.64	7.78	1788	7.8	200
1120	13.91		12.6	511.6	11.53	7.89	1662	10.8	200
1125	18.04		13.2	517.3	9.96	7.90	1641	14.8	100
1130	Well	Dry 1.5 gal purged							100
0900	9.16		12.5	485.1	9.44	7.84	OR	12.6	100

MF

M Fox
5/16/2018

MF

Sampling Time: 0930

Sample ID:	Analysis Requested:	Filtered Y/N:	Preservative:
JS-TMW-038(05162018)	VOCs TOCs pH PFAS	N	HCL

Additional Field Measurements

Notes:

[1] = Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.

[2] = Stabilization criteria based on three most recent consecutive measurements.

[3] = Plus or minus 10-percent when turbidity is over 10 NTUs.

Low-Flow Groundwater Sampling Form

ERM

Site Name: A+P
Project No.: 0378075

Monitoring Well: JS-TMW-039	Area: JS
Date: 5/15/2018	Sampling Device: Peristaltic Pump
Sampling Personnel: M. Fox	
Weather Conditions: 65°F Sunny Calm	
Time: 0925	

Total Depth (TD)[1]: 21.39.	Screen Length: 5'
Depth to Water (DTW): 6.99	Well Diameter: 1"
Total Volume Purged: 1.5	Casing Type: PVC
Purge Rate: 100	PID Headspace (ppm): 1394
Tubing Type: HDPE	Measuring Point: TOC
Pump Intake (feet below MP):	Color: Gray Odor: Strong chem-like odor

Time: (min) Stabilization Criteria[2]	DTW: (feet)	Comments:	Temp (°C) +/- 3%	SpC (uS/cm³) +/- 3%	DO (mg/L) +/- 10%	pH (std units) +/- 0.1 unit	Turb NTU +/- 10%[3]	ORP mV +/- 10 mV	Flow (mL/min) 100-400
0930	8.69		13.1	353.6	1.37	10.72	743	-78.6	100
0935	9.61	Sheen - Red water	12.3	387.7	3.13	10.71	OR	-30.6	100
0940	9.87	DNPL Found	13.2	18.9	2.88	10.52	OR	-14.7	100
0945	well sampled	due to DNPL -like	12.6	16.0	9.03	10.19	OR	12.3	100

MF

M Fox
5/15/2018

MF

Sampling Time: 1000

Sample ID:	Analysis Requested:	Filtered Y/N:	Preservative:
JS-TMW-039 (05152018)	VOCs TOCs pH PFAS	N	HCL

Additional Field Measurements

DUP(05152018) 1200

Notes:

[1] = Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.

[2] = Stabilization criteria based on three most recent consecutive measurements.

[3] = Plus or minus 10-percent when turbidity is over 10 NTUs.

5/16/2018 - 1245
Static DTW: 6.99'
DTW after product 7.21'

Low-Flow Groundwater Sampling Form

Site Name: A+P
Project No.: 0378075

ERM

Monitoring Well: JS-TMW-044
Date: 5/15/2018
Sampling Personnel: M. Fox
Weather Conditions: 68°F Partly Cloudy
Time: 1305
Area: JS
Sampling Device: Peristaltic Pump

Total Depth (TD)[1]: 19.35
Depth to Water (DTW): 12.19
Total Volume Purged: 1.25 gal
Purge Rate: 100
Tubing Type: HDPE
Pump Intake (feet below MP): 19.00
Screen Length: 5'
Well Diameter: 1"
Casing Type: PVC
PID Headspace (ppm): 5.9
Measuring Point: TOC
Color: Tan-gray
Odor: NONE

Time: (min) Stabilization Criteria[2]	DTW: (feet)	Comments:	Temp (°C) +/- 3%	SpC (uS/cm³) +/- 3%	DO (mg/L) +/- 10%	pH (std units) +/- 0.1 unit	Turb NTU +/- 10%[3]	ORP mV +/- 10 mV	Flow (mL/min) 100-400
1310	14.91		14.7	834	6.17	7.94	OR	7.6	100
1315	15.51		12.7	854	5.92	7.79	3161	6.8	100
1320	17.19		12.7	840	5.01	7.67	1649	7.7	100
1325	19.01		12.4	807	3.55	7.67	OR	0.4	100
1330	Well DRY	1.25 gal purged							
1450	12.62		12.56	830	5.56	7.71	OR	0.9	100

MF

M Fox
5/15/2018

MF

Sampling Time: 1455

Sample ID:	Analysis Requested:	Filtered Y/N:	Preservative:
JS-TMW-044(05152018)	VOC TOC pH PFAS	N	HCL
Eurofins Split JS-TMW-044(05152018)	PFAS	↓	

Additional Field Measurements

Notes:

[1] = Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.

[2] = Stabilization criteria based on three most recent consecutive measurements.

[3] = Plus or minus 10-percent when turbidity is over 10 NTUs.

Low-Flow Groundwater Sampling Form

Site Name: A+P
Project No.: 0378075

ERM

Monitoring Well: JS-TMW-049
Date: 5/14/2018
Sampling Personnel: M. Fox
Weather Conditions: 75°F Sunny Calm
Time: 1525
Area: JS
Sampling Device: Peristaltic Pump

Total Depth (TD)[1]: 19.33
Depth to Water (DTW): 7.03
Total Volume Purged: 2.25 gal
Purge Rate: 100
Tubing Type: HDPE
Pump Intake (feet below MP): 18.50'
Screen Length: 5'
Well Diameter: 1"
Casing Type: PVC
PID Headspace (ppm): 29.0
Measuring Point: TOC
Color: Gray
Odor: NONE

Time: (min)	DTW: (feet)	Comments:	Temp (°C)	SpC (uS/cm³)	DO (mg/L)	pH (std units)	Turb NTU	ORP mV	Flow (mL/min)
Stabilization Criteria[2]			+/- 3%	+/- 3%	+/- 10%	+/- 0.1 unit	+/- 10%[3]	+/- 10 mV	100-400
1530	9.94		12.4	1085	0.78	7.24	OR	126.0	100
1535	12.41		10.7	976	1.91	7.31	OR	80.9	100
1540	14.58		11.2	936	2.32	7.34	OR	75.3	100
1545	16.46		10.9	981	3.05	7.42	OR	71.9	100
1550	15.49		11.2	895	3.51	7.48	OR	69.6	100
1555	DRY	2 gal purged							
5/15/2018 0850	7.01		14.0	776	5.76	7.57	OR	78.9	100

MF

M Fox
5/15/2018

MF

Sampling Time: 0900

Sample ID: JS-TMW-049(05152018)

Analysis Requested: VOCs TOCs pH PFAS

Filtered Y/N: N

Preservative: HCl

Additional Field Measurements

Notes:
[1] = Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.
[2] = Stabilization criteria based on three most recent consecutive measurements.
[3] = Plus or minus 10-percent when turbidity is over 10 NTUs.

Low-Flow Groundwater Sampling Form

ERM

Site Name: A+P
Project No.: 0378075

Monitoring Well: JS-TMW-050
Date: 5/14/2018
Sampling Personnel: M. FOX
Weather Conditions: 75°F Sunny Calm
Time: 1600

Area: JS
Sampling Device: Peristaltic Pump

Total Depth (TD)^1: 18.65
Depth to Water (DTW): 6.82
Total Volume Purged: 3.5 gal
Purge Rate: 200
Tubing Type: HDPE
Pump Intake (feet below MP):

Screen Length: 5'
Well Diameter: 1"
Casing Type: PVC
PID Headspace (ppm): 2.7
Measuring Point: TOC
Color:
Odor:

Time: (min) Stabilization Criteria^2	DTW: (feet)	Comments:	Temp (°C) +/- 3%	SpC (uS/cm^3) +/- 3%	DO (mg/L) +/- 10%	pH (std units) +/- 0.1 unit	Turb NTU +/- 10%^{3}	ORP mV +/- 10 mV	Flow (mL/min) 100-400
1605	6.95		10.2	1039	2.40	7.32	OR	-28.7	200
1610	6.95		9.8	1075	2.64	7.23	50.7	-39.2	200
1615	6.96		9.7	1074	2.74	7.24	60.4	-42.6	200
1620	6.96		9.7	1078	2.77	7.22	35.3	-48.7	200
1625	6.96		9.6	1087	2.73	7.21	13.9	-51.4	200
1630	6.98		9.8	1092	2.75	7.20	12.7	-53.4	200
1635	6.98		9.8	1087	2.74	7.21	12.9	-55.4	↓
1640	6.98		9.7	1086	2.72	7.19	11.8	-55.2	

MP

M Fox
5/14/2018

MP

Sampling Time: 1645

Sample ID:	Analysis Requested:	Filtered Y/N:	Preservative:
JS-TMW-050(05142018) MS/MSD	VOC TOC PH PFAS	N ↓	HCL

Additional Field Measurements

Notes:

^{1} = Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.

^{2} = Stabilization criteria based on three most recent consecutive measurements.

^{3} = Plus or minus 10-percent when turbidity is over 10 NTUs.

Low-Flow Groundwater Sampling Form

Site Name: A+P
Project No.: 0378075

Monitoring Well: JS-TMW-053
Date: 5/14/2018
Sampling Personnel: M. Fox
Weather Conditions: 75°F Sunny Calm
Time: 1440

Area: JS
Sampling Device: Peristaltic Pump

Total Depth (TD)[1]: 15.79
Depth to Water (DTW): 7.81
Total Volume Purged: .75 gal
Purge Rate: 100
Tubing Type: HDPE
Pump Intake (feet below MP): 15.00'

Screen Length: 5'
Well Diameter: 1"
Casing Type: PVC
PID Headspace (ppm): 180.1
Measuring Point: TOC
Color: Gray/Black
Odor: NONE

Time: (min) Stabilization Criteria[2]	**DTW:** (feet)	**Comments:**	**Temp** (°C) +/- 3%	**SpC** (uS/cm³) +/- 3%	**DO** (mg/L) +/- 10%	**pH** (std units) +/- 0.1 unit	**Turb** NTU +/- 10%[3]	**ORP** mV +/- 10 mV	**Flow** (mL/min) 100-400
1445	11.75		11.6	617.2	5.40	7.82	99	-79.5	120
1450	14.15		14.0	641	7.40	7.74	389	-73.2	100
1500	Well DRY	.5 gal purged	~~12.8~~	~~691~~	~~7.52~~ MF				
5/15/2018 0800	8.65	Sample @ 0810	12.8	691	7.52	7.43	OR	265.6	100
MF									MF

M. Fox
5/15/2018

Sampling Time: 0810

Sample ID:	Analysis Requested:	Filtered Y/N:	Preservative:
JS-TMW-053(05152018)	VOC TOC PH PFAS	N	HCL

Additional Field Measurements

Notes:

[1] = Do not measure depth to bottom of well until after purging and sampling to reduce resuspending fines that may be resting on the well bottom.

[2] = Stabilization criteria based on three most recent consecutive measurements.

[3] = Plus or minus 10-percent when turbidity is over 10 NTUs.

Appendix A-3

PeroxyChem Report: Bench Scale Evaluation of ISCO Technologies for the Treatment of CVOCs in Groundwater and Soil from the Confidential NY Site

BENCH SCALE EVALUATION OF ISCO TECHNOLOGIES FOR THE TREATMENT OF CVOCS IN GROUNDWATER AND SOIL FROM THE CONFIDENTAL SITE

FINAL REPORT

Prepared for:

ERM
15 Park Row West Suite 104
T: 401-415-9600

***Submitted by*:**
PeroxyChem
Project No.: PC 20831B

December 2018

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1. INTRODUCTION

1.1 Project Background

A bench study was completed at the PeroxyChem laboratory in Tonawanda, NY, USA for the treatment of soil and groundwater impacted with chlorinated volatile organic compounds (cVOCs) collected from two separate locations a confidential New York site. The primary contaminants of concern (COC) included trichloroethene (TCE) and 1,1,1-trichloroethane (1,1,1-TCA) and the bench scale test also evaluated the potential evolution of certain per- and poly-fluoroalkyl substances (PFAS) as a result of the treatment process. The study was designed to evaluate the efficacy of sodium persulfate (SP) and sodium permanganate in a batch study to emulate treatment of the source zone for two soil types. This report was prepared for ERM and presents the results and data bench-scale studies completed between April 2018 and September 2018.

2. PROJECT OBJECTIVES

The aim of this bench-scale study was to assess In-Situ Chemical Oxidation for the treatment of cVOCs. Specific objectives included:

- Determination for each soil type provided of
    - soil oxidant demand (SOD) for persulfate;
    - base buffering capacity (BBC) of the soil;
    - soil oxidant demand (SOD) for permanganate;
    - the efficiency of ISCO treatments at treating site contaminants in a series of batch reactors; and,
    - the potential evolution of perfluorinated alkyl acids
- Provision of a document containing the test results.

3. METHOD BLANK – TEST 1

3.1 Method Blank Set Up

A Method Blank Study was set up on April 17th, 2018 to assess the potential contamination of test samples by per- and poly-fluoroalkyl substances (PFAS) due to the materials to be used during the study. The intent of the study was to evaluate the potential introduction of PFAS compounds from materials and equipment used during the bench study. Materials that are not expected to contain PFAS such as such as HDPE and polypropylene were used whenever possible. Other materials were thoroughly rinsed before use with the water provided by TestAmerica labeled as PFAS-free. Teflon materials were not used during the method blank study.

The Method Blank Study evaluated a 50 grams per liter (g/L) dose of alkaline activated persulfate (AAP) and a 20 g/L dose of potassium permanganate. For the set up the potassium permanganate used was from Sigma-Aldrich, ACS reagent, ≥99.0%. Alkaline activated persulfate consisted of PeroxyChem's Klozur SP persulfate source (SP) and a 25% sodium hydroxide (NaOH) solution using NaOH pellets (VWR ACS grade).

The study was set up in 1L PFAS-free certified containers provided by TestAmerica. All lab work was done in a cleaned fume hood, dedicated for the method blank study. No other work was done in the fume hood for the duration of the study. The water used for setup was provided by TestAmerica and labeled as PFAS-free water, this water was also used to prepare the 25% NaOH solution.

Powderless nitrile gloves (VWR Nitrile Examination Gloves) were used at all points during the study. Also used as required; lab tissues (VWR Light-Duty Tissue Wipers), disposable polypropylene spatulas (VWR Disposable Spatulas), disposable weigh boats (VWR Weigh Boat 85c85x24mm PS, Medium, White, Anti-Static), and polystyrene disposable serological pipets (VWR 50mL Serological Pipet).

Triplicate sacrificial reactors for each condition were set up, all were sacrificially sampled for PFAS after 7 days reaction time. Samples were sent to TestAmerica Buffalo on ice via courier. A summary of the Method Blank Study set up is in **Table 1.**

Table 1: Method Blank Study set up

Treatment	Sodium Persulfate (g)	25% NaOH (g)	Potassium Permanganate (g)	PFAS-free Water (g)
Control	---	---	---	1172.40
Alkali-activated persulfate	58.62	79.72	---	1082.77
Potassium Permanganate	---	---	23.45	1162.27

3.2 Method Blank Results

The summary of results from the Method Blank Study are shown below in **Table 2.**

Table 2: Test 1: PFAS Method Blank Results

Parameter	**Control A**	**Control B**	**Control C**	**50 g/L SP AAP A**	**50 g/L SP AAP B**	**50 g/L SP AAP C**	**20 g/L KMnO4 A**	**20 g/L KMnO4 B**	**20 g/L KMnO4 C**	**Units**
Perfluorobutanoic acid (PFBA)	0.89 J	0.58 J	0.47 J	1.2 J	1.5	3.1	32	20	69	ng/L
Perfluoropentanoic acid (PFPeA)	ND (0.40)	ND (0.40)	ND (0.39)	0.57 J	0.44 J	0.46 J	ND (1.2)	ND (1.2)	ND (1.2)	ng/L
Perfluoroheptanoic acid (PFHpA)	0.35 J	ND (0.21)	ND (0.20)	0.31 J	0.30 J	0.25 J	ND (0.63)	ND (0.63)	1.2 J	ng/L
Perfluorooctanoic acid (PFOA)	0.71 UJ	0.71 UJ	0.72 UJ	0.71 UJ	0.69 UJ	0.69 UJ	2.2 J	2.1 UJ	2.1 UJ	ng/L
Perfluorononanoic acid (PFNA)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.68)	ND (0.68)	1.9 J	ng/L
Perfluorodecanoic acid (PFDA)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.24)	0.29 J	ND (0.24)	ND (0.78)	ND (0.78)	ND (0.78)	ng/L
Perfluorobutanesulfonic acid (PFBS)	ND (0.16)	ND (0.16)	ND (0.16)	ND (0.16)	ND (0.15)	ND (0.15)	0.70 J	ND (0.50 J)	2.4 J	ng/L
Perfluorohexanesulfonic acid (PFHxS)	ND (0.24)	ND (0.20)	ND (0.24)	ND (0.24)	ND (0.26)	ND (0.22)	ND (5)	ND (0.43)	ND (3.0)	ng/L
Perfluoroheptanesulfonic Acid (PFHpS)	ND (0.15)	ND (0.16)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.48)	ND (0.48)	0.50 J	ng/L
Perfluorooctanesulfonic acid (PFOS)	ND (0.44)	ND (0.44)	ND (0.43)	ND (0.42)	ND (0.41)	ND (0.41)	ND (1.4)	ND (1.4)	13	ng/L
6.2 FTS	ND (19)	ND (19)	ND (19)	ND (19)	ND (20)	ND (17)	ND (170)	ND (150)	ND (210)	ng/L
Total PFAS =	**1.24**	**0.58**	**0.47**	**2.08**	**2.53**	**3.81**	**34.9**	**20.0**	**88.0**	**ng/L**
Average Total PFAS =	**0.76**			**2.8**			**48**			**ng/L**

UJ = The analyte was analyzed for but was not detected. The reported quantitation limits are approximate and may be inaccurate or imprecise.

J = The analyte is an estimated quantity. The associated numerical value is an approximate quantitation of the analyte in the sample.

4 BASELINE

4.1 Baseline Sampling

On April 27th, 2018, coolers containing soil samples, approximately 20.6 kilograms (kg) and 13.9 kg, were received. The samples received from the site consisted of two bags of site soil with the following sample identification numbers:

- Silt and Clay
    - JS-B-033(9-14)(16-19)(24-25)
    - JS-B-037 (14-20)
    - JS-B-038(12-21)
    - JS-B-044(18-20)
    - JS-B-036(15-20)
    - JS-B-039(10-11)(14-16)(17-19)(20-22)
    - JS-B-050(9-16)
    - JS-B-053(12-13)(14-16)
- Sand & Gravel
    - JS-B-044(7-13)
    - JS-B-046(6-10)
    - JS-B-047(7-10)
    - JS-B-043(8-10)
    - JS-B-042(4-5)(7-9)
    - JS-B-036(8-10)
    - JS-B-037(2-3)
    - JS-B-041(7-9)
    - JS-B-039(7-10)
    - JS-B-049(7-9)
    - JS-B-048(8-9)
    - JS-B-050(7-9)
    - JS-B-053(6-9)

The soil samples were put into a walk-in cooler kept at 4°C until the start of the study.

On May 4, 2018, coolers of groundwater samples were received. The samples consisted of 28L of site groundwater with the following sample identification numbers:

- JS-MW-001A(05012018)
- JS-MW-002A(05022018)
- JS-MW-003A(05022018)
- JS-MW-004A(05052018)
- JS-MW-005A(05022018)

The groundwater samples were put into the 4°C walk-in cooler until the start of the study.

On June 12th, 2018, the two soil samples were homogenized separately. Some soil was left in the original shipping container and was untouched to be used for the Potential Evolution of PFAS – Test 3 to minimize transfer of potential laboratory PFAS contamination. The soil homogenization was done by quickly transferring the soil to a bag with the headspace removed and homogenized well by kneading the bag. The homogenized sand & gravel soil was a tan brown color, the homogenized clay & silt soil was gray/black. Each homogenized soil was sampled in duplicate for VOCs (Method 8260) and pH.

On June 12th, 2018, a composite of half of the groundwater of all the samples provided was prepared by pumping groundwater from the shipping containers into zero-headspace Tedlar bags. Approximately 14L of groundwater was reserved in the original shipping containers to be used for other testing. The homogenized groundwater was sampled for VOCs (Method 8260), pH and oxidation reduction potential (ORP).

All samples for cVOC analyses were submitted to TestAmerica Buffalo on ice via courier and under standard chain of custody. The pH and ORP were measured in-house by PeroxyChem.

4.2 Baseline Results

The summary of results from the baseline sampling are shown below in **Table 3 – 5**.

Table 3: Baseline Clay & Silt Soil Results

Analysis	Parameter	Test 2B Composite Soil	Test 2B Composite Soil Dup.	Units
VOCs	1,1,1-Trichloroethane	ND (600)	ND (3,100)	µg/Kg
	1,1-Dichloroethane	ND (600)	ND (3,100)	µg/Kg
	cis-1,2-Dichloroethene	380 J	ND (3,100)	µg/Kg
	Tetrachloroethene	ND (600)	ND (3,100)	µg/Kg
	Trichloroethene	75,000	83,000	µg/Kg
	Total cVOCs =	**75,380**	**83,000**	**µg/Kg**
	Average cVOCs =	**79,190**		**µg/Kg**
Lab Parameters	pH (Slurry method)	8.34		SI Units

J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Table 4: Baseline Sand & Gravel Soil Results

Analysis	Parameter	Test 2A Composite Soil	Test 2A Composite Soil Dup.	Units
VOCs	1,1,1-Trichloroethane	220	170	µg/Kg
	1,1-Dichloroethane	ND (120)	ND (120)	µg/Kg
	cis-1,2-Dichloroethene	ND (120)	ND (120)	µg/Kg
	Tetrachloroethene	130	110 J	µg/Kg
	Trichloroethene	3,100	3,500	µg/Kg
	Total cVOCs =	**3,450**	**3,780**	**µg/Kg**
	Average cVOCs =	**3,615**		**µg/Kg**
Lab Parameter	pH (Slurry method)	9.11		SI Units

Table 5: Baseline Groundwater Results

Analysis	Parameter	Composite GW	Units
VOCs	1,1,1-Trichloroethane	4.4	µg/L
	1,1-Dichloroethane	0.52 J	µg/L
	cis-1,2-Dichloroethene	3.3	µg/L
	Tetrachloroethene	ND (1.0)	µg/L
	Trichloroethene	19	µg/L
	Total cVOCs =	**27**	**µg/L**
Lab Parameters	pH	7.02	SI Units
	ORP	381	mV

J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

5 PERSULFATE SOIL OXIDANT DEMAND TEST

5.1 Method

The persulfate demand test measures the loss of persulfate in the presence of uncontaminated or lightly contaminated soil, groundwater and activator over a period of 48 and 168 hours.

A SOD for persulfate was set up for each soil type separately.

Handling Procedures

- The tubes were prepared according to the PeroxyChem Tonawanda persulfate demand test protocol using the soil and groundwater provided. 10g of soil and 30g of water composites were added to each tube. Tubes were dosed at 15g of sodium persulfate / kg soil. Sodium hydroxide is added to each tube to bring the pH above 10.5.
- The experimental samples were stored at room temperature and each sample was inverted several times once per day.
- On day 2 and day 7 tubes are sacrificed, and residual persulfate is measured using a ceric sulfate and ferrous ammonium sulfate titration on a Radiometer Analytical auto-titration unit.

5.2 Results

- **Clay & Silt Soil**
  - A value of 9.4 g sodium persulfate/kg dry soil was found after 48 hours. An SOD value of 14.95g sodium persulfate/kg dry soil was found after 168 hours.
- **Sand & Gravel Soil**
  - A value of 3.92 g sodium persulfate/kg dry soil was found after 48 hours. An SOD value of 5.72 g sodium persulfate/kg dry soil was found after 168 hours.

6. BASE BUFFERING CAPACITY (BBC)

6.1 Method

The goal of a BBC test is to determine the amount of sodium hydroxide (NaOH) needed to raise the pH of a soil to pH 10.5, which is necessary for persulfate activation by alkali. The base buffering capacity test was set up using the composite soil and groundwater provided. The pH of a soil and groundwater slurry and of groundwater was measured using an in-house probe and the amount of sodium hydroxide is recorded. A separate BBC was set up for each soil type. Duplicate reactors are set up for each soil type, 30 g of site soil and 30 g of site groundwater was added to each reactor. Sodium hydroxide is added to each reactor until a pH greater than 10.5 is reached. Reactors were checked 3hr after setup, 1, 2, 5 & 7 days after setup. Additional sodium hydroxide is added at each point if the pH of the reactor drops below 10.5.

6.2 Results

The base buffering for each area was calculated using the pH titration details and finding the amount of NaOH that would have been used to reach and maintain a pH of 10.5 for 7 days.

- **Clay & Silt Calculated NaOH demand - 1.64 g 25% NaOH/kg dry soil**

- **Sand & Gravel Calculated NaOH demand - 1.09 g 25% NaOH/kg dry soil**

7 PERMANGANATE SOIL OXIDANT DEMAND TEST

7.1 Method

The site specific “natural oxidant demand” (NOD) was determined in-house by conducting a batch test with specified concentrations of potassium permanganate. The ASTM D 7262-07 method was followed for the tests. This test was run separately on the Clay & Silt and the Sand & Gravel soils.

7.2 Results

- **Clay & Silt NOD – 7.43 g $KMnO_4$/kg dry soil**
- **Sand & Gravel NOD – 4.36 g $KMnO_4$/kg dry soil**

8. SAND & GRAVEL ISCO TREATABILITY STUDY – TEST 2A

8.1 Test 2A: Methods

On August 13th, 2018, a batch test was set up as outlined below (**Table 6**). One control, two alkaline activated sodium persulfate treatments, two potassium permanganate treatments, one high dose alkaline activated sodium persulfate method blank and one high dose potassium permanganate method blank were evaluated.

Sacrificial jars (500mL borosilicate glass jars with Teflon lined lids) were set up for the control and treatments. Three jars for each control & oxidant treatment and one jar for each method blank were set up to allow for sampling of one jar at each sampling event.

Table 6: Sand & Gravel Batch test summary

Treatment	Dose (g/L)	Soil or Clean Sand (g)	SP (g)	25% NaOH (g)	Potassium Permanganate (g)	Activator	Sampling Events
Control	-	250	-	-	-	None	3, 7, 22
High AAP	50	250	18.67	25.63	-	NaOH	3, 7, 22
Low AAP	15	250	5.6	7.86	-	NaOH	3, 7, 22
High Permanganate	32.43	250	-	-	12.11	None	3, 7, 22
Low Permanganate	19.46	250	-	-	7.27	None	3, 7, 22
High AAP Method Blank	50	250	18.67	25.63	-	AAP	22
High Permanganate Method Blank	32.43	250	-	-	12.11	None	22

The control and treatment jars were set up with 250 g of site soil and the control jars had an average of 373.5 g of groundwater, giving the reactors a 1:1.5 soil to groundwater ratio. Clean sand and DI water was used to set up the method blank jars. The jars were stored at room temperature and in the dark. Each jar was inverted twice per week for the duration of the study.

Ascorbic acid was added to the cVOC sample vials to quench remaining oxidant. Some samples were diluted 2x to minimize the amount of ascorbic acid needed to quench remaining oxidant. At each sample point, the amount of ascorbic acid needed to quench the residual oxidant was added to all of the VOC sample vials.

Geochemical parameters such as ORP, pH and residual persulfate were monitored in the groundwater by PeroxyChem. The samples for cVOC analyses were submitted to TestAmerica Buffalo on ice via courier under standard chain of custody.

ERM's Quality Assurance Officer carried out a preliminary review of the data packages that were received from TestAmerica. The data received from TestAmerica were validated by an independent third party, Environmental Data Services, Inc. (EDS), located in Newport News, Virginia.

8.2 Results

Results of cVOCs, residual persulfate and pH/ORP can be found in **Tables 7-10.** Only detected cVOCs are reported in the tables. The data tabulated was provided by TestAmerica, validated by ERM and provided to PeroxyChem in validated data summaries for tabulation in this report.

Table 7: Test 2A Sand & Gravel Day 3 Groundwater Results

Analysis	Parameter	Control	50 g/L SP	15 g/L SP AAP	32.4 g/L Permanganate	19.5 g/L Permanganate	Units
VOCs	1,1,1-Trichloroethane	3.3	2.5	6.3	3.8	4.2	µg/L
	Benzene	ND (0.50)	ND (0.50)	0.92	ND (0.50)	ND (0.50)	µg/L
	cis-1,2-Dichloroethene	2.3	ND (1.0)	0.54 J	ND (1.0)	ND (1.0)	µg/L
	Naphthalene	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	1.4	µg/L
	Tetrachloroethene	0.83 J	0.87 J	1.1	ND (1.0)	ND (1.0)	µg/L
	Trichloroethene	87	3.4	30	ND (0.50)	ND (0.50)	µg/L
	2-Butanone (MEK)	ND (5.0)	ND (5.0)	15	54	52	µg/L
	Acetone	ND (5.0)	37	250	650	590	µg/L
	Total VOCs =	**93**	**43.8**	**304**	**707.8**	**647.6**	**µg/L**
Lab Parameters	pH	8.41	12.98	12.58	7.57	7.69	SI Units
	ORP	181	193	113	609	600	mV
	Initial Oxidant	NA	50.00	15.00	32.43	19.46	g/L
	Oxidant (Day 3)	NA	34.97	11.11	23.29	14.98	g/L
	% Oxidant Consumption =		**30.1%**	**25.9%**	**28.2%**	**23.0%**	

J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Table 8: Test 2A Sand & Gravel Day 7 Groundwater Results

Analysis	Parameter	Control	50 g/L SP AAP	15 g/L SP AAP	32.4 g/L Permanganate	19.5 g/L Permanganate	Units
VOCs	1,1,1-Trichloroethane	4.2	6.7	7.1	5.3	11	µg/L
	Benzene	ND (2.0)	ND (1.0)	1.3	ND (4.0)	ND (4.0)	µg/L
	cis-1,2-Dichloroethene	2.7	ND (1.0)	ND (1.0)	ND (4.0)	ND (4.0)	µg/L
	Methyl Acetate	ND (5.0)	ND (2.5)	ND (2.5)	5.4 J	8.9 J	µg/L
	Tetrachloroethene	1.2 J	2.8	1.0	ND (4.0)	ND (4.0)	µg/L
	Trichloroethene	120	8.6	17	ND (4.0)	ND (4.0)	µg/L
	2-Butanone (MEK)	ND (20)	2.1 J	14	13 J	43	µg/L
	Acetone	ND (20)	60	160	830	1,300	µg/L
	Total VOCs =	**128**	**78.1**	**200.4**	**840.7**	**1,362.9**	**µg/L**
Lab Parameters	pH	8.51	13.16	12.65	7.72	7.62	SI Units
	ORP	320	220	146	621	626	mV
	Initial Oxidant	NA	50.00	15.00	32.43	19.46	g/L
	Oxidant (Day 7)	NA	30.66	9.10	24.75	13.38	g/L
	% Oxidant Consumption		**38.7%**	**39.4%**	**23.7%**	**31.3%**	

J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Table 9: Test 2A Sand & Gravel Day 22 Groundwater Results

Analysis	Parameter	Control	50 g/L SP AAP	15 g/L SP AAP	32.4 g/L KMnO4	19.5 g/L KMnO4	50 g/L SP AAP - Method Blank	32.4 g/L KMnO4 - Method Blank	Units
VOCs	Trichloroethene	190	47 J	88 J	ND (100)	ND (100)	ND (100)	ND (100)	µg/L
	Acetone	ND (1,000)	ND (1,000)	540 J	3,500	2,600	ND (1,000)	ND (1,000)	µg/L
	Total VOCs =	**190**	**47**	**628**	**3,500**	**2,600**	**0.0**	**0.0**	**µg/L**
Lab Parameters	pH	8.52	12.84	10.76	8.23	7.84	13.15	10.08	SI Units
	ORP	460	312	296	599	611	244	573	mV
	Initial Oxidant	NA	50.00	15.00	32.43	19.46	50.00	32.43	g/L
	Oxidant (Day 22)	NA	21.42	5.46	16.38	10.89	46.13	30.65	g/L
	% Oxidant Consumption =		**57.2%**	**63.6%**	**49.5%**	**44.0%**	**7.7%**	**5.5%**	

J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Table 10: Test 2A Sand & Gravel Day 22 Soil Results

Analysis	Parameter	Control	50 g/L SP AAP	15 g/L SP AAP	32.4 g/L KMnO4	19.5 g/L KMnO4	50 g/L SP AAP - Method Blank	32.4 g/L KMnO4 - Method Blank	Units
VOCs	Trichloroethene	9,600 J	ND (11,000)	ND (13,000)	ND (12,000)	ND (11,000)	ND (12,000)	ND (13,000)	µg/Kg
	Total VOCs =	**9,600**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**µg/Kg**

J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

9. CLAY & SILT ISCO TREATABILITY STUDY – TEST 2B

9.1 Study Set up

On August 14th, 2018, a batch test was set up as outlined below (**Table 11**). One control, two alkaline activated (Portland cement) sodium persulfate (SP) treatments, two alkaline activated (hydrated lime) potassium persulfate (KP), two potassium permanganate treatments, one high dose alkaline activated sodium persulfate method blank, one high dose alkaline activated potassium persulfate method blank and one high dose potassium permanganate method blank were evaluated.

Sacrificial bags (7”x6” Teflon bags) were set up for the control and treatments. Three bags for each control & oxidant treatments, and one bag for each method blank were set up to allow for sampling of one bag at each sampling event.

Table 11: Clay & Silt Batch Test Summary

Treatment	Dose (g/kg)	Activator	Soil or Clean Sand (g)	SP or KP (g)	Portland cement or Hydrated Lime (g)	Potassium Permanganate (g)	Groundwater or DI water (mL)	Sampling Events (days)
Control	-	None	300	-	-	-	25	3, 7, 21
High SP AAP	46	Portland Cement	300	13.8	15.01	-	35	3, 7, 21
Low SP AAP	23	Portland Cement	300	6.9	7.51	-	33	3, 7, 21
High KP AAP	52	Hydrated Lime	300	15.66	4.67	-	60	3, 7, 21
Low KP AAP	26	Hydrated Lime	300	7.83	2.34	-	35	3, 7, 21
High Permanganate	23	None	300	-	-	6.77	30	3, 7, 21
Low Permanganate	4.50	None	300	-	-	1.35	27	3, 7, 21
High SP Method Blank	46	Portland Cement	300	13.8	15.01	-	70	21
High KP Method Blank	52	Hydrated Lime	300	15.66	4.67	-	70	21
High Permanganate Method Blank	23	None	300	-	-	6.77	70	21

The control and treatment bags were set up with 300g of site soil, enough groundwater was added to each bag to reach 90% moisture content. Clean sand and DI water was used to set up the method blank bags. A saturated stock solution of 1,1,1-Tricloroethane (1,1,1-TCA) was prepared (Ultra Scientific, 1,1,1-Trichloroethane Neat) and 4.6mL of stock solution was added to each control and treatment bag. No 1,1,1-TCA was added to the method blank bags. After the bags were set up, they were kneaded by hand to mix all of the components. The bags were stored at room temperature and in the dark.

Geochemical parameters such as ORP, pH and residual persulfate were monitored in the groundwater. The VOC samples were submitted to TestAmerica Buffalo on ice via courier under standard chain of custody.

9.2 Results

Results of VOCs, residual oxidant and pH/ORP can be found in **Tables 12-15.**

Table 12: Test 2B Clay & Silt Day 3 Soil Results

Analysis	**Parameter**	**Control**	**46 g/Kg SP AAP - Portland Cement**	**23 g/Kg SP AAP - Portland Cement**	**52 g/Kg KP AAP - Hydrated Lime**	**26 g/Kg KP AAP - Hydrated Lime**	**23 g/Kg Permanganate**	**4.5 g/Kg Permanganate**	**Units**
Lab	Trichloroethene	40,000	14,000 J	16,000	16,000 J	15,000 J	11,000 J	14,000 J	µg/Kg
	1,1,1-Trichloroethane	ND (16,000)	ND (17,000)	4,300 J	4,600 J	5,500 J	ND (16,000)	ND (17,000)	µg/Kg
	Total VOCs =	**40,000**	**14,000**	**20,300**	**20,600**	**20,500**	**11,000**	**14,000**	**µg/Kg**
Lab Parameters	pH	6.93	10.98	10.53	10.29	8.68	7.72	7.75	SI Units
	ORP	215	440	444	512	598	721	665	mV
	Initial Oxidant	NA	46.00	23.00	52.18	26.09	22.57	4.51	g/Kg
	Oxidant (Day 3)	NA	14.70	4.85	17.89	7.63	9.64	0.28	g/Kg
	% Oxidant Consumption =		**68.0%**	**78.9%**	**65.7%**	**70.8%**	**57.3%**	**93.8%**	

J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B = Compound was found in the blank and sample.

Table 13: Test 2B Clay & Silt Day 7 Soil Results

Analysis	**Parameter**	**Control**	**46 g/Kg SP AAP - Portland Cement**	**23 g/Kg SP AAP - Portland Cement**	**52 g/Kg KP AAP - Hydrated Lime**	**26 g/Kg KP AAP - Hydrated Lime**	**23 g/Kg Permanganate**	**4.5 g/Kg Permanganate**	**Units**
VOCs	Trichloroethene	47,000	12,000 J	17,000	14,000 J	18,000	ND (17,000)	20,000	µg/Kg
	1,1,1-Trichloroethane	5,500 J	ND (18,000)	ND (15,000)	ND (20,000)	ND (18,000)	5,400 J	ND (18,000)	µg/Kg
	Total VOCs =	**52,500**	**12,000**	**17,000**	**14,000**	**18,000**	**5,400**	**20,000**	**µg/Kg**
Lab Parameters	pH	6.65	10.67	10.48	9.65	7.70	7.88	7.86	SI Units
	ORP	283	442	501	586	617	689	602	mV
	Initial Oxidant	NA	46.00	23.00	52.18	26.09	22.57	4.51	g/Kg
	Oxidant (Day 7)	NA	14.27	3.76	17.41	6.56	9.73	0.00	g/Kg
	% Oxidant Consumption =		**69.0%**	**83.7%**	**66.6%**	**74.8%**	**56.9%**	**100%**	

J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B = Compound was found in the blank and sample.

Table 14: Test 2B Clay & Silt Day 21 Soil Results

Analysis	Parameter	Control	46 g/Kg SP AAP - Portland Cement	23 g/Kg SP AAP - Portland Cement	52 g/Kg KP AAP - Hydrated Lime	26 g/Kg KP AAP - Hydrated Lime	23 g/Kg Permanganate	4.5 g/Kg Permanganate	Units
VOCs	Trichloroethene	46,000	5,600 J	16,000 J	6,000 J	11,000 J	ND (18,000)	29,000	µg/Kg
	Total VOCs =	**46,000**	**5,600**	**16,000**	**6,000**	**11,000**	**0.0**	**29,000**	**µg/Kg**
	% Removal of VOCs =		**87.8%**	**65.2%**	**87.0%**	**76.1%**	**100%**	**37.0%**	
Lab Parameters	pH	8.39	9.57	9.85	8.92	8.30	8.53	8.46	SI Units
	ORP	559	429	440	528	515	686	488	mV
	Initial Oxidant	NA	46.00	23.00	52.18	26.09	22.57	4.51	g/Kg
	Oxidant (Day 21)	NA	6.81	0.77	15.03	1.62	8.37	0.00	g/Kg
	% Oxidant Consumption =		**85.2%**	**96.7%**	**71.2%**	**93.8%**	**62.9%**	**100%**	

J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Table 15: Test 2B Clay & Silt Day 21 Method Blank Results

Analysis	Parameter	46 g/Kg SP AAP - Portland Cement Method Blank	52 g/Kg KP AAP - Hydrated Lime Method Blank	23 g/Kg Permanganate Method Blank	Units
VOCs	Trichloroethene	ND (13,000)	ND (13,000)	ND (13,000)	µg/Kg
	Total VOCs =	**0.0**	**0.0**	**0.0**	**µg/Kg**
	% Removal of VOCs =	**100%**	**100%**	**100%**	
Lab Parameters	pH	10.89	11.46	9.44	SI Units
	ORP	394	395	553	mV
	Initial Oxidant	46.00	52.18	22.57	g/Kg
	Oxidant (Day 21)	26.31	28.57	13.61	g/Kg
	% Oxidant Consumption =	**42.8%**	**45.3%**	**39.7%**	

10. POTENTIAL EVOLUTION OF PFAS – TEST 3

10.1 Study Handling and PFAS Baseline Sampling

For the Potential Evolution of PFAS (Test 3) the same procedures were followed as outlined in the Method Blank Study (Test 1). Materials that do not contain PFAS such as such as HDPE and polypropylene were used whenever possible. Other materials were thoroughly rinsed before use. Teflon materials were not used during the method blank study. The same dedicated cleaned fume hood, handling procedures and equipment were used during set up as were used in Test 1 – Method Blank.

The previously untouched soil was sent for baseline PFAS analysis. Each were homogenized prior to being sampled. The previously untouched groundwater was homogenized by pouring it into the empty, PFAS-free certified DI H2O water container that had been received from TestAmerica Buffalo. The baseline samples were sent to TestAmerica Buffalo, on ice, via courier under standard chain of custody.

10.2 PFAS Baseline Results

The summary of results from the baseline PFAS sampling are shown below in **Table 16 –17**.

Table 16: Baseline Groundwater PFAS Results

Analysis	Parameter	Composite GW	Units
PFAS	Perfluorobutanoic acid (PFBA)	2.9	ng/L
	Perfluoropentanoic acid (PFPeA)	3.3	ng/L
	Perfluorohexanoic acid (PFHxA)	6.4	ng/L
	Perfluoroheptanoic acid (PFHpA)	12	ng/L
	Perfluorooctanoic acid (PFOA)	1,600	ng/L
	Perfluorononanoic acid (PFNA)	5.2	ng/L
	Perfluorodecanoic acid (PFDA)	2.1	ng/L
	Perfluorobutanesulfonic acid (PFBS)	1.0 J	ng/L
	Perfluorohexanesulfonic acid (PFHxS)	ND (0.72)	ng/L
	Perfluorooctanesulfonic acid (PFOS)	2.6	ng/L
	Total PFAS =	**1,636**	**ng/L**

J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Table 17: Baseline Soil PFAS Results

Analysis	Parameter	Homogenized Test 2A Sand	Homogenized Test 2B Silt	Units
PFAS	Perfluorobutanoic acid (PFBA)	0.063 J	0.047 J	µg/Kg
	Perfluoropentanoic acid (PFPeA)	ND (0.096)	ND (0.11)	µg/Kg
	Perfluorohexanoic acid (PFHxA)	ND (0.052)	ND (0.060)	µg/Kg
	Perfluoroheptanoic acid (PFHpA)	ND (0.036)	ND (0.041)	µg/Kg
	Perfluorooctanoic acid (PFOA)	2.5	0.38	µg/Kg
	Perfluorononanoic acid (PFNA)	ND (0.045)	ND (0.051)	µg/Kg
	Perfluorodecanoic acid (PFDA)	0.015 J	ND (0.031)	µg/Kg
	Perfluorobutanesulfonic acid (PFBS)	ND (0.031)	ND (0.036)	µg/Kg
	Perfluorohexanesulfonic acid (PFHxS)	ND (0.039)	ND (0.044)	µg/Kg
	Perfluorooctanesulfonic acid (PFOS)	ND (0.25)	ND (0.29)	µg/Kg
	Total PFAS =	**2.5**	**0.42**	**µg/Kg**
	Average Total PFAS =	**1.5**		**µg/Kg**

J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

10.3 Study Set Up

On August 15th, 2018, a batch test was set up as outlined below (**Table 18**). Test conditions included a control, a NaOH control system (no persulfate), an alkaline activated sodium persulfate system and a potassium permanganate system were evaluated.

The study was set up in 1L PFAS-free certified containers provided by TestAmerica. All lab work was done in a cleaned fume hood, dedicated for the method blank study. No other work was done in the fume hood for the duration of the study. The PFAS-free water provided by TestAmerica was used to prepare the 25% NaOH solution used.

Table 18: Batch test summary

Treatment	Clay & Silt Site Soil (g)	Sand & Gravel Site Soil (g)	SP (g)	25% NaOH (g)	Potassium Permanganate (g)	Sampling Events (days)
Control	500	500	-	-	-	21
Control+NaOH	500	500	-	44.65	-	21
SP AAP	500	500	44.65	32.47	-	21
Permanganate	500	500	-	-	12.11	21

The control and treatment bottles were set up with 500 g of a 50:50 mix of clay & silt site soil and sand & gravel site soil. All bottles had 750 g of site groundwater added.

The reaction jars were sampled by pouring off the groundwater into 2x250 mL PFAS free certified bottles provided by TestAmerica Buffalo. The soil samples were submitted in the same 1L bottle that the study was set up in. The PFAS samples were submitted to TestAmerica Buffalo on ice via courier under standard chain of custody.

10.4 Results

Data of PFAS results are below in **Tables 19 – 20.**

Table 19: Test 3 Day 21 Groundwater Results

Analysis	Parameter	Control A	Control B	Control C	NaOH Control A	NaOH Control B	NaOH Control C	SP AAP A	SP AAP B	SP AAP C	KMnO4 A	KMnO4 B	KMnO4 C	Units
PFAS	Perfluorobutanoic acid (PFBA)	7.1	6.9	7.4	ND (2.9)	0.31 U J	0.28 U J	15 J	8.9	12	R	R	R	ng/L
	Perfluoropentanoic acid (PFPeA)	5.1	5.1	4.8	6.9	5.3	6.8	6.5	5.6	5.9	13 J	19 J	2.5 U J	ng/L
	Perfluorohexanoic acid (PFHxA)	11	11	11	10	10	11	14	13	12	14	12	16	ng/L
	Perfluoroheptanoic acid (PFHpA)	17	16	17	18	19	20	23	21	22	23	21	24	ng/L
	Perfluorooctanoic acid (PFOA)	1,400 J	1,600 J	1,500 J	1,900 J	1,700 J	1,900 J	2,100 J	1,900 J	2,000 J	1,900	1,700	1,900	ng/L
	Perfluorononanoic acid (PFNA)	5.3	5.8	5.3	12	11	11	12	13	12	11	12	12	ng/L
	Perfluorodecanoic acid (PFDA)	1.7	1.5 J	1.3 J	6.7	6.7	6.4	6.6	7.6	7.2	8.2 J	8.7 J	10	ng/L
	Perfluoroundecanoic acid (PFUnA)	ND (0.90)	ND (0.88)	ND (0.92)	0.99 J	0.98 U J	1.0 J	ND (0.89)	1.1 J	ND (0.86)	ND (5.5)	ND (5.5)	ND (5.5)	ng/L
	Perfluorododecanoic acid (PFDoA)	ND (0.45)	ND (0.44)	ND (0.46)	ND (0.46)	0.50 J	ND (0.45)	ND (0.44)	ND (0.45)	ND (0.43)	ND (2.8)	ND (2.8)	ND (2.8)	ng/L
	Perfluorotetradecanoic acid (PFTeA)	ND (0.24)	ND (0.23)	ND (0.24)	ND (0.24)	ND (0.26)	ND (0.24)	ND (0.23)	ND (0.24)	ND (0.23)	ND (1.5)	1.8 J	ND (1.5)	ng/L
	Perfluorobutanesulfonic acid (PFBS)	0.90 J	0.96 J	0.87 J	1.1 J	1.0 J	1.2 J	1.2 J	1.2 J	1.3 J	1.4 J	1.3 J	1.7 J	ng/L
	Perfluoroheptanesulfonic acid (PFHpS)	ND (0.16)	ND (0.15)	ND (0.16)	ND (0.16)	ND (0.17)	ND (0.15)	0.16 J	ND (0.15)	0.19 J	ND (0.95)	ND (0.95)	ND (0.95)	ng/L
	Perfluorooctanesulfonic acid (PFOS)	3.6	3.4	3.4	16	17	16	17	17	18	18	17	20	ng/L
	Perfluorooctane Sulfonamide (FOSA)	ND (0.29)	ND (0.28)	ND (0.29)	0.63 J	0.64 J	0.53 J	0.95 J	1.0 J	1.0 J	ND (1.8)	ND (1.8)	ND (1.8)	ng/L
	Total PFAS =	**1,452**	**1,651**	**1,551**	**1,972**	**1,772**	**1,975**	**2,196**	**1,989**	**2,092**	**1,989**	**1,793**	**1,984**	**ng/L**

U J = The analyte was analyzed for but was not detected. The reported quantitation limits are approximate and may be inaccurate or imprecise.

J = The analyte is an estimated quantity. The associated numerical value is an approximate quantitation of the analyte in the sample.

R = The data is unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the samples.

Table 20: Test 3 Day 21 Soil Results

Analysis	Parameter	Control A	Control B	Control C	NaOH Control A	NaOH Control B	NaOH Control C	SP AAP A	SP AAP B	SP AAP C	KMnO4 A	KMnO4 B	KMnO4 C	Units
PFAS	Perfluorooctanoic acid (PFOA)	4.3	4.5	3.9	3.4	3.9	2.9	3.0	2.4	2.8	2.9	2.3	2.1	µg/Kg
	Total PFAS =	**4.3**	**4.5**	**3.9**	**3.4**	**3.9**	**2.9**	**3.0**	**2.4**	**2.8**	**2.9**	**2.3**	**2.1**	**µg/Kg**
Average Total PFAS =		**4.2**			**3.4**			**2.7**			**2.4**			**µg/Kg**

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