SOIL VAPOR EXTRACTION SYSTEM
DESIGN

109 MARBLEDALE ROAD, TUCKAHOE, NY
BCP SITE NO. C360143

December 2018

Project Number 223060P

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ATTACHMENTS

1.0 BACKGROUND

The 109 Marbledale Road Site in Tuckahoe, Westchester County, New York is enrolled in the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) as BCP Site No. C360143. Volunteer Bilwin Development Affiliates, LLC is remediating the Former Marble Quarry Landfill (Site) and redeveloping the Site into a multi-story hotel and restaurant with associated parking areas. The Site has a long history of commercial and industrial operations including a marble quarry, a municipal landfill, auto repair and car storage, and surface parking.

1.1 Purpose

A July 2016 Remedial Action Work Plan (RAWP) for the Site was approved by the NYSDEC Division of Environmental Remediation, and accepted as the approved remedy as indicated in the July 2016 Decision Document for the Site.

A soil vapor extraction (SVE) system is a component of the approved remedy, to remove volatile organic compounds (VOCs) and Freons from the subsurface. The remedial plan also includes:

1. Soil excavation and removal from shallow contaminant source areas;
2. Subsurface depressurization systems (SSDSs), for the protection of the proposed hotel and restaurant buildings from intrusion of contaminated soil vapors that are present in the subsurface;
3. A low permeability capping system in areas of the Site not covered by pavement, concrete, or buildings; and
4. Groundwater monitoring.

This report provides the basis of design for the proposed SVE system for the Site.

1.2 Site Documents and Data

Site-specific data and documents that were reviewed to develop the basis of the SVE design included:

- The March 1, 2016 Remedial Investigation Report for the Site;
- The February 21, 2017 Draft Supplemental Environmental Investigation Report for the Site;
- Pre- and Post-Rapid Impact Compaction (RIC) and micropile installation vapor sampling results from May 2017, June 2017, and October 2017;
- Vapor Monitoring Results from Daily SVE Events in 2017; and
- SVE Pilot Testing Data from November 2016.

1.3 Contaminants of Concern

VOCs and Freons that have been detected in soil vapor samples at the site are summarized in the tables included in **Attachment 1**. Based on the magnitudes of concentrations detected, contaminant toxicity, and the contaminant distribution relative to the proposed building locations, the primary contaminants of concern for potential vapor intrusion into the proposed buildings were determined to be:

- Freons;
- Chlorinated solvents (primarily tetrachloroethylene [PCE], trichloroethylene [TCE], and vinyl chloride); and
- Benzene.

The soil vapor contaminant distribution for these contaminants based on the most recent sampling result from each vapor point is shown on Drawing SV 1 in **Attachment 2**.

1.4 November 2016 Pilot Test Results

In November 2016, four SVE pilot testing wells (SVE-1, SVE-2, SVE-3, and SVE-4) were installed at the site. Around each pilot testing well, three 1-inch soil vapor monitoring points were installed at distances of 8, 15, and 25 feet from the SVE well to allow for monitoring of induced vacuum and vapor concentrations during the pilot tests. Pilot tests were conducted as follows:

- Well SVE-1 was tested on November 18, 2016;
- Well SVE-2 was tested on November 21, 2016; and
- Wells SVE-3 and SVE-4 were each tested (individually) on November 22, 2016.

November 2016 SVE pilot testing data is included in **Attachment 3**. The results were analyzed to estimate radii of influence from each pilot test. The radii of influence estimated based on the pilot testing results were:

Test Well	Estimated Radius of Influence From Pilot Test (feet)
SVE-1	19.0
SVE-2	50.9
SVE-3	24.1
SVE-4	26.8

1.5 Vapor Monitoring Results from 2017 Daily SVE Events

In August through September 2017, three vapor monitoring wells (VW-7, VW-12, and VP-19) were used as temporary vapor extraction wells to control soil vapors during site compaction and pile installation construction activities. The nearest existing vapor monitoring wells were used to monitor for induced vacuum influence in the area. Tests were conducted as follows:

- Well VW-7 was tested on August 21, 2017;
- Wells VW-7 and VW-12 were tested on August 22 and August 23, 2017; and
- Wells VW-7, VW-12, and VP-19 were tested on September 1 and September 6, 1017.

The testing data sheets and resulting radius of influence estimations are included in **Attachment 4**. The observed radius of influence in the vicinity of test well VW-12 ranged from 22.2 to 68.4 feet based on the testing results (at extraction flow rates of 34 to 43 scfm). Together with the SVE-4 pilot testing results, this suggests an average radius of influence in the restaurant area of approximately 30 feet.

2.0 SYSTEM COMPONENTS

The components of the SVE systems include SVE wells, subsurface conveyance piping, pre-blower appurtenances, SVE blowers, vapor phase carbon treatment systems, and performance monitoring wells.

2.1 SVE Wells

Proposed SVE wells will be constructed according to the detail included on Sheet SV 5. The attached SVE Wells Design Basis (**Attachment 5**) provides additional detail on the basis for the proposed SVE well locations and construction.

The proposed SVE well locations are shown on the plans included in **Attachment 2**. The proposed SVE well locations were selected based on the approximate estimated radii of influence from the SVE pilot testing (**Section 1.4**) and Daily SVE Events (**Section 1.5**), to provide vacuum influence across the majority of the accessible areas of the highest soil vapor concentrations for chlorinated solvents, freons, and benzene.

Boring logs for nearby wells were reviewed to identify depths that should be targeted for SVE treatment due to higher contaminant concentrations within the unsaturated soil profile as described in **Attachment 5**.

Excavation of contaminated soils from the restaurant footprint is expected to reduce the magnitude and extent of soil vapor concentrations in the vicinity of the restaurant from the conditions shown on Sheet SV1. As a result, three originally-proposed SVE wells in the restaurant area are no longer proposed. Soil vapor sampling and SVE system startup data will be used to verify that the current SVE well locations provide adequate coverage to control off-site migration of VOCs and Freons in the restaurant area. If additional SVE wells are necessary to control off-site migration and/or human health, the proposed additional well locations will be submitted for NYSDEC approval.

2.2 Subsurface Conveyance Piping

Proposed piping from the individual SVE wells to the SVE system will be Schedule 40 PVC. Plans and details for installation of the proposed subsurface SVE piping are included on the plan sheets in **Attachment 2**.

2.3 Pre-Blower Appurtenances

The conveyance piping from each SVE well will be 4-inch Schedule 40 PVC. A 6-inch Schedule 40 PVC manifold will be used to connect the combined conveyance piping to a moisture knockout tank equipped with a normally closed condensate drain ball valves. The moisture knockout tank will be equipped with a vacuum relief valve (to prevent collapse) and a high level switch (to shutdown the

SVE system in the event that the tank is full of water, protecting the SVE blower from moisture damage). The system will be equipped with an Autodialer to automatically notify the operator in the event of an SVE system shutdown.

Each conveyance pipe and manifold will be equipped with vacuum gauges, pitot tubes for flow monitoring, and sample ports for vapor monitoring. Manifold piping will also be equipped with temperature gauges. Valves will be provided for each individual SVE line to regulate the flow from each individual SVE well. The flow from each well will be adjusted using the valves as needed to achieve the targeted induced vacuum level in the nearest vapor monitoring well.

The blower will also be protected by an inline polyester filter to remove particulates.

2.4 SVE Blower

The basis of design calculations for the proposed SVE blower are included in **Attachment 6**. The proposed blower will be capable of providing up to 340 cfm of air flow at 72 inches of water ("H_2O) applied vacuum. This includes 100 cfm allocated for the restaurant SSDS and 240 cfm for the SVE wells, which should provide sufficient flow for operating four to five SVE wells at a given time.

The SVE wells will be operated on a rotating basis to provide "pulsed" operation as described in the basis of design in **Attachment 6**. Initial operations are planned to include the following:

Restaurant Area

1. Continuous operation of well SVE-201 to control off-site vapor migration.
2. If no induced vacuum is observed in well VW-201 from the operation of SVE-201, well VW-201 will be connected to the SVE system and operated continuously (as "SVE-204") for the control of off-site vapor migration.
3. One other well (SVE-202 or SVE-203) will also be operated, alternating on a monthly basis.
4. When contaminant of concern concentrations in well VW-204 have declined to levels complying with the NYS DOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, operation of wells SVE-202 and SVE-203 will be discontinued, allowing additional wells in the Hotel Area to be operated.

Hotel Area

1. Continuous operation of well SVE-107 to control off-site vapor migration.

2. One or two other wells from among SVE-101, SVE-102, SVE-103, SVE-104, SVE-105, SVE-106, SVE-108, SVE-109, and SVE-110 will also be operated, cycling to a new well on a monthly basis.
3. If the blower performance and demonstrated vacuum influence allows, additional wells within the hotel area will be operated as well.

The blower will be equipped with a variable frequency drive (VFD) for energy efficiency under a variety of operational conditions. With a VFD, the motor output (and power consumption) can be turned down when the site remediation progresses to the point where the high initial vacuum and air flow conditions are no longer necessary for protection of human health and the environment.

The blower, motor, VFD, moisture knockout, and inline filter will be skid-mounted construction, allowing the system to be installed, tested, and operated within a temporary on-site trailer until the restaurant is constructed and the blower can be moved into the basement.

2.5 Vapor Phase Carbon Treatment System

A vapor phase treatment system is required to remove VOCs and Freons from the air extracted from beneath the slab to comply with the discharge limits included in 6 NYCRR Part 212 and the DAR-1 Guidelines for the Evaluation and Control of Ambient Air Contaminants Under Part 212. The goal of the treatment system is to comply with the applicable Short-term Guideline Concentrations (SGCs) at the location of the system exhaust to the ambient air, and to comply with the applicable Annual Guideline Concentrations (AGCs) at the property lines. In addition, the system shall be operated and maintained with a goal of minimizing the discharge of ozone depleting substances (ODS) and greenhouse gasses (GHG) to the extent practicable in accordance with the Federal Clean Air Act prohibition on intentional venting of ODS and DER-31 Green Remediation guidance.

Vapor monitoring wells in the vicinity of the proposed hotel and restaurant have been sampled periodically during the implementation of the Remedial Action Work Plan. The most recent round of soil vapor sampling analytical results from each well is included on Sheet SV 1 in **Attachment 2**.

Soil vapor contaminants that were detected during any of the SVE pilot tests were compiled into the table included in **Attachment 7**. The average contaminant concentrations from soil vapor monitoring points located throughout the proposed SVE area of influence were calculated, and contaminant removal efficiencies that were measured during the SVE pilot tests were applied to estimate the post-treatment contaminant concentrations for the full scale SVE system. Based on the estimated average contaminant concentrations and contaminant removal efficiencies, the treated air from the SVE system is expected to comply with the applicable SGCs and AGCs and remove ODS and GHG from the system exhaust.

VOC and Freons concentrations and flow rates from the SVE pilot tests were provided to Carbonair and Carbtrol for estimates of the anticipated initial carbon usage rates in pounds per day (lb/day). Estimated initial carbon usage rates range from 6.6 to 14.0 lb/day. Two GPC-13R carbon drums in series are proposed for treatment of the extracted air, with a carbon capacity of 1,500 pounds. Based on the estimated initial carbon usage rates, carbon changeouts may initially be required every 107 to 227 days.

Exhaust piping from the SVE vapor phase carbon treatment system will discharge not less than 25 feet from property lines, and from any door, window or other opening of a building, including heating, ventilating, and air intake points, and from any receptors including outdoor seating areas. The vent will be fitted with a rain cap.

2.6 SVE Performance Monitoring Points

Proposed SVE system performance monitoring points are shown on the plans included in **Attachment 2**. The monitoring point locations were planned based on the following criteria:

- Locating points near the perimeter of the anticipated radius of influence for each SVE well;
- Locating points in areas where overlapping influence from two SVE wells is anticipated; and
- Locating points within areas where higher concentrations of benzene, freons, and chlorinated solvents have been detected in soil gas samples to measure whether the SVE system has sufficient vacuum influence in these areas.

The proposed SVE performance monitoring points are Schedule 40 PVC well screens, 1-inch diameter, screened starting at least 7 feet below grade, with a 10-foot screened interval (see detail on Sheet SV 5).

2.7 Autodialer System

The SVE will be provided with an Autodialer to notify the system operator in the event of an SVE system shutdown.

3.0 INSTALLATION AND STARTUP PROCEDURES

The SVE system will be installed as shown on the plans included in **Attachment 2**. For initial startup and operation, the SVE equipment will be staged in an enclosed trailer until the basement of the restaurant is constructed. Regular review of the construction by the SVE design engineer's on-site representative (Engineer) is required. Construction of all SVE wells shall be observed by the Engineer during construction to verify that the wells are installed according to the approved design plans.

Electrical and interior plumbing associated with the systems shall be installed by licensed tradesman as required by any applicable building codes and project permits.

Startup testing of the SVE system will be performed after construction and installation is complete. The blower will be used to extract air from each individual SVE well to determine the flow rate and vacuum needed to achieve the design radius of influence. The following data will be measured at startup:

- Prior to startup, readings will be collected from each nearby SVE performance monitoring point, including PID, FID, and 4-Gas Meter;
- After startup, readings will be collected from each SVE performance monitoring point, including PID, FID, and 4-Gas Meter, and Induced Vacuum;
- Induced vacuum readings in the SVE performance monitoring points will be checked, with a goal of 0.1 "H_2O induced vacuum, and the blower flow rate/vacuum will be adjusted if necessary to achieve the target induced vacuum level;
- After setting the blower operating conditions, the air flow rates, temperatures, applied vacuums, and system pressures will be recorded, and PID and FID readings shall be collected at the carbon influent, mid, and effluent sampling locations, as well as from each of the individual SVE wells in operation; and
- After stabilization of PID and FID readings from the treatment system, an initial round of air sampling will be collected to confirm that the off-gas treatment is performing as designed; Summa canister air samples will be collected from the carbon influent, midpoint, and effluent sampling locations, and submitted to a laboratory to be analyzed for volatile organic compounds by EPA Method TO-15 including Freons.

If 0.1 "H_2O induced vacuum is not measured at the nearest SVE performance monitoring point, but a measurable vacuum is observed, the Engineer may also use other performance data including PID, FID, and 4-Gas Meter readings and other monitoring points in the area to evaluate whether adequate influence has been achieved.

A system startup letter report will be prepared, summarizing the above data, and providing photographs of the constructed systems.

4.0 OPERATION, MAINTENANCE, AND MONITORING

For the first three months following startup, routine operation, maintenance, and monitoring of the SVE system will initially include the following:

- On a twice monthly basis, readings will be collected from each SVE performance monitoring point, including PID, FID, and 4-Gas Meter, and Induced Vacuum;
- Twice monthly rotation of operational SVE wells, and if needed, adjustments to the blower flow rate/vacuum to optimize system performance (see below);
- Twice monthly recording of the air flow rates, temperatures, applied vacuums, and system pressures will be recorded, and PID and FID readings shall be collected at the carbon influent, midpoint, and effluent sampling locations;
- Twice monthly, the water level in the moisture knockout drum will be observed and drained off if necessary;
- Once every three months, Summa canister air samples will be collected from the carbon influent, midpoint, and effluent sampling locations, and submitted to a laboratory to be analyzed for volatile organic compounds by EPA Method TO-15 including Freons;
- Once every three months, the condition of the inline particulate filter will be checked visually for clogging.
- When field readings and/or laboratory analytical results indicate breakthrough of VOCs and/or Freons from the first carbon unit in series is starting to occur, the first carbon unit shall be taken off-line, the second carbon unit shall be reconnected (using camlock hose connections) to the first position in series, and a new carbon unit shall be connected by camlock hose connections to the second position in series;
- Carbon from spent carbon units shall be removed for proper disposal or regeneration by a licensed hauler and disposal or regeneration facility according to applicable State and Federal rules; and
- Any maintenance activities recommended by the blower manufacturer at the frequency recommended by the manufacturer.

After the three months of operation, the frequency of site visits may be adjusted if warranted based on the site conditions. The frequency of monitoring and maintenance shall be sufficient to maintain the vapor phase carbon treatment system before breakthrough to the effluent occurs. The revised operation, maintenance, and monitoring plan shall be submitted by the Engineer to NYSDEC for review and approval.

4.1 SVE Well Operations

The SVE wells will be operated on a rotating basis to provide “pulsed” operation as described in the basis of design in **Attachment 6**. The SVE system is designed to be capable of extracting from four to five SVE wells based on the pilot testing results. Startup conditions for the full scale SVE system will be monitored to evaluate whether additional wells can be brought on-line. The basis of design describes anticipated changes that are expected to occur as a result of the site

development (increased impervious area leading to lower air flow rates than the pilot test achieving a comparable radius of influence). The proposed approach to startup monitoring is described below.

Restaurant Area

1. Well SVE-201 will initially be operated continuously to control off-site vapor migration. If induced vacuum of at least 0.1 "H_2O is observed in well VW-201, this will be considered sufficient influence to control off-site vapor migration in this area.
2. If no induced vacuum is observed in well VW-201 from the operation of SVE-201, well VW-201 will be connected to the SVE system and also operated continuously (as "SVE-204") for the control of off-site vapor migration.
3. When contaminant of concern concentrations in wells VW-201 and VW-202 have declined to levels complying with the NYS DOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, operation of wells SVE-201 and SVE-204 will be discontinued.
4. One other well (SVE-202 or SVE-203) will also be operated, alternating on a monthly basis, and using well VW-204 to monitor for vacuum influence, with a target of inducing a vacuum of at least 0.1 "H_2O in well VW-204.
5. When contaminant of concern concentrations in well VW-204 have declined to levels complying with the NYS DOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, operation of wells SVE-202 and SVE-203 will be discontinued, allowing additional wells in the Hotel Area to be operated.

Hotel Area

1. Well SVE-107 will initially be operated continuously to control off-site vapor migration. The flow rate from SVE-107 will be adjusted with a goal of inducing a vacuum of at least 0.1 "H_2O in well VW-106; this will be considered sufficient influence to control off-site vapor migration in this area.
2. One or two other wells from among SVE-101, SVE-102, SVE-103, SVE-104, SVE-105, SVE-106, SVE-108, SVE-109, and SVE-110 will initially be operated, cycling to a new well on a monthly basis. The nearest vapor monitoring well will be used to monitor for vacuum influence, and the flow rate from each SVE well will be adjusted to the minimum at which an induced vacuum of 0.1 "H_2O is measured in the nearest vapor monitoring well.
3. When contaminant of concern concentrations in vapor monitoring wells in the hotel area have declined to levels complying with the NYS DOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, operation of the corresponding SVE wells will be discontinued.

4. If the blower performance and demonstrated vacuum influence allows, additional wells within the hotel area will be operated as well.

Soil vapor sampling and SVE system sampling will be used to evaluate the progress of remediation. Goals of the SVE system operations include controlling the off-site migration of VOCs and Freons, as well as reducing the on-site soil vapor concentrations to reduce the threat to potential receptors. When the rate of VOC removal from an individual SVE well or the entire SVE system reaches a point of diminishing returns, an asymptotic decline in VOC removal rate will be observed (when the rate of VOC removal from the subsurface becomes diffusion limited). When VOC removal rates from the SVE system or a particular well decline asymptotically for a period of at least six (6) months, SVE operations in that location will be discontinued at least temporarily. If post-shutdown VOC and Freon concentrations do not rebound by more than 33% or show indications of off-site migration, the shutdown will be permanent.

The blower will be equipped with a variable frequency drive (VFD) for energy efficiency under a variety of operational conditions. With a VFD, the motor output (and power consumption) can be turned down when the site remediation progresses to the point where the high initial vacuum and air flow conditions are no longer necessary for protection of human health and the environment.

5.0 REFERENCES

USACE Soil Vapor Extraction and Bioventing EM_1110-1-4001

A Practical Approach to the Design, Operation, and Monitoring of In Situ Soil Venting Systems, P.C. Johnson, et. Al., 1990

DAR-1 Guidelines for the Evaluation and Control of Ambient Air Contaminants Under Part 212, NYSDEC, August 10, 2016

How to Evaluate Cleanup Technologies for Underground Storage Tank Sites, Chapter II Soil Vapor Extraction, USEPA, October 2017

Attachment 1

MAY 2015
VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
REMEDIAL INVESTIGATION
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE # C360143

Volatile Organic Compounds	Sample Designation and Result																											
	VP-1				VP-2				VP-3				VP-4				VP-5				Blind Dup of VP-5 (QA/QC) VP-105				VP-6			
	5/18/2015				5/18/2015				5/18/2015				5/27/2015				5/18/2015				5/18/2015				5/18/2015			
	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL
Result in ppbv																												
1,1,1,2-Tetrachloroethane	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146
1,1,1-Trichloroethane	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183
1,1,2,2-Tetrachloroethane	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146
1,1,2-Trichloroethane	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183
1,1-Dichloroethane	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247
1,1-Dichloroethene	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252
1,2,4-Trichlorobenzene	< 0.135	0.135	U	0.135	< 0.135	0.135	U	0.135	< 0.135	0.135	U	0.135	< 0.135	0.135	U	0.135	< 0.135	0.135	U	0.135	< 0.135	0.135	U	0.135	< 0.135	0.135	U	0.135
1,2,4-Trimethylbenzene	0.966	0.204		0.204	0.87	0.204		0.204	0.941	0.204		0.204	1.36	0.204		0.204	1.06	0.204		0.204	1.02	0.204		0.204	0.901	0.204		0.204
1,2-Dibromoethane(EDB)	< 0.130	0.130	U	0.130	< 0.130	0.130	U	0.130	< 0.130	0.130	U	0.130	< 0.130	0.130	U	0.130	< 0.130	0.130	U	0.130	< 0.130	0.130	U	0.130	< 0.130	0.130	U	0.130
1,2-Dichlorobenzene	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166
1,2-Dichloroethane	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247
1,2-dichloropropane	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217
1,2-Dichlorotetrafluoroethane	4.89	0.143		0.143	15.5	0.143		0.143	2,160	57.3		57.3	19.2	4.29		4.29	1,250	28.6		28.6	171	1.43		1.43	20,300	137		137
1,3,5-Trimethylbenzene	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	0.423	0.204		0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204
1,3-Butadiene	< 0.452	0.452	U	0.452	< 0.452	0.452	U	0.452	< 0.452	0.452	U	0.452	< 0.452	0.452	U	0.452	< 0.452	0.452	U	0.452	< 0.452	0.452	U	0.452	< 0.452	0.452	U	0.452
1,3-Dichlorobenzene	0.704	0.166		0.166	0.724	0.166		0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	0.772	0.166		0.166	0.783	0.166		0.166	0.612	0.166		0.166
1,4-Dichlorobenzene	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166
1,4-Dioxane	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278
2-Hexanone(MBK)	< 0.244	0.244	U	0.244	< 0.244	0.244	U	0.244	< 0.244	0.244	U	0.244	< 0.244	0.244	U	0.244	< 0.244	0.244	U	0.244	< 0.244	0.244	U	0.244	< 0.244	0.244	U	0.244
4-Ethyltoluene	< 0.204	0.204	U	0.204	0.305	0.204		0.204	< 0.204	0.204	U	0.204	0.327	0.204		0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	0.421	0.204		0.204
4-Isopropyltoluene	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	0.218	0.182		0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182
4-Methyl-2-pentanone(MIBK)	< 0.244	0.244	U	0.244	< 0.244	0.244	U	0.244	< 0.244	0.244	U	0.244	< 0.244	0.244	U	0.244	0.477	0.244		0.244	0.403	0.244		0.244	< 0.244	0.244	U	0.244
Acetone	< 0.421	0.421	U	0.421	< 0.421	0.421	U	0.421	< 0.421	0.421	U	0.421	< 0.421	0.421	U	0.421	< 0.421	0.421	U	0.421	< 0.421	0.421	U	0.421	108	4.21		4.21
Acrylonitrile	< 0.461	0.461	U	0.461	< 0.461	0.461	U	0.461	< 0.461	0.461	U	0.461	< 0.461	0.461	U	0.461	< 0.461	0.461	U	0.461	< 0.461	0.461	U	0.461	< 0.461	0.461	U	0.461
Benzene	0.898	0.313		0.313	3.14	0.313		0.313	73.8	12.5		12.5	1.17	0.313		0.313	1.18	0.313		0.313	0.564	0.313		0.313	15.7	0.313		0.313
Benzyl chloride	< 0.193	0.193	U	0.193	< 0.193	0.193	U	0.193	< 0.193	0.193	U	0.193	< 0.193	0.193	U	0.193	< 0.193	0.193	U	0.193	< 0.193	0.193	U	0.193	< 0.193	0.193	U	0.193
Bromodichloromethane	< 0.149	0.149	U	0.149	< 0.149	0.149	U	0.149	< 0.149	0.149	U	0.149	< 0.149	0.149	U	0.149	< 0.149	0.149	U	0.149	< 0.149	0.149	U	0.149	< 0.149	0.149	U	0.149
Bromoform	< 0.097	0.097	U	0.097	< 0.097	0.097	U	0.097	< 0.097	0.097	U	0.097	< 0.097	0.097	U	0.097	< 0.097	0.097	U	0.097	< 0.097	0.097	U	0.097	< 0.097	0.097	U	0.097
Bromomethane	< 0.258	0.258	U	0.258	< 0.258	0.258	U	0.258	< 0.258	0.258	U	0.258	< 0.258	0.258	U	0.258	< 0.258	0.258	U	0.258	< 0.258	0.258	U	0.258	< 0.258	0.258	U	0.258
Carbon Disulfide	0.566	0.321		0.321	0.739	0.321		0.321	0.582	0.321		0.321	2.4	0.321		0.321	< 0.321	0.321	U	0.321	< 0.321	0.321	U	0.321	3.38	0.321		0.321
Carbon Tetrachloride	< 0.040	0.040	U	0.040	< 0.040	0.040	U	0.040	< 0.040	0.040	U	0.040	0.068	0.040		0.040	0.072	0.040		0.040	0.085	0.040		0.040	< 0.040	0.040	U	0.040
Chlorobenzene	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217
Chloroethane	< 0.379	0.379	U	0.379	< 0.379	0.379	U	0.379	< 0.379	0.379	U	0.379	< 0.379	0.379	U	0.379	< 0.379	0.379	U	0.379	< 0.379	0.379	U	0.379	< 0.379	0.379	U	0.379
Chloroform	< 0.205	0.205	U	0.205	< 0.205	0.205	U	0.205	< 0.205	0.205	U	0.205	0.435	0.205		0.205	< 0.205	0.205	U	0.205	< 0.205	0.205	U	0.205	30.9	0.205		0.205
Chloromethane	< 0.485	0.485	U	0.485	< 0.485	0.485	U	0.485	< 0.485	0.485	U	0.485	< 0.485	0.485	U	0.485	< 0.485	0.485	U	0.485	< 0.485	0.485	U	0.485	< 0.485	0.485	U	0.485
Cis-1,2-Dichloroethene	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	2.51	0.252		0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	2.26	0.252		0.252
cis-1,3-Dichloropropene	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221
Cyclohexane	112	2.91		2.91	16.8	0.291		0.291	385	11.6		11.6	18.4	0.291		0.291	7.1	0.291		0.291	2.85	0.291		0.291	18	0.291		0.291
Dibromochloromethane	< 0.118	0.118	U	0.118	< 0.118	0.118	U	0.118	< 0.118	0.118	U	0.118	< 0.118	0.118	U	0.118	< 0.118	0.118	U	0.118	< 0.118	0.118	U	0.118	< 0.118	0.118	U	0.118
Dichlorodifluoromethane	9.01	0.202		0.202	57.6	1.01		1.01	2,650	80.9		80.9	36.1	6.07		6.07	1,320	40.5		40.5	171	2.02		2.02	21,600	194		194
Ethanol	4.05	0.531		0.531	9.54	0.531	S	0.531	12.8	0.531	S	0.531	42.3	15.9		15.9	5.26	0.531	S	0.531	4.92	0.531		0.531	1,140	127		127
Ethyl acetate	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278
Ethylbenzene	< 0.230	0.230	U	0.230	0.344	0.230		0.230	0.37	0.230		0.230	17.6	0.230		0.230	0.245	0.230		0.230	< 0.230	0.230	U	0.230	2.57	0.230		0.230
Heptane	3	0.244		0.244	2.92	0.244		0.244	268	9.77		9.77	2.38	0.244		0.244	< 0.244	0.244	U	0.244	< 0.244	0.244	U	0.244	39.9	0.244		0.244
Hexachlorobutadiene	< 0.094	0.094	U	0.094	< 0.094	0.094	U	0.094	< 0.094	0.094	U	0.094	< 0.094	0.094	U	0.094	< 0.094	0.094	U	0.094	< 0.094	0.094	U	0.094	< 0.094	0.094	U	0.094
Hexane	145	2.84		2.84	16.8	0.284	S	0.284	1,480	11.4	S	11.4	8.34	0.284		0.284	46	2.84	S	2.84	18.7	0.284		0.284	83.1	2.84		2.84
Isopropylalcohol	556	4.07	E	4.07	225	6.11	S	6.11	415	16.3	S	16.3	27.7	0.407		0.407	444	4.07	SE	4.07	433	0.407	E	0.407	319	4.07		4.07
Isopropylbenzene	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	1.18	0.204		0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204

Volatile Organic Compounds	Sample Designation and Result																											
	VP-1				VP-2				VP-3				VP-4				VP-5				Blind Dup of VP-5 (QA/QC) VP-105				VP-6			
	5/18/2015				5/18/2015				5/18/2015				5/27/2015				5/18/2015				5/18/2015				5/18/2015			
	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL
m,p-Xylene	0.808	0.230		0.230	1.07	0.230		0.230	1.03	0.230		0.230	89.9	6.91		6.91	0.846	0.230		0.230	0.811	0.230		0.230	1.71	0.230		0.230
Methyl Ethyl Ketone	< 0.339	0.339	U	0.339	2.7	0.339		0.339	34.2	0.339		0.339	< 0.339	0.339	U	0.339	< 0.339	0.339	U	0.339	< 0.339	0.339	U	0.339	6.42	0.339		0.339
Methyl tert-butyl ether (MTBE)	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278
Methylene Chloride	1.01	0.288		0.288	2.16	0.288	S	0.288	< 0.288	0.288	U	0.288	1.1	0.288		0.288	< 0.288	0.288	U	0.288	< 0.288	0.288	U	0.288	7.02	0.288		0.288
n-Butylbenzene	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	0.211	0.182		0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182
o-Xylene	0.319	0.230		0.230	0.567	0.230		0.230	0.502	0.230		0.230	54.9	6.91		6.91	0.286	0.230		0.230	0.29	0.230		0.230	0.714	0.230		0.230
Propylene	< 0.581	0.581	U	0.581	< 0.581	0.581	U	0.581	< 23.3	23.3	U	23.3	< 0.581	0.581	U	0.581	< 0.581	0.581	U	0.581	< 0.581	0.581	U	0.581	< 0.581	0.581	U	0.581
sec-Butylbenzene	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182
Styrene	< 0.235	0.235	U	0.235	< 0.235	0.235	U	0.235	< 0.235	0.235	U	0.235	1	0.235		0.235	< 0.235	0.235	U	0.235	< 0.235	0.235	U	0.235	< 0.235	0.235	U	0.235
Tetrachloroethene	0.075	0.037		0.037	0.144	0.037		0.037	0.34	0.037		0.037	0.212	0.037		0.037	0.213	0.037		0.037	0.217	0.037		0.037	1.25	0.037		0.037
Tetrahydrofuran	0.35	0.339		0.339	0.956	0.339		0.339	< 0.339	0.339	U	0.339	2.42	0.339		0.339	< 0.339	0.339	U	0.339	< 0.339	0.339	U	0.339	5.02	0.339		0.339
Toluene	3.56	0.266		0.266	5.31	0.266		0.266	4.96	0.266		0.266	6.58	0.266		0.266	1.6	0.266		0.266	1.31	0.266		0.266	315	2.66		2.66
Trans-1,2-Dichloroethene	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	2.94	0.252		0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252
trans-1,3-Dichloropropene	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221
Trichloroethene	0.095	0.047		0.047	0.191	0.047		0.047	0.88	0.047		0.047	0.1	0.047		0.047	0.21	0.047		0.047	0.194	0.047		0.047	1.25	0.047		0.047
Trichlorofluoromethane	< 0.178	0.178	U	0.178	< 0.178	0.178	U	0.178	0.232	0.178		0.178	< 0.178	0.178	U	0.178	0.291	0.178		0.178	0.279	0.178		0.178	1,100	42.7		42.7
Trichlorotrifluoroethane	< 0.131	0.131	U	0.131	< 0.131	0.131	U	0.131	0.18	0.131		0.131	< 0.131	0.131	U	0.131	0.142	0.131		0.131	< 0.131	0.131	U	0.131	0.928	0.131		0.131
Vinyl Chloride	0.131	0.098		0.098	0.549	0.098		0.098	36.7	0.098		0.098	< 0.098	0.098	U	0.098	8.16	0.098		0.098	3.06	0.098		0.098	5.49	0.098		0.098
Result in ug/m^3																												
1,1,1,2-Tetrachloroethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,1,1-Trichloroethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,1,2,2-Tetrachloroethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,1,2-Trichloroethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,1-Dichloroethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,1-Dichloroethene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,2,4-Trichlorobenzene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,2,4-Trimethylbenzene	4.75	1.00		1.00	4.27	1.00		1.00	4.62	1.00		1.00	6.68	1.00		1.00	5.21	1.00		1.00	5.01	1.00		1.00	4.43	1.00		1.00
1,2-Dibromoethane(EDB)	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,2-Dichlorobenzene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,2-Dichloroethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,2-dichloropropane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,2-Dichlorotetrafluoroethane	34.2	1.00		1.00	108	1.00		1.00	15,100	400		400	134	30.0		30.0	8,730	200		200	1,190	9.99		9.99	142,000	957		957
1,3,5-Trimethylbenzene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	2.08	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,3-Butadiene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,3-Dichlorobenzene	4.23	1.00		1.00	4.35	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	4.64	1.00		1.00	4.7	1.00		1.00	3.68	1.00		1.00
1,4-Dichlorobenzene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,4-Dioxane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
2-Hexanone(MBK)	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
4-Ethyltoluene	< 1.00	1.00	U	1.00	1.5	1.00		1.00	< 1.00	1.00	U	1.00	1.61	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	2.07	1.00		1.00
4-Isopropyltoluene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	1.2	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
4-Methyl-2-pentanone (MIBK)	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	1.95	1.00		1.00	1.65	1.00		1.00	< 1.00	1.00	U	1.00
Acetone	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	256	9.99		9.99
Acrylonitrile	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Benzene	2.87	1.00		1.00	10	1.00		1.00	236	39.9		39.9	3.74	1.00		1.00	3.77	1.00		1.00	1.8	1.00		1.00	50.1	1.00		1.00
Benzyl chloride	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Bromodichloromethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Bromoform	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Bromomethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Carbon Disulfide	1.76	1.00		1.00	2.3	1.00		1.00	1.81	1.00		1.00	7.47	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	10.5	1.00		1.00
Carbon Tetrachloride	< 0.25	0.25	U	0.25	< 0.25	0.25	U	0.25	< 0.25	0.25	U	0.25	0.43	0.25		0.25	0.45	0.25		0.25	0.53	0.25		0.25	< 0.25	0.25	U	0.25
Chlorobenzene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Chloroethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Chloroform	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	2.12	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	151	1.00		1.00
Chloromethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Cis-1,2-Dichloroethene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	9.95	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	8.96	1.00		1.00
cis-1,3-Dichloropropene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00

Volatile Organic Compounds	Sample Designation and Result																											
	VP-1				VP-2				VP-3				VP-4				VP-5				Blind Dup of VP-5 (QA/QC) VP-105				VP-6			
	5/18/2015				5/18/2015				5/18/2015				5/27/2015				5/18/2015				5/18/2015				5/18/2015			
	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL
Cyclohexane	385	10.0		10.0	57.8	1.00		1.00	1,320	39.9		39.9	63.3	1.00		1.00	24.4	1.00		1.00	9.8	1.00		1.00	61.9	1.00		1.00
Dibromochloromethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Dichlorodifluoromethane	44.5	1.00		1.00	285	4.99		4.99	13,100	400		400	178	30.0		30.0	6,520	200		200	845	9.98		9.98	107,000	959		959
Ethanol	7.63	1.00		1.00	18	1.00	S	1.00	24.1	1.00	S	1.00	79.7	29.9		29.9	9.9	1.00	S	1.00	9.26	1.00		1.00	2,150	239		239
Ethyl acetate	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Ethylbenzene	< 1.00	1.00	U	1.00	1.49	1.00		1.00	1.61	1.00		1.00	76.4	1.00		1.00	1.06	1.00		1.00	< 1.00	1.00	U	1.00	11.2	1.00		1.00
Heptane	12.3	1.00		1.00	12	1.00		1.00	1,100	40.0		40.0	9.75	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	163	1.00		1.00
Hexachlorobutadiene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Hexane	511	10.0		10.0	59.2	1.00	S	1.00	5,210	40.2	S	40.2	29.4	1.00		1.00	162	10.0	S	10.0	65.9	1.00		1.00	293	10.0		10.0
Isopropylalcohol	1,370	10.0	E	10.0	553	15.0	S	15.0	1,020	40.0	S	40.0	68	1.00		1.00	1,090	10.0	SE	10.0	1,060	1.00	E	1.00	784	10.0		10.0
Isopropylbenzene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	5.8	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
m,p-Xylene	3.51	1.00		1.00	4.64	1.00		1.00	4.47	1.00		1.00	390	30.0		30.0	3.67	1.00		1.00	3.52	1.00		1.00	7.42	1.00		1.00
Methyl Ethyl Ketone	< 1.00	1.00	U	1.00	7.96	1.00		1.00	101	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	18.9	1.00		1.00
Methyl tert-butyl ether(MTBE)	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Methylene Chloride	3.51	1.00		1.00	7.5	1.00	S	1.00	< 1.00	1.00	U	1.00	3.82	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	24.4	1.00		1.00
n-Butylbenzene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	1.16	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
o-Xylene	1.38	1.00		1.00	2.46	1.00		1.00	2.18	1.00		1.00	238	30.0		30.0	1.24	1.00		1.00	1.26	1.00		1.00	3.1	1.00		1.00
Propylene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 40.1	40.1	U	40.1	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
sec-Butylbenzene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Styrene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	4.26	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Tetrachloroethene	0.51	0.25		0.25	0.98	0.25		0.25	2.3	0.25		0.25	1.44	0.25		0.25	1.44	0.25		0.25	1.47	0.25		0.25	8.47	0.25		0.25
Tetrahydrofuran	1.03	1.00		1.00	2.82	1.00		1.00	< 1.00	1.00	U	1.00	7.13	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	14.8	1.00		1.00
Toluene	13.4	1.00		1.00	20	1.00		1.00	18.7	1.00		1.00	24.8	1.00		1.00	6.03	1.00		1.00	4.93	1.00		1.00	1,190	10.0		10.0
Trans-1,2-Dichloroethene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	11.6	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
trans-1,3-Dichloropropene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Trichloroethene	0.51	0.25		0.25	1.03	0.25		0.25	4.73	0.25		0.25	0.54	0.25		0.25	1.13	0.25		0.25	1.04	0.25		0.25	6.71	0.25		0.25
Trichlorofluoromethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	1.3	1.00		1.00	< 1.00	1.00	U	1.00	1.63	1.00		1.00	1.57	1.00		1.00	6,180	240		240
Trichlorotrifluoroethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	1.38	1.00		1.00	< 1.00	1.00	U	1.00	1.09	1.00		1.00	< 1.00	1.00	U	1.00	7.11	1.00		1.00
Vinyl Chloride	0.33	0.25		0.25	1.4	0.25		0.25	93.8	0.25		0.25	< 0.25	0.25	U	0.25	20.8	0.25		0.25	7.82	0.25		0.25	14	0.25		0.25

Legend:

ppbv = Parts per billion volume/volume concentration

RL = Laboratory Reporting Limit

0.549 = Compound detected and concentration (ppbv)

MDL = Method Detection Limit. The minimum reportable concentration that can be measured with 99% confidence, as defined in 40CFR part 136 (Appendix B).

Qual = Laboratory and/or Data Validation Qualifier:

U = Compound was not detected at or above the MDL.

E = The reported value is estimated because the concentration exceeded the calibration range.

S = This compound is a solvent that is used in the laboratory. Laboratory contamination is suspected if concentration is less than five times the reporting level.

Notes:

1. The samples were collected from subsurface soil vapor probes installed by HydroEnvironmental Solutions, Inc. to a total depth of 6-feet below grade.
2. The samples were collected in 6-liter summa canisters with an installed flow regulator. The collected samples were analyzed by Phoenix Environmental Laboratories of Manchester, Connecticut.
3. Data validation performed by Premier Evironmental Services of Merrick, New York.

MAY 2015
VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
REMEDIAL INVESTIGATION
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE # C360143

Volatile Organic Compounds	Sample Designation and Result																							
	VP-7				VP-8				VP-9				VP-10				VP-11				VP-12			
	5/18/2015				5/18/2015				5/18/2015				5/18/2015				5/18/2015				5/18/2015			
	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL
	Result in ppbv																							
1,1,1,2-Tetrachloroethane	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146
1,1,1-Trichloroethane	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183	19.4	0.183		0.183	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183
1,1,2,2-Tetrachloroethane	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146	< 0.146	0.146	U	0.146
1,1,2-Trichloroethane	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183	< 0.183	0.183	U	0.183
1,1-Dichloroethane	0.644	0.247		0.247	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247	1.01	0.247		0.247	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247
1,1-Dichloroethene	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252
1,2,4-Trichlorobenzene	< 0.135	0.135	U	0.135	< 0.135	0.135	U	0.135	< 0.135	0.135	U	0.135	< 0.135	0.135	U	0.135	< 0.135	0.135	U	0.135	< 0.135	0.135	U	0.135
1,2,4-Trimethylbenzene	1.03	0.204		0.204	0.968	0.204		0.204	0.967	0.204		0.204	0.908	0.204		0.204	0.914	0.204		0.204	1.04	0.204		0.204
1,2-Dibromoethane(EDB)	< 0.130	0.130	U	0.130	< 0.130	0.130	U	0.130	< 0.130	0.130	U	0.130	< 0.130	0.130	U	0.130	< 0.130	0.130	U	0.130	< 0.130	0.130	U	0.130
1,2-Dichlorobenzene	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166
1,2-Dichloroethane	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247	< 0.247	0.247	U	0.247
1,2-dichloropropane	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217
1,2-Dichlorotetrafluoroethane	4,330	30.1		30.1	74.8	2.15		2.15	100	4.29		4.29	< 0.143	0.143	U	0.143	5,280	57.3		57.3	76.4	5.73		5.73
1,3,5-Trimethylbenzene	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204
1,3-Butadiene	< 0.452	0.452	U	0.452	< 0.452	0.452	U	0.452	< 0.452	0.452	U	0.452	< 0.452	0.452	U	0.452	< 0.452	0.452	U	0.452	< 0.452	0.452	U	0.452
1,3-Dichlorobenzene	0.901	0.166		0.166	0.596	0.166		0.166	0.587	0.166		0.166	0.363	0.166		0.166	1.06	0.166		0.166	0.631	0.166		0.166
1,4-Dichlorobenzene	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166	< 0.166	0.166	U	0.166
1,4-Dioxane	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278
2-Hexanone(MBK)	< 0.244	0.244	U	0.244	< 0.244	0.244	U	0.244	< 0.244	0.244	U	0.244	< 0.244	0.244	U	0.244	< 0.244	0.244	U	0.244	< 0.244	0.244	U	0.244
4-Ethyltoluene	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204
4-Isopropyltoluene	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182
4-Methyl-2-pentanone(MIBK)	< 0.244	0.244	U	0.244	0.389	0.244		0.244	< 0.244	0.244	U	0.244	0.327	0.244		0.244	< 0.244	0.244	U	0.244	0.4	0.244		0.244
Acetone	< 88.5	88.5	U	88.5	42.2	6.32	S	6.32	133	12.6		12.6	35.4	4.21	S	4.21	41.1	16.8	S	16.8	64.6	16.8	S	16.8
Acrylonitrile	< 0.461	0.461	U	0.461	< 0.461	0.461	U	0.461	< 0.461	0.461	U	0.461	< 0.461	0.461	U	0.461	< 0.461	0.461	U	0.461	< 0.461	0.461	U	0.461
Benzene	21.5	0.313		0.313	1.21	0.313		0.313	9.09	0.313		0.313	< 0.313	0.313	U	0.313	0.651	0.313		0.313	< 0.313	0.313	U	0.313
Benzyl chloride	< 0.193	0.193	U	0.193	< 0.193	0.193	U	0.193	< 0.193	0.193	U	0.193	< 0.193	0.193	U	0.193	< 0.193	0.193	U	0.193	< 0.193	0.193	U	0.193
Bromodichloromethane	< 0.149	0.149	U	0.149	< 0.149	0.149	U	0.149	< 0.149	0.149	U	0.149	< 0.149	0.149	U	0.149	< 0.149	0.149	U	0.149	< 0.149	0.149	U	0.149
Bromoform	< 0.097	0.097	U	0.097	< 0.097	0.097	U	0.097	< 0.097	0.097	U	0.097	< 0.097	0.097	U	0.097	< 0.097	0.097	U	0.097	< 0.097	0.097	U	0.097
Bromomethane	< 0.258	0.258	U	0.258	< 0.258	0.258	U	0.258	< 0.258	0.258	U	0.258	< 0.258	0.258	U	0.258	< 0.258	0.258	U	0.258	< 0.258	0.258	U	0.258
Carbon Disulfide	18.8	0.321		0.321	< 0.321	0.321	U	0.321	0.369	0.321		0.321	0.424	0.321		0.321	< 0.321	0.321	U	0.321	0.359	0.321		0.321
Carbon Tetrachloride	< 0.040	0.040	U	0.040	< 0.040	0.040	U	0.040	< 0.040	0.040	U	0.040	< 0.040	0.040	U	0.040	< 0.040	0.040	U	0.040	< 0.040	0.040	U	0.040
Chlorobenzene	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217	< 0.217	0.217	U	0.217
Chloroethane	< 0.379	0.379	U	0.379	< 0.379	0.379	U	0.379	< 0.379	0.379	U	0.379	< 0.379	0.379	U	0.379	< 0.379	0.379	U	0.379	< 0.379	0.379	U	0.379
Chloroform	0.832	0.205		0.205	0.303	0.205		0.205	0.583	0.205		0.205	0.896	0.205		0.205	0.809	0.205		0.205	< 0.205	0.205	U	0.205
Chloromethane	< 0.485	0.485	U	0.485	< 0.485	0.485	U	0.485	< 0.485	0.485	U	0.485	< 0.485	0.485	U	0.485	< 0.485	0.485	U	0.485	< 0.485	0.485	U	0.485
Cis-1,2-Dichloroethene	5.28	0.252		0.252	< 0.252	0.252	U	0.252	0.581	0.252		0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252
cis-1,3-Dichloropropene	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221
Cyclohexane	10.1	0.291		0.291	< 0.291	0.291	U	0.291	50.8	8.72		8.72	< 0.291	0.291	U	0.291	4.73	0.291		0.291	< 0.291	0.291	U	0.291
Dibromochloromethane	< 0.118	0.118	U	0.118	< 0.118	0.118	U	0.118	< 0.118	0.118	U	0.118	< 0.118	0.118	U	0.118	< 0.118	0.118	U	0.118	< 0.118	0.118	U	0.118
Dichlorodifluoromethane	4,670	42.5		42.5	305	3.04		3.04	276	6.07		6.07	282	3.04		3.04	8,320	80.9		80.9	587	8.09		8.09

Volatile Organic Compounds	Sample Designation and Result																							
	VP-7				VP-8				VP-9				VP-10				VP-11				VP-12			
	5/18/2015				5/18/2015				5/18/2015				5/18/2015				5/18/2015				5/18/2015			
	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL
Ethanol	9.88	0.531	S	0.531	2.92	0.531	S	0.531	7.12	0.531		0.531	3.93	0.531	S	0.531	2.93	0.531	S	0.531	3.08	0.531	S	0.531
Ethyl acetate	< 0.278	0.278	U	0.278	0.297	0.278		0.278	< 0.278	0.278	U	0.278	0.347	0.278		0.278	< 0.278	0.278	U	0.278	< 0.278	0.278	U	0.278
Ethylbenzene	0.343	0.230		0.230	< 0.230	0.230	U	0.230	0.467	0.230		0.230	0.271	0.230		0.230	0.285	0.230		0.230	0.237	0.230		0.230
Heptane	3.57	0.244		0.244	0.502	0.244		0.244	15.6	0.244		0.244	0.438	0.244		0.244	0.738	0.244		0.244	0.463	0.244		0.244
Hexachlorobutadiene	< 0.094	0.094	U	0.094	< 0.094	0.094	U	0.094	< 0.094	0.094	U	0.094	< 0.094	0.094	U	0.094	< 0.094	0.094	U	0.094	< 0.094	0.094	U	0.094
Hexane	10.5	0.284	S	0.284	0.369	0.284	S	0.284	37.6	0.284		0.284	0.785	0.284	S	0.284	8.62	0.284	S	0.284	0.453	0.284	S	0.284
Isopropylalcohol	413	0.407	SE	0.407	346	6.11	S	6.11	289	12.2		12.2	318	4.07	S	4.07	235	16.3	S	16.3	403	0.407	SE	0.407
Isopropylbenzene	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204	< 0.204	0.204	U	0.204
m,p-Xylene	0.931	0.230		0.230	0.782	0.230		0.230	1.29	0.230		0.230	0.929	0.230		0.230	0.947	0.230		0.230	0.818	0.230		0.230
Methyl Ethyl Ketone	6.8	0.339		0.339	1.22	0.339		0.339	2.5	0.339		0.339	1.03	0.339		0.339	1.64	0.339		0.339	1.34	0.339		0.339
Methyl tert-butyl ether (MTBE)	< 0.278	0.278	U	0.278	2.05	0.278		0.278	< 0.278	0.278	U	0.278	1.73	0.278		0.278	< 0.278	0.278	U	0.278	2.02	0.278		0.278
Methylene Chloride	12.9	0.288	S	0.288	< 0.288	0.288	U	0.288	0.612	0.288		0.288	6.01	0.288	S	0.288	1.23	0.288	S	0.288	< 0.288	0.288	U	0.288
n-Butylbenzene	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182
o-Xylene	0.401	0.230		0.230	0.267	0.230		0.230	0.514	0.230		0.230	0.323	0.230		0.230	0.335	0.230		0.230	0.275	0.230		0.230
Propylene	249	122		122	< 0.581	0.581	U	0.581	< 0.581	0.581	U	0.581	< 0.581	0.581	U	0.581	21	0.581		0.581	< 0.581	0.581	U	0.581
sec-Butylbenzene	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182	< 0.182	0.182	U	0.182
Styrene	< 0.235	0.235	U	0.235	< 0.235	0.235	U	0.235	< 0.235	0.235	U	0.235	< 0.235	0.235	U	0.235	< 0.235	0.235	U	0.235	< 0.235	0.235	U	0.235
Tetrachloroethene	10.4	0.037		0.037	0.408	0.037		0.037	0.285	0.037		0.037	0.997	0.037		0.037	1.34	0.037		0.037	0.472	0.037		0.037
Tetrahydrofuran	4.82	0.339		0.339	0.559	0.339		0.339	2.34	0.339		0.339	< 0.339	0.339	U	0.339	< 0.339	0.339	U	0.339	0.579	0.339		0.339
Toluene	11.4	0.266		0.266	3.79	0.266		0.266	7.29	0.266		0.266	5.32	0.266		0.266	4.94	0.266		0.266	3.8	0.266		0.266
Trans-1,2-Dichloroethene	1.17	0.252		0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252	< 0.252	0.252	U	0.252
trans-1,3-Dichloropropene	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221	< 0.221	0.221	U	0.221
Trichloroethene	4.76	0.047		0.047	0.141	0.047		0.047	0.281	0.047		0.047	0.175	0.047		0.047	0.368	0.047		0.047	0.048	0.047		0.047
Trichlorofluoromethane	404	37.4		37.4	17.9	0.178		0.178	11.3	0.178		0.178	6.22	0.178		0.178	25.1	0.178		0.178	6.72	0.178		0.178
Trichlorotrifluoroethane	0.183	0.131		0.131	< 0.131	0.131	U	0.131	< 0.131	0.131	U	0.131	0.254	0.131		0.131	1.77	0.131		0.131	0.176	0.131		0.131
Vinyl Chloride	33.1	0.098		0.098	< 0.098	0.098	U	0.098	0.313	0.098		0.098	< 0.098	0.098	U	0.098	< 0.098	0.098	U	0.098	< 0.098	0.098	U	0.098
Result in ug/m^3																								
1,1,1,2-Tetrachloroethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,1,1-Trichloroethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	106	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,1,2,2-Tetrachloroethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,1,2-Trichloroethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,1-Dichloroethane	2.6	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	4.09	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,1-Dichloroethene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,2,4-Trichlorobenzene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,2,4-Trimethylbenzene	5.06	1.00		1.00	4.76	1.00		1.00	4.75	1.00		1.00	4.46	1.00		1.00	4.49	1.00		1.00	5.11	1.00		1.00
1,2-Dibromoethane(EDB)	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,2-Dichlorobenzene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,2-Dichloroethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,2-dichloropropane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,2-Dichlorotetrafluoroethane	30,300	210		210	523	15.0		15.0	699	30.0		30.0	< 1.00	1.00	U	1.00	36,900	400		400	534	40.0		40.0
1,3,5-Trimethylbenzene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,3-Butadiene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,3-Dichlorobenzene	5.41	1.00		1.00	3.58	1.00		1.00	3.53	1.00		1.00	2.18	1.00		1.00	6.37	1.00		1.00	3.79	1.00		1.00
1,4-Dichlorobenzene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
1,4-Dioxane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
2-Hexanone(MBK)	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
4-Ethyltoluene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
4-Isopropyltoluene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00

Volatile Organic Compounds	Sample Designation and Result																							
	VP-7				VP-8				VP-9				VP-10				VP-11				VP-12			
	5/18/2015				5/18/2015				5/18/2015				5/18/2015				5/18/2015				5/18/2015			
	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL
4-Methyl-2-pentanone (MIBK)	< 1.00	1.00	U	1.00	1.59	1.00		1.00	< 1.00	1.00	U	1.00	1.34	1.00		1.00	< 1.00	1.00	U	1.00	1.64	1.00		1.00
Acetone	< 210	210	U	210	100	15.0	S	15.0	316	29.9		29.9	84	9.99	S	9.99	97.6	39.9	S	39.9	153	39.9	S	39.9
Acrylonitrile	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Benzene	68.6	1.00		1.00	3.86	1.00		1.00	29	1.00		1.00	< 1.00	1.00	U	1.00	2.08	1.00		1.00	< 1.00	1.00	U	1.00
Benzyl chloride	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Bromodichloromethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Bromoform	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Bromomethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Carbon Disulfide	58.5	1.00		1.00	< 1.00	1.00	U	1.00	1.15	1.00		1.00	1.32	1.00		1.00	< 1.00	1.00	U	1.00	1.12	1.00		1.00
Carbon Tetrachloride	< 0.25	0.25	U	0.25	< 0.25	0.25	U	0.25	< 0.25	0.25	U	0.25	< 0.25	0.25	U	0.25	< 0.25	0.25	U	0.25	< 0.25	0.25	U	0.25
Chlorobenzene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Chloroethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Chloroform	4.06	1.00		1.00	1.48	1.00		1.00	2.84	1.00		1.00	4.37	1.00		1.00	3.95	1.00		1.00	< 1.00	1.00	U	1.00
Chloromethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Cis-1,2-Dichloroethene	20.9	1.00		1.00	< 1.00	1.00	U	1.00	2.3	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
cis-1,3-Dichloropropene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Cyclohexane	34.7	1.00		1.00	< 1.00	1.00	U	1.00	175	30.0		30.0	< 1.00	1.00	U	1.00	16.3	1.00		1.00	< 1.00	1.00	U	1.00
Dibromochloromethane	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Dichlorodifluoromethane	23,100	210		210	1,510	15.0		15.0	1,360	30.0		30.0	1,390	15.0		15.0	41,100	400		400	2,900	40.0		40.0
Ethanol	18.6	1.00	S	1.00	5.5	1.00	S	1.00	13.4	1.00		1.00	7.4	1.00	S	1.00	5.52	1.00	S	1.00	5.8	1.00	S	1.00
Ethyl acetate	< 1.00	1.00	U	1.00	1.07	1.00		1.00	< 1.00	1.00	U	1.00	1.25	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Ethylbenzene	1.49	1.00		1.00	< 1.00	1.00	U	1.00	2.03	1.00		1.00	1.18	1.00		1.00	1.24	1.00		1.00	1.03	1.00		1.00
Heptane	14.6	1.00		1.00	2.06	1.00		1.00	63.9	1.00		1.00	1.79	1.00		1.00	3.02	1.00		1.00	1.9	1.00		1.00
Hexachlorobutadiene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Hexane	37	1.00	S	1.00	1.3	1.00	S	1.00	132	1.00		1.00	2.77	1.00	S	1.00	30.4	1.00	S	1.00	1.6	1.00	S	1.00
Isopropylalcohol	1,010	1.00	SE	1.00	850	15.0	S	15.0	710	30.0		30.0	781	10.0	S	10.0	577	40.0	S	40.0	990	1.00	SE	1.00
Isopropylbenzene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
m,p-Xylene	4.04	1.00		1.00	3.39	1.00		1.00	5.6	1.00		1.00	4.03	1.00		1.00	4.11	1.00		1.00	3.55	1.00		1.00
Methyl Ethyl Ketone	20	1.00		1.00	3.6	1.00		1.00	7.37	1.00		1.00	3.04	1.00		1.00	4.83	1.00		1.00	3.95	1.00		1.00
Methyl tert-butyl ether(MTBE)	< 1.00	1.00	U	1.00	7.39	1.00		1.00	< 1.00	1.00	U	1.00	6.23	1.00		1.00	< 1.00	1.00	U	1.00	7.28	1.00		1.00
Methylene Chloride	44.8	1.00	S	1.00	< 1.00	1.00	U	1.00	2.12	1.00		1.00	20.9	1.00	S	1.00	4.27	1.00	S	1.00	< 1.00	1.00	U	1.00
n-Butylbenzene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
o-Xylene	1.74	1.00		1.00	1.16	1.00		1.00	2.23	1.00		1.00	1.4	1.00		1.00	1.45	1.00		1.00	1.19	1.00		1.00
Propylene	428	210		210	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	36.1	1.00		1.00	< 1.00	1.00	U	1.00
sec-Butylbenzene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Styrene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Tetrachloroethene	70.5	0.25		0.25	2.77	0.25		0.25	1.93	0.25		0.25	6.76	0.25		0.25	9.08	0.25		0.25	3.2	0.25		0.25
Tetrahydrofuran	14.2	1.00		1.00	1.65	1.00		1.00	6.9	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	1.71	1.00		1.00
Toluene	42.9	1.00		1.00	14.3	1.00		1.00	27.5	1.00		1.00	20	1.00		1.00	18.6	1.00		1.00	14.3	1.00		1.00
Trans-1,2-Dichloroethene	4.64	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
trans-1,3-Dichloropropene	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00
Trichloroethene	25.6	0.25		0.25	0.76	0.25		0.25	1.51	0.25		0.25	0.94	0.25		0.25	1.98	0.25		0.25	0.26	0.25		0.25

Volatile Organic Compounds	Sample Designation and Result																							
	VP-7				VP-8				VP-9				VP-10				VP-11				VP-12			
	5/18/2015				5/18/2015				5/18/2015				5/18/2015				5/18/2015				5/18/2015			
	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL	Result	RL	Qual	MDL
Trichlorofluoromethane	2,270	210		210	101	1.00		1.00	63.4	1.00		1.00	34.9	1.00		1.00	141	1.00		1.00	37.7	1.00		1.00
Trichlorotrifluoroethane	1.4	1.00		1.00	< 1.00	1.00	U	1.00	< 1.00	1.00	U	1.00	1.95	1.00		1.00	13.6	1.00		1.00	1.35	1.00		1.00
Vinyl Chloride	84.6	0.25		0.25	< 0.25	0.25	U	0.25	0.8	0.25		0.25	< 0.25	0.25	U	0.25	< 0.25	0.25	U	0.25	< 0.25	0.25	U	0.25

Legend:

ppbv = Parts per billion volume/volume concentration

RL = Laboratory Reporting Limit

0.549 = Compound detected and concentration (ppbv)

MDL = Method Detection Limit. The minimum reportable concentration that can be measured with 99% confidence, as defined in 40CFR part 136 (Appendix B).

Qual = Laboratory and/or Data Validation Qualifier:

U = Compound was not detected at or above the MDL.

E = The reported value is estimated because the concentration exceeded the calibration range.

S = This compound is a solvent that is used in the laboratory. Laboratory contamination is suspected if concentration is less than five times the reporting level.

Notes:

1. The samples were collected from subsurface soil vapor probes installed by HydroEnvironmental Solutions, Inc. to a total depth of 6-feet below grade.
2. The samples were collected in 6-liter summa canisters with an installed flow regulator. The collected samples were analyzed by Phoenix Environmental Laboratories of Manchester, Connecticut.
3. Data validation performed by Premier Evironmental Services of Merrick, New York.

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VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	VW-1		VW-2		VW-3		VW-4		VW-5		VW-6	
York ID	17E0579-01		17E0579-02		17E0579-03		17E0579-04		17E0579-05		17E0579-06	
Sampling Date	5/12/2017		5/12/2017		5/12/2017		5/12/2017		5/12/2017		5/12/2017	
Client Matrix	Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor	
Compound	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Volatile Organics, EPA TO15 Full List	ug/m3		ug/m3		ug/m3		ug/m3		ug/m3		ug/m3	
Dilution Factor	17.75		17.03		16.97		1358		18		191	
1,1,1,2-Tetrachloroethane	12	U	12	U	12	U	12	U	12	U	13	U
1,1,1-Trichloroethane	9.700	U	9.300	U	9.300	U	9.300	U	9.800	U	10	U
1,1,2,2-Tetrachloroethane	12	U	12	U	12	U	12	U	12	U	13	U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	14	U	13	U	13	U	670	D	14	U	15	U
1,1,2-Trichloroethane	9.700	U	9.300	U	9.300	U	9.300	U	9.800	U	10	U
1,1-Dichloroethane	7.200	U	6.900	U	6.900	U	6.900	U	7.300	U	7.700	U
1,1-Dichloroethylene	7	U	6.800	U	6.700	U	6.700	U	7.100	U	7.600	U
1,2,4-Trichlorobenzene	13	U	13	U	13	U	13	U	13	U	14	U
1,2,4-Trimethylbenzene	8.700	U	8.400	U	18	D	98	D	8.800	U	320	D
1,2-Dibromoethane	14	U	13	U	13	U	13	U	14	U	15	U
1,2-Dichlorobenzene	11	U	10	U	10	U	10	U	11	U	11	U
1,2-Dichloroethane	7.200	U	6.900	U	6.900	U	6.900	U	7.300	U	7.700	U
1,2-Dichloropropane	8.200	U	7.900	U	7.800	U	7.800	U	8.300	U	8.800	U
1,2-Dichlorotetrafluoroethane	260	D	56	D	4,100	D	230,000	D	2,500	D	35,000	D
1,3,5-Trimethylbenzene	8.700	U	8.400	U	11	D	62	D	8.800	U	260	D
1,3-Butadiene	12	U	31	D	140	D	11	U	12	U	85	D
1,3-Dichlorobenzene	11	U	10	U	10	U	10	U	11	U	11	U
1,3-Dichloropropane	8.200	U	7.900	U	7.800	U	7.800	U	8.300	U	8.800	U
1,4-Dichlorobenzene	11	U	10	U	10	U	10	U	11	U	11	U
1,4-Dioxane	13	U	12	U	12	U	12	U	13	U	14	U
2-Butanone	42	D	54	D	29	D	31	D	9	D	170	D
2-Hexanone	15	U	14	U	14	U	14	U	15	U	16	U
3-Chloropropene	28	U	27	U	27	U	27	U	28	U	30	U
4-Methyl-2-pentanone	7.300	U	7	U	7	U	7	U	7.400	U	7.800	U
Acetone	120	D	120	D	94	D	110	D	33	D	430	D
Acrylonitrile	3.900	U	3.700	U	3.700	U	3.700	U	3.900	U	4.100	U
Benzene	10	D	140	D	360	D	2,100	D	5.800	U	310	D
Benzyl chloride	9.200	U	8.800	U	8.800	U	8.800	U	9.300	U	9.900	U
Bromodichloromethane	12	U	11	U	11	U	11	U	12	U	13	U
Bromoform	18	U	18	U	18	U	18	U	19	U	20	U
Bromomethane	6.900	U	6.600	U	6.600	U	6.600	U	7	U	7.400	U
Carbon disulfide	17	D	29	D	97	D	55	D	5.600	U	26	D
Carbon tetrachloride	2.800	U	2.700	U	2.700	U	2.700	U	2.800	U	3	U
Chlorobenzene	8.200	U	7.800	U	7.800	U	7.800	U	8.300	U	8.800	U
Chloroethane	4.700	U	4.500	U	4.500	U	4.500	U	4.700	U	5	U
Chloroform	8.700	U	12	D	8.300	U	63	D	30	D	9.300	U
Chloromethane	3.700	U	4.900	D	6.300	D	3.500	U	3.700	U	30	D
cis-1,2-Dichloroethylene	7	U	6.800	U	6.700	U	51	D	7.100	U	23	D
cis-1,3-Dichloropropylene	8.100	U	7.700	U	7.700	U	7.700	U	8.200	U	8.700	U
Cyclohexane	23	D	5.900	U	500	D	880	D	6.200	U	320	D
Dibromochloromethane	15	U	15	U	14	U	14	U	15	U	16	U
Dichlorodifluoromethane	400	D	230	D	4,000	D	320,000	D	3,400	D	30,000	D
Ethyl acetate	13	U	12	U	12	U	12	U	13	U	14	U
Ethyl Benzene	7.700	U	7.400	D	9.600	D	120	D	7.800	U	170	D
Hexachlorobutadiene	19	U	18	U	18	U	18	U	19	U	20	U
Isopropanol	8.700	U	9.200	D	20	D	43	D	8.800	U	34	D
Methyl Methacrylate	7.300	U	7	U	6.900	U	6.900	U	7.400	U	7.800	U
Methyl tert-butyl ether (MTBE)	6.400	U	6.100	U	6.100	U	6.100	U	6.500	U	6.900	U
Methylene chloride	12	U	13	D	16	D	47	D	13	U	13	U
n-Heptane	160	D	190	D	460	D	1,000	D	7.400	U	690	D
n-Hexane	460	D	400	D	2,900	D	1,200	D	7.600	D	720	D
o-Xylene	7.700	U	7.400	U	19	D	120	D	7.800	U	190	D
p- & m- Xylenes	15	U	15	U	32	D	250	D	16	U	480	D
p-Ethyltoluene	8.700	U	8.400	U	10	D	75	D	8.800	U	230	D
Propylene	390	D	630	D	930	DE	290	D	9.600	D	320	D
Styrene	7.600	U	7.300	U	7.200	U	7.200	U	7.700	U	8.100	U
Tetrachloroethylene	13	D	28	D	15	D	83	D	67	D	63	D
Tetrahydrofuran	10	U	81	D	10	U	10	U	11	U	11	U
Toluene	8.700	D	33	D	67	D	1,000	D	10	D	220	D
trans-1,2-Dichloroethylene	7	U	6.800	U	6.700	U	18	D	7.100	U	7.600	U
trans-1,3-Dichloropropylene	8.100	U	7.700	U	7.700	U	7.700	U	8.200	U	8.700	U
Trichloroethylene	2.900	D	2.300	U	2.300	U	45	D	14	D	52	D
Trichlorofluoromethane (Freon 11)	790	D	9.600	D	58	D	110,000	D	130	D	60	D
Vinyl acetate	6.200	U	6	U	6	U	6	U	6.300	U	6.700	U
Vinyl bromide	7.800	U	7.400	U	7.400	U	7.400	U	7.900	U	8.400	U
Vinyl Chloride	4.500	U	4.400	U	15	D	80	D	4.600	U	7.800	D

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VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE #C360143

NOTES:
Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:
D=result is from an analysis that required a dilution
J=analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated
U=analyte not detected at or above the level indicated
B=analyte found in the analysis batch blank
E=result is estimated and cannot be accurately reported due to levels encountered or interferences
P=this flag is used for pesticide and PCB (Aroclor) target compounds when there is a % difference for detected concentrations that exceed method dictated limits between the two GC columns used for analysis
NT=this indicates the analyte was not a target for this sample
~=this indicates that no regulatory limit has been established for this analyte

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VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	VW-7		VW-8		VW-9		VW-10		VW-11	
York ID	17E0429-01		17E0429-02		17E0429-03		17E0429-04		17E0429-05	
Sampling Date	5/10/2017		5/10/2017		5/10/2017		5/10/2017		5/10/2017	
Client Matrix	Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor	
Compound	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Volatile Organics, EPA TO15 Full List	ug/m3		ug/m3		ug/m3		ug/m3		ug/m3	
Dilution Factor	16.8		67.2		67.2		16.8		16.8	
1,1,1,2-Tetrachloroethane	12	U	12	U	12	U	12	U	12	U
1,1,1-Trichloroethane	170	D	9.200	U	9.200	U	9.200	U	9.200	U
1,1,2,2-Tetrachloroethane	12	U	12	U	12	U	12	U	12	U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	13	U	13	U	13	U	13	U	13	U
1,1,2-Trichloroethane	9.200	U	9.200	U	9.200	U	9.200	U	9.200	U
1,1-Dichloroethane	6.800	U	6.800	U	6.800	U	6.800	U	6.800	U
1,1-Dichloroethylene	6.700	U	6.700	U	6.700	U	6.700	U	6.700	U
1,2,4-Trichlorobenzene	12	U	12	U	12	U	12	U	12	U
1,2,4-Trimethylbenzene	73	D	17	D	8.300	U	8.300	U	8.300	U
1,2-Dibromoethane	13	U	13	U	13	U	13	U	13	U
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U
1,2-Dichloroethane	6.800	U	6.800	U	6.800	U	6.800	U	6.800	U
1,2-Dichloropropane	7.800	U	7.800	U	7.800	U	7.800	U	7.800	U
1,2-Dichlorotetrafluoroethane	3,800	D	8,500	D	820	D	43	D	12	U
1,3,5-Trimethylbenzene	31	D	12	D	8.300	U	8.300	U	8.300	U
1,3-Butadiene	5,000	DE	45	D	12	D	11	U	25	D
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U
1,3-Dichloropropane	7.800	U	7.800	U	7.800	U	7.800	U	7.800	U
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U
1,4-Dioxane	12	U	12	U	12	U	12	U	12	U
2-Butanone	1,000	D	78	D	39	D	12	D	80	D
2-Hexanone	14	U	14	U	14	U	14	U	14	U
3-Chloropropene	26	U	26	U	26	U	26	U	26	U
4-Methyl-2-pentanone	6.900	U	6.900	U	6.900	U	6.900	U	14	D
Acetone	3,400	DE	240	D	110	D	23	D	210	D
Acrylonitrile	3.600	U	3.600	U	3.600	U	3.600	U	3.600	U
Benzene	7,100	DE	310	D	78	D	6.400	D	110	D
Benzyl chloride	8.700	U	8.700	U	8.700	U	8.700	U	8.700	U
Bromodichloromethane	11	U	11	U	11	U	11	U	11	U
Bromoform	17	U	17	U	17	U	17	U	17	U
Bromomethane	6.500	U	6.500	U	6.500	U	6.500	U	6.500	U
Carbon disulfide	480	D	74	D	21	D	17	D	36	D
Carbon tetrachloride	2.600	U	2.600	U	2.600	U	4.200	D	2.600	U
Chlorobenzene	7.700	U	7.700	U	7.700	U	7.700	U	7.700	U
Chloroethane	4.400	U	4.400	U	4.400	U	4.400	U	4.400	U
Chloroform	210	D	15	D	37	D	64	D	1,000	D
Chloromethane	88	D	3.500	U	3.500	U	3.500	U	4.200	D
cis-1,2-Dichloroethylene	6.700	U	15	D	6.700	U	6.700	U	6.700	U
cis-1,3-Dichloropropylene	7.600	U	7.600	U	7.600	U	7.600	U	7.600	U
Cyclohexane	560	D	69	D	5.800	U	5.800	U	5.800	D
Dibromochloromethane	14	U	14	U	14	U	14	U	14	U
Dichlorodifluoromethane	3,200	D	3,800	D	12,000	D	160	D	1,100	D
Ethyl acetate	12	U	12	U	12	U	12	U	12	U
Ethyl Benzene	430	D	17	D	7.300	U	7.300	U	7.300	U
Hexachlorobutadiene	18	U	18	U	18	U	18	U	18	U
Isopropanol	41	D	15	D	8.300	U	8.300	U	9.900	D
Methyl Methacrylate	6.900	U	6.900	U	6.900	U	6.900	U	6.900	U
Methyl tert-butyl ether (MTBE)	6.100	U	6.100	U	6.100	U	6.100	U	6.100	U
Methylene chloride	12	U	12	U	12	U	12	U	23	D
n-Heptane	1,000	D	160	D	9	D	6.900	U	23	D
n-Hexane	2,500	D	88	D	15	D	5.900	U	34	D
o-Xylene	230	D	26	D	7.300	U	7.300	U	7.300	U
p- & m- Xylenes	670	D	45	D	16	D	15	U	19	D
p-Ethyltoluene	110	D	16	D	8.300	U	8.300	U	8.300	U
Propylene	12,000	DE	620	D	130	D	60	D	180	D

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109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	VW-7		VW-8		VW-9		VW-10		VW-11	
York ID	17E0429-01		17E0429-02		17E0429-03		17E0429-04		17E0429-05	
Sampling Date	5/10/2017		5/10/2017		5/10/2017		5/10/2017		5/10/2017	
Client Matrix	Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor	
Compound	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Styrene	140	D	7.200	U	7.200	U	7.200	U	7.200	U
Tetrachloroethylene	430	D	22	D	50	D	680	D	41	D
Tetrahydrofuran	9.900	U	9.900	U	17	D	9.900	U	15	D
Toluene	3,200	DE	120	D	53	D	11	D	55	D
trans-1,2-Dichloroethylene	6.700	U	6.700	U	6.700	U	6.700	U	6.700	U
trans-1,3-Dichloropropylene	7.600	U	7.600	U	7.600	U	7.600	U	7.600	U
Trichloroethylene	100	D	15	D	7.200	D	280	D	60	D
Trichlorofluoromethane (Freon 11)	2,800	D	45	D	1,100	D	9.400	U	29	D
Vinyl acetate	5.900	U	5.900	U	5.900	U	5.900	U	5.900	U
Vinyl bromide	7.300	U	7.300	U	7.300	U	7.300	U	7.300	U
Vinyl Chloride	4.300	D	35	D	4.300	U	4.300	U	4.300	U

NOTES:

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Q is the Qualifier Column with definitions as follows:

D=result is from an analysis that required a dilution

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

U=analyte not detected at or above the level indicated

B=analyte found in the analysis batch blank

E=result is estimated and cannot be accurately reported due to levels encountered or interferences

P=this flag is used for pesticide and PCB (Aroclor) target compounds when there is a % difference for detected concentrations that exceed method dictated limits between the two GC columns used for analysis

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

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

MAY 2017

VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES

109-125 MARBLEDALE ROAD

TUCKAHOE, NEW YORK

BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	**VW-12**	
York ID	**17E0630-01**	
Sampling Date	**5/15/2017**	
Client Matrix	**Soil Vapor**	
Compound	Result	Q
Volatile Organics, EPA TO15 Full List	ug/m3	
Dilution Factor	17.03	
1,1,1,2-Tetrachloroethane	12	U
1,1,1-Trichloroethane	9.300	U
1,1,2,2-Tetrachloroethane	12	U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	13	U
1,1,2-Trichloroethane	9.300	U
1,1-Dichloroethane	6.900	U
1,1-Dichloroethylene	6.800	U
1,2,4-Trichlorobenzene	13	U
1,2,4-Trimethylbenzene	26	D
1,2-Dibromoethane	13	U
1,2-Dichlorobenzene	10	U
1,2-Dichloroethane	6.900	U
1,2-Dichloropropane	7.900	U
1,2-Dichlorotetrafluoroethane	46	D
1,3,5-Trimethylbenzene	8.400	U
1,3-Butadiene	11	U
1,3-Dichlorobenzene	10	U
1,3-Dichloropropane	7.900	U
1,4-Dichlorobenzene	10	U
1,4-Dioxane	12	U
2-Butanone	5	U
2-Hexanone	14	U
3-Chloropropene	27	U
4-Methyl-2-pentanone	7	U
Acetone	8.100	U

MAY 2017

VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES

109-125 MARBLEDALE ROAD

TUCKAHOE, NEW YORK

BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	**VW-12**	
York ID	**17E0630-01**	
Sampling Date	**5/15/2017**	
Client Matrix	**Soil Vapor**	
Compound	Result	Q
Acrylonitrile	3.700	U
Benzene	7.600	D
Benzyl chloride	8.800	U
Bromodichloromethane	11	U
Bromoform	18	U
Bromomethane	6.600	U
Carbon disulfide	5.300	U
Carbon tetrachloride	2.700	U
Chlorobenzene	7.800	U
Chloroethane	4.500	U
Chloroform	42	D
Chloromethane	3.500	U
cis-1,2-Dichloroethylene	6.800	U
cis-1,3-Dichloropropylene	7.700	U
Cyclohexane	5.900	U
Dibromochloromethane	15	U
Dichlorodifluoromethane	140	D
Ethyl acetate	12	U
Ethyl Benzene	16	D
Hexachlorobutadiene	18	U
Isopropanol	8.400	U
Methyl Methacrylate	7	U
Methyl tert-butyl ether (MTBE)	6.100	U
Methylene chloride	12	U
n-Heptane	7	U
n-Hexane	6	U
o-Xylene	23	D

MAY 2017

VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES

109-125 MARBLEDALE ROAD

TUCKAHOE, NEW YORK

BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	**VW-12**	
York ID	**17E0630-01**	
Sampling Date	**5/15/2017**	
Client Matrix	**Soil Vapor**	
Compound	Result	Q
p- & m- Xylenes	60	D
p-Ethyltoluene	23	D
Propylene	22	D
Styrene	7.300	U
Tetrachloroethylene	1,600	D
Tetrahydrofuran	10	U
Toluene	38	D
trans-1,2-Dichloroethylene	6.800	U
trans-1,3-Dichloropropylene	7.700	U
Trichloroethylene	100	D
Trichlorofluoromethane (Freon 11)	31	D
Vinyl acetate	6	U
Vinyl bromide	7.400	U
Vinyl Chloride	4.400	U

NOTES:

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Q is the Qualifier Column with definitions as follows:

D=result is from an analysis that required a dilution

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

U=analyte not detected at or above the level indicated

B=analyte found in the analysis batch blank

E=result is estimated and cannot be accurately reported due to levels encountered or interferences

P=this flag is used for pesticide and PCB (Aroclor) target compounds when there is a % difference for detected concentrations that exceed method dictated limits between the two GC columns used for analysis

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

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

JUNE 2017
VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	**VW-1**		**VW-2**		**VW-3**		**VW-4**		**VW-5**		**VW-6**	
York ID	**17F1126-01**		**17F1126-02**		**17F1126-03**		**17F1126-04**		**17F1126-05**		**17F1126-06**	
Sampling Date	**6/28/2017**		**6/28/2017**		**6/28/2017**		**6/28/2017**		**6/28/2017**		**6/28/2017**	
Client Matrix	**Soil Vapor**		**Soil Vapor**		**Soil Vapor**		**Soil Vapor**		**Soil Vapor**		**Soil Vapor**	
Compound	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Volatile Organics, EPA TO15 Full List	ug/m3		ug/m3		ug/m3		ug/m3		ug/m3		ug/m3	
Dilution Factor	15.23		15.180		15		14.78		14.52		1377	
1,1,1,2-Tetrachloroethane	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
1,1,1-Trichloroethane	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
1,1,2,2-Tetrachloroethane	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
1,1,2-Trichloro-1,2,2-trifluoroethane (Fr	ND	U	ND	U	ND	U	170	D	ND	U	ND	U
1,1,2-Trichloroethane	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
1,1-Dichloroethane	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
1,1-Dichloroethylene	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
1,2,4-Trichlorobenzene	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
1,2,4-Trimethylbenzene	ND	U	ND	U	36	D	78	D	ND	U	210	D
1,2-Dibromoethane	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
1,2-Dichlorobenzene	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
1,2-Dichloroethane	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
1,2-Dichloropropane	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
1,2-Dichlorotetrafluoroethane	ND	U	ND	D	3,300	D	760,000	D	2,200	D	110,000	D
1,3,5-Trimethylbenzene	ND	U	ND	U	27	D	43	D	ND	U	150	D
1,3-Butadiene	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
1,3-Dichlorobenzene	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
1,3-Dichloropropane	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
1,4-Dichlorobenzene	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
1,4-Dioxane	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
2-Butanone	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
2-Hexanone	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
3-Chloropropene	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
4-Methyl-2-pentanone	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Acetone	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Acrylonitrile	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Benzene	ND	U	ND	U	450	D	160	D	ND	U	260	D
Benzyl chloride	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Bromodichloromethane	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Bromoform	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Bromomethane	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U

JUNE 2017
VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	VW-1		VW-2		VW-3		VW-4		VW-5		VW-6	
York ID	17F1126-01		17F1126-02		17F1126-03		17F1126-04		17F1126-05		17F1126-06	
Sampling Date	6/28/2017		6/28/2017		6/28/2017		6/28/2017		6/28/2017		6/28/2017	
Client Matrix	Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor	
Compound	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Carbon disulfide	ND	U	7.100	D	ND	U	20	D	ND	U	ND	U
Carbon tetrachloride	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Chlorobenzene	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Chloroethane	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Chloroform	ND	U	16	D	ND	U	43	D	170	D	ND	U
Chloromethane	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
cis-1,2-Dichloroethylene	ND	U	ND	U	ND	U	27	D	ND	U	36	D
cis-1,3-Dichloropropylene	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Cyclohexane	ND	U	ND	U	530	D	220	D	ND	U	290	D
Dibromochloromethane	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Dichlorodifluoromethane	21	D	250	D	4,500	D	1,100,000	D	2,100	D	160,000	D
Ethyl acetate	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Ethyl Benzene	ND	U	ND	U	13	D	89	D	ND	U	63	D
Hexachlorobutadiene	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Isopropanol	ND	U	ND	U	34	D	ND	U	ND	U	ND	U
Methyl Methacrylate	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Methyl tert-butyl ether (MTBE)	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Methylene chloride	ND	U	ND	U	ND	U	16	D	ND	U	ND	U
n-Heptane	ND	U	ND	U	550	D	180	D	ND	U	1,100	D
n-Hexane	19	D	ND	U	3,500	D	490	D	ND	U	1,000	D
o-Xylene	ND	U	ND	U	30	D	92	D	ND	U	75	D
p- & m- Xylenes	ND	U	ND	U	43	D	130	D	ND	U	180	D
p-Ethyltoluene	ND	U	ND	U	16	D	65	D	ND	U	130	D
Propylene	19	D	ND	U	180	D	ND	U	ND	U	100	D
Styrene	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Tetrachloroethylene	17	D	41	D	10	D	110	D	110	D	70	D
Tetrahydrofuran	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Toluene	ND	U	ND	U	52	D	410	D	ND	U	42	D
trans-1,2-Dichloroethylene	ND	U	ND	U	ND	U	ND	U	ND	U	9.800	D
trans-1,3-Dichloropropylene	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U

JUNE 2017
VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	**VW-1**		**VW-2**		**VW-3**		**VW-4**		**VW-5**		**VW-6**	
York ID	**17F1126-01**		**17F1126-02**		**17F1126-03**		**17F1126-04**		**17F1126-05**		**17F1126-06**	
Sampling Date	**6/28/2017**		**6/28/2017**		**6/28/2017**		**6/28/2017**		**6/28/2017**		**6/28/2017**	
Client Matrix	**Soil Vapor**		**Soil Vapor**		**Soil Vapor**		**Soil Vapor**		**Soil Vapor**		**Soil Vapor**	
Compound	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Trichloroethylene	ND	U	ND	U	ND	U	33	D	17	D	30	D
Trichlorofluoromethane (Freon 11)	4,500	D	9.400	D	77	D	230,000	D	130	D	60	D
Vinyl acetate	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Vinyl bromide	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Vinyl Chloride	ND	U	ND	U	19	D	ND	U	ND	U	42	D

NOTES:
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P=this flag is used for pesticide and PCB (Aroclor) target compounds when there is a % difference for detected concentrations that exceed method dictated limits between the two GC columns used for analysis
NT=this indicates the analyte was not a target for this sample

JUNE 2017
VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	VW-7		VW-9		VW-12		VW-8		VP-19	
York ID	17F1126-07		17F1126-08		17F1126-09		17F1252-01		17F1252-02	
Sampling Date	6/28/2017		6/28/2017		6/28/2017		6/29/2017		6/29/2017	
Client Matrix	Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor	
Compound	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Volatile Organics, EPA TO15 Full	ug/m3		ug/m3		ug/m3		ug/m3		ug/m3	
Dilution Factor	14.61		5027		14.41		15.11		15.23	
1,1,1,2-Tetrachloroethane	ND	U	ND	U	ND	U	ND	U	ND	U
1,1,1-Trichloroethane	ND	U	ND	U	11	D	ND	U	ND	U
1,1,2,2-Tetrachloroethane	ND	U	ND	U	ND	U	ND	U	ND	U
1,1,2-Trichloro-1,2,2-trifluoroetha	ND	U	ND	U	ND	U	ND	U	ND	U
1,1,2-Trichloroethane	ND	U	ND	U	ND	U	ND	U	ND	U
1,1-Dichloroethane	ND	U	ND	U	ND	U	ND	U	ND	U
1,1-Dichloroethylene	ND	U	ND	U	ND	U	ND	U	ND	U
1,2,4-Trichlorobenzene	ND	U	ND	U	ND	U	ND	U	ND	U
1,2,4-Trimethylbenzene	ND	U	ND	U	ND	U	21	D	ND	U
1,2-Dibromoethane	ND	U	ND	U	ND	U	ND	U	ND	U
1,2-Dichlorobenzene	ND	U	ND	U	ND	U	ND	U	ND	U
1,2-Dichloroethane	ND	U	ND	U	ND	U	ND	U	ND	U
1,2-Dichloropropane	ND	U	ND	U	ND	U	ND	U	ND	U
1,2-Dichlorotetrafluoroethane	560	D	470,000	D	1,700	D	4,200	D	540	D
1,3,5-Trimethylbenzene	ND	U	ND	U	ND	U	19	D	ND	U
1,3-Butadiene	ND	U	ND	U	ND	U	ND	U	ND	U
1,3-Dichlorobenzene	ND	U	ND	U	ND	U	ND	U	ND	U
1,3-Dichloropropane	ND	U	ND	U	ND	U	ND	U	ND	U
1,4-Dichlorobenzene	ND	U	ND	U	ND	U	ND	U	ND	U
1,4-Dioxane	ND	U	ND	U	ND	U	ND	U	ND	U
2-Butanone	8.600	D	ND	U	ND	U	6.200	D	ND	U
2-Hexanone	ND	U	ND	U	ND	U	ND	U	ND	U
3-Chloropropene	ND	U	ND	U	ND	U	ND	U	ND	U
4-Methyl-2-pentanone	ND	U	ND	U	ND	U	ND	U	ND	U
Acetone	32	D	ND	U	ND	U	16	D	ND	U
Acrylonitrile	ND	U	ND	U	ND	U	ND	U	ND	U
Benzene	9.300	D	19	D	ND	U	33	D	ND	U
Benzyl chloride	ND	U	ND	U	ND	U	ND	U	ND	U
Bromodichloromethane	ND	U	ND	U	ND	U	ND	U	ND	U
Bromoform	ND	U	ND	U	ND	U	ND	U	ND	U
Bromomethane	ND	U	ND	U	ND	U	ND	U	ND	U

JUNE 2017
VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	**VW-7**		**VW-9**		**VW-12**		**VW-8**		**VP-19**	
York ID	**17F1126-07**		**17F1126-08**		**17F1126-09**		**17F1252-01**		**17F1252-02**	
Sampling Date	**6/28/2017**		**6/28/2017**		**6/28/2017**		**6/29/2017**		**6/29/2017**	
Client Matrix	**Soil Vapor**		**Soil Vapor**		**Soil Vapor**		**Soil Vapor**		**Soil Vapor**	
Compound	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Carbon disulfide	ND	U	6.800	D	ND	U	54	D	ND	U
Carbon tetrachloride	ND	U	ND	U	2.700	D	ND	U	ND	U
Chlorobenzene	ND	U	ND	U	ND	U	ND	U	ND	U
Chloroethane	ND	U	ND	U	ND	U	ND	U	ND	U
Chloroform	7.100	D	ND	U	55	D	ND	U	32	D
Chloromethane	3.300	D	ND	U	ND	U	ND	U	ND	U
cis-1,2-Dichloroethylene	ND	U	ND	U	ND	U	12	D	ND	U
cis-1,3-Dichloropropylene	ND	U	ND	U	ND	U	ND	U	ND	U
Cyclohexane	7	D	9.700	D	ND	U	49	D	ND	U
Dibromochloromethane	ND	U	ND	U	ND	U	ND	U	ND	U
Dichlorodifluoromethane	870	D	440,000	D	2,300	D	2,200	D	900	D
Ethyl acetate	ND	U	ND	U	ND	U	ND	U	ND	U
Ethyl Benzene	ND	U	ND	U	ND	U	9.200	D	ND	U
Hexachlorobutadiene	ND	U	ND	U	ND	U	ND	U	ND	U
Isopropanol	ND	U	ND	U	ND	U	ND	U	ND	U
Methyl Methacrylate	ND	U	ND	U	ND	U	ND	U	ND	U
Methyl tert-butyl ether (MTBE)	ND	U	ND	U	ND	U	ND	U	ND	U
Methylene chloride	ND	U	ND	U	ND	U	ND	U	ND	U
n-Heptane	14	D	21	D	ND	U	120	D	ND	U
n-Hexane	34	D	65	D	ND	U	37	D	ND	U
o-Xylene	ND	U	ND	U	ND	U	26	D	ND	U
p- & m- Xylenes	ND	U	ND	U	ND	U	39	D	ND	U
p-Ethyltoluene	ND	U	ND	U	ND	U	18	D	ND	U
Propylene	22	D	410	D	ND	U	240	D	3.700	D
Styrene	ND	U	ND	U	ND	U	ND	U	ND	U
Tetrachloroethylene	38	D	48	D	2,700	D	7.200	D	500	D
Tetrahydrofuran	ND	U	ND	U	ND	U	ND	U	ND	U
Toluene	ND	U	6.500	D	ND	U	18	D	ND	U
trans-1,2-Dichloroethylene	ND	U	ND	U	ND	U	ND	U	ND	U
trans-1,3-Dichloropropylene	ND	U	ND	U	ND	U	ND	U	ND	U

JUNE 2017
VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	**VW-7**		**VW-9**		**VW-12**		**VW-8**		**VP-19**	
York ID	**17F1126-07**		**17F1126-08**		**17F1126-09**		**17F1252-01**		**17F1252-02**	
Sampling Date	**6/28/2017**		**6/28/2017**		**6/28/2017**		**6/29/2017**		**6/29/2017**	
Client Matrix	**Soil Vapor**		**Soil Vapor**		**Soil Vapor**		**Soil Vapor**		**Soil Vapor**	
Compound	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Trichloroethylene	3.900	D	2.500	D	350	D	13	D	550	D
Trichlorofluoromethane (Freon 11	320	D	170,000	D	370	D	12	D	130	D
Vinyl acetate	ND	U	ND	U	ND	U	ND	U	ND	U
Vinyl bromide	ND	U	ND	U	ND	U	ND	U	ND	U
Vinyl Chloride	ND	U	ND	U	ND	U	32	D	ND	U

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:

D=result is from an analysis that required a dilution

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

U=analyte not detected at or above the level indicated

B=analyte found in the analysis batch blank

E=result is estimated and cannot be accurately reported due to levels encountered or interferences

P=this flag is used for pesticide and PCB (Aroclor) target compounds when there is a % difference for detected concentrations that exceed method dictated limits between the two GC columns used for analysis

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

JUNE 2017
VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	**SVE-2, VM-2**		**SVE-3**	
York ID	**17F0150-01**		**17F0150-02**	
Sampling Date	**6/2/2017**		**6/2/2017**	
Client Matrix	**Soil Vapor**		**Soil Vapor**	
Compound	Result	Q	Result	Q
Volatile Organics, EPA TO15 Full List	ug/m3		ug/m3	
Dilution Factor	672		685.6	
1,1,1,2-Tetrachloroethane	12	U	12	U
1,1,1-Trichloroethane	9.200	U	9.400	U
1,1,2,2-Tetrachloroethane	12	U	12	U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	14	D	370	D
1,1,2-Trichloroethane	9.200	U	9.400	U
1,1-Dichloroethane	6.800	U	6.900	U
1,1-Dichloroethylene	6.700	U	6.800	U
1,2,4-Trichlorobenzene	12	U	13	U
1,2,4-Trimethylbenzene	48	D	8.400	U
1,2-Dibromoethane	13	U	13	U
1,2-Dichlorobenzene	10	U	10	U
1,2-Dichloroethane	6.800	U	6.900	U
1,2-Dichloropropane	7.800	U	7.900	U
1,2-Dichlorotetrafluoroethane	130,000	D	170,000	D
1,3,5-Trimethylbenzene	34	D	8.400	U
1,3-Butadiene	11	U	11	U
1,3-Dichlorobenzene	10	U	10	U
1,3-Dichloropropane	7.800	U	7.900	U
1,4-Dichlorobenzene	10	U	10	U
1,4-Dioxane	12	U	12	U
2-Butanone	8.400	D	6.600	D
2-Hexanone	14	U	14	U
3-Chloropropene	26	U	27	U
4-Methyl-2-pentanone	6.900	U	7	U

JUNE 2017
VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	**SVE-2, VM-2**		**SVE-3**	
York ID	**17F0150-01**		**17F0150-02**	
Sampling Date	**6/2/2017**		**6/2/2017**	
Client Matrix	**Soil Vapor**		**Soil Vapor**	
Compound	Result	Q	Result	Q
Acetone	180	D	45	D
Acrylonitrile	3.600	U	3.700	U
Benzene	110	D	5.500	U
Benzyl chloride	8.700	U	8.900	U
Bromodichloromethane	11	U	11	U
Bromoform	17	U	18	U
Bromomethane	6.500	U	6.700	U
Carbon disulfide	13	D	5.300	U
Carbon tetrachloride	2.600	U	2.700	U
Chlorobenzene	7.700	U	7.900	U
Chloroethane	4.400	U	4.500	U
Chloroform	8.200	U	8.400	U
Chloromethane	3.500	U	3.500	U
cis-1,2-Dichloroethylene	19	D	6.800	U
cis-1,3-Dichloropropylene	7.600	U	7.800	U
Cyclohexane	300	D	77	D
Dibromochloromethane	14	U	15	U
Dichlorodifluoromethane	97,000	D	170,000	D
Ethyl acetate	12	U	12	U
Ethyl Benzene	8.800	D	7.400	U
Hexachlorobutadiene	18	U	18	U
Isopropanol	12	D	8.400	U
Methyl Methacrylate	6.900	U	7	U
Methyl tert-butyl ether (MTBE)	6.100	U	6.200	U

JUNE 2017
VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	**SVE-2, VM-2**		**SVE-3**	
York ID	**17F0150-01**		**17F0150-02**	
Sampling Date	**6/2/2017**		**6/2/2017**	
Client Matrix	**Soil Vapor**		**Soil Vapor**	
Compound	Result	Q	Result	Q
Methylene chloride	12	U	12	U
n-Heptane	510	D	7	U
n-Hexane	830	D	170	D
o-Xylene	20	D	7.400	U
p- & m- Xylenes	31	D	15	U
p-Ethyltoluene	30	D	8.400	U
Propylene	250	D	92	D
Styrene	7.200	U	7.300	U
Tetrachloroethylene	24	D	5.800	D
Tetrahydrofuran	9.900	U	30	D
Toluene	8.900	D	6.500	U
trans-1,2-Dichloroethylene	6.700	U	6.800	U
trans-1,3-Dichloropropylene	7.600	U	7.800	U
Trichloroethylene	11	D	2.800	D
Trichlorofluoromethane (Freon 11)	100	D	890	D

JUNE 2017
VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	**SVE-2, VM-2**		**SVE-3**	
York ID	**17F0150-01**		**17F0150-02**	
Sampling Date	**6/2/2017**		**6/2/2017**	
Client Matrix	**Soil Vapor**		**Soil Vapor**	
Compound	Result	Q	Result	Q
Vinyl acetate	5.900	U	6	U
Vinyl bromide	7.300	U	7.500	U
Vinyl Chloride	86	D	4.400	D

NOTES:
Any detections are highlighted.

Q is the Qualifier Column with definitions as follows:
D=result is from an analysis that required a dilution
J=analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated
U=analyte not detected at or above the level indicated
B=analyte found in the analysis batch blank
E=result is estimated and cannot be accurately reported due to levels encountered or interferences
P=this flag is used for pesticide and PCB (Aroclor) target compounds when there is a % difference for detected concentrations that exceed method dictated limits between the two GC columns used for analysis
NT=this indicates the analyte was not a target for this sample
~=this indicates that no regulatory limit has been established for this analyte

OCTOBER 2017
VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	VW-1		VW-2		VW-3		VW-4		VW-5		VW-6	
York ID	17J0914-11		17J0914-06		17J0914-08		17J0914-09		17J0914-07		17J0914-10	
Sampling Date	10/20/2017		10/20/2017		10/20/2017		10/20/2017		10/20/2017		10/20/2017	
Client Matrix	Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor	
Compound	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Volatile Organics, EPA TO15 Full List	ug/m3		ug/m3		ug/m3		ug/m3		ug/m3		ug/m3	
Dilution Factor	14.52		66.76		549		70750		14.89		1086	
1,1,1,2-Tetrachloroethane	10	U	46	U	76	U	78	U	10	U	75	U
1,1,1-Trichloroethane	7.900	U	36	U	60	U	62	U	8.100	U	59	U
1,1,2,2-Tetrachloroethane	10	U	46	U	76	U	78	U	10	U	75	U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	11	U	51	U	84	U	150	D	11	U	84	U
1,1,2-Trichloroethane	7.900	U	36	U	60	U	62	U	8.100	U	59	U
1,1-Dichloroethane	5.900	U	27	U	45	U	46	U	6	U	44	U
1,1-Dichloroethylene	5.800	U	26	U	44	U	45	U	5.900	U	43	U
1,2,4-Trichlorobenzene	11	U	50	U	82	U	84	U	11	U	81	U
1,2,4-Trimethylbenzene	7.100	D	33	U	54	U	56	U	7.300	U	54	U
1,2-Dibromoethane	11	U	51	U	85	U	87	U	11	U	84	U
1,2-Dichlorobenzene	8.700	U	40	U	66	U	68	U	9	U	66	U
1,2-Dichloroethane	5.900	U	27	U	45	U	46	U	6	U	44	U
1,2-Dichloropropane	6.700	U	31	U	51	U	52	U	6.900	U	50	U
1,2-Dichlorotetrafluoroethane	920	D	3,100	D	110,000	D	10,000,000	D	820	D	160,000	D
1,3,5-Trimethylbenzene	7.100	U	33	U	54	U	56	U	7.300	U	54	U
1,3-Butadiene	9.600	U	44	U	73	U	75	U	9.900	U	72	U
1,3-Dichlorobenzene	8.700	U	40	U	66	U	68	U	9	U	66	U
1,3-Dichloropropane	6.700	U	31	U	51	U	52	U	6.900	U	50	U
1,4-Dichlorobenzene	8.700	U	40	U	66	U	68	U	9	U	66	U
1,4-Dioxane	10	U	48	U	79	U	81	U	11	U	79	U
2-Butanone	14	D	20	U	32	U	33	U	4.400	U	32	U
2-Hexanone	12	U	55	U	90	U	93	U	12	U	89	U
3-Chloropropene	23	U	100	U	170	U	180	U	23	U	170	U
4-Methyl-2-pentanone	5.900	U	27	U	45	U	46	U	6.100	U	45	U
Acetone	390	D	35	D	52	U	54	U	9.600	D	52	U
Acrylonitrile	3.200	U	14	U	24	U	25	U	3.200	U	24	U
Benzene	4.600	U	34	D	53	D	160	D	4.800	U	360	D
Benzyl chloride	7.500	U	35	U	57	U	59	U	7.700	U	56	U
Bromodichloromethane	9.700	U	45	U	74	U	76	U	10	U	73	U
Bromoform	15	U	69	U	110	U	120	U	15	U	110	U
Bromomethane	5.600	U	26	U	43	U	44	U	5.800	U	42	U
Carbon disulfide	4.500	U	21	U	34	U	35	U	4.600	U	34	U
Carbon tetrachloride	2.300	U	11	U	17	U	18	U	2.300	U	17	U
Chlorobenzene	6.700	U	31	U	51	U	52	U	6.900	U	50	U
Chloroethane	3.800	U	18	U	29	U	30	U	3.900	U	29	U
Chloroform	7.100	U	33	U	54	U	55	U	710	D	53	U
Chloromethane	3	U	14	U	23	U	23	U	3.100	U	23	U
cis-1,2-Dichloroethylene	5.800	U	26	U	44	U	45	U	5.900	U	48	D
cis-1,3-Dichloropropylene	6.600	U	30	U	50	U	51	U	6.800	U	49	U
Cyclohexane	5	U	23	U	120	D	190	D	5.100	U	780	D
Dibromochloromethane	12	U	57	U	94	U	96	U	13	U	93	U
Dichlorodifluoromethane	700	D	4,200	D	25,000	D	6,700,000	D	3,200	D	110,000	D
Ethyl acetate	15	D	48	U	79	U	81	U	11	U	330	D
Ethyl Benzene	18	D	29	U	48	U	49	U	6.500	U	47	U
Hexachlorobutadiene	15	U	71	U	120	U	120	U	16	U	120	U
Isopropanol	12	D	33	U	54	U	56	U	7.300	U	54	U
Methyl Methacrylate	5.900	U	27	U	45	U	46	U	6.100	U	45	U
Methyl tert-butyl ether (MTBE)	5.200	U	24	U	40	U	41	U	5.400	U	39	U

OCTOBER 2017
VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	VW-1		VW-2		VW-3		VW-4		VW-5		VW-6	
York ID	17J0914-11		17J0914-06		17J0914-08		17J0914-09		17J0914-07		17J0914-10	
Sampling Date	10/20/2017		10/20/2017		10/20/2017		10/20/2017		10/20/2017		10/20/2017	
Client Matrix	Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor	
Compound	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Methylene chloride	10	U	46	U	76	U	79	U	10	U	76	U
n-Heptane	6	U	27	U	160	D	180	D	6.100	U	1,900	D
n-Hexane	8.200	D	24	U	790	D	870	D	5.200	U	2,200	D
o-Xylene	19	D	29	U	48	U	49	U	6.500	U	52	D
p- & m- Xylenes	67	D	58	U	96	U	98	U	13	U	99	D
p-Ethyltoluene	9.300	D	33	U	54	U	56	U	7.300	U	54	U
Propylene	9.700	D	130	D	400	D	19	U	2.600	U	19	U
Styrene	6.200	U	28	U	47	U	48	U	6.300	U	46	U
Tetrachloroethylene	3.900	D	11	U	19	U	170	D	120	D	22	D
Tetrahydrofuran	8.600	U	39	U	65	U	67	U	8.800	U	64	U
Toluene	11	D	25	U	41	U	980	D	5.600	U	290	D
trans-1,2-Dichloroethylene	5.800	U	26	U	44	U	45	U	5.900	U	43	U
trans-1,3-Dichloropropylene	6.600	U	30	U	50	U	51	U	6.800	U	49	U
Trichloroethylene	2	U	9	U	15	U	18	D	21	D	47	D
Trichlorofluoromethane (Freon 11)	15	D	38	U	62	U	50,000	D	540	D	98	D
Vinyl acetate	5.100	U	24	U	39	U	40	U	5.200	U	38	U
Vinyl bromide	6.400	U	29	U	48	U	49	U	6.500	U	48	U
Vinyl Chloride	3.700	U	17	U	28	U	29	U	3.800	U	100	D

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:

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

U=analyte not detected at or above the level indicated

B=analyte found in the analysis batch blank

E=result is estimated and cannot be accurately reported due to levels encountered or interferences

P=this flag is used for pesticide and PCB (Aroclor) target compounds when there is a % difference for detected concentrations that exceed method dictated limits between the two GC columns used for analysis

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

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

OCTOBER 2017
VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	VW-7		VW-8		VW-9		VW-12		VW-19	
York ID	17J0914-03		17J0914-02		17J0914-01		17J0914-04		17J0914-05	
Sampling Date	10/20/2017		10/20/2017		10/20/2017		10/20/2017		10/20/2017	
Client Matrix	Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor	
Compound	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Volatile Organics, EPA TO15 Full List	ug/m3		ug/m3		ug/m3		ug/m3		ug/m3	
Dilution Factor	15.53		14.89		3434		57.64		14.15	
1,1,1,2-Tetrachloroethane	11	U	10	U	94	U	40	U	9.700	U
1,1,1-Trichloroethane	8.500	U	8.100	U	75	U	31	U	7.700	U
1,1,2,2-Tetrachloroethane	11	U	10	U	94	U	40	U	9.700	U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	12	U	11	U	100	U	44	U	11	U
1,1,2-Trichloroethane	8.500	U	8.100	U	75	U	31	U	7.700	U
1,1-Dichloroethane	6.300	U	6	U	55	U	23	U	5.700	U
1,1-Dichloroethylene	6.200	U	5.900	U	54	U	23	U	5.600	U
1,2,4-Trichlorobenzene	12	U	87	D	100	U	43	U	11	U
1,2,4-Trimethylbenzene	7.600	U	7.300	U	67	U	28	U	7	U
1,2-Dibromoethane	12	U	11	U	110	U	44	U	11	U
1,2-Dichlorobenzene	9.300	U	9	U	82	U	35	U	8.500	U
1,2-Dichloroethane	6.300	U	6	U	55	U	23	U	5.700	U
1,2-Dichloropropane	7.200	U	6.900	U	63	U	27	U	6.500	U
1,2-Dichlorotetrafluoroethane	560	D	86	D	90,000	D	1,100	D	110	D
1,3,5-Trimethylbenzene	7.600	U	7.300	U	67	U	28	U	7	U
1,3-Butadiene	10	U	9.900	U	91	U	38	U	9.400	U
1,3-Dichlorobenzene	9.300	U	9	U	82	U	35	U	8.500	U
1,3-Dichloropropane	7.200	U	6.900	U	63	U	27	U	6.500	U
1,4-Dichlorobenzene	9.300	U	9	U	82	U	35	U	8.500	U
1,4-Dioxane	11	U	11	U	99	U	42	U	10	U
2-Butanone	4.600	D	4.400	U	40	U	17	U	64	D
2-Hexanone	13	U	12	U	110	U	47	U	46	D
3-Chloropropene	24	U	23	U	210	U	90	U	22	U
4-Methyl-2-pentanone	6.400	U	6.100	U	56	U	24	U	5.800	U
Acetone	16	D	31	D	68	D	36	D	150	D
Acrylonitrile	3.400	U	3.200	U	30	U	13	U	3.100	U
Benzene	5	U	4.800	U	66	D	18	U	4.500	U
Benzyl chloride	8	U	7.700	U	71	U	30	U	7.300	U
Bromodichloromethane	10	U	10	U	92	U	39	U	9.500	U
Bromoform	16	U	15	U	140	U	60	U	15	U
Bromomethane	6	U	5.800	U	53	U	22	U	5.500	U
Carbon disulfide	4.800	U	4.600	U	43	U	18	U	4.400	U
Carbon tetrachloride	2.400	U	2.300	U	22	U	9.100	U	2.200	U
Chlorobenzene	7.100	U	6.900	U	63	U	27	U	6.500	U
Chloroethane	4.100	U	3.900	U	36	U	15	U	3.700	U
Chloroform	7.600	U	7.300	U	67	U	45	D	9.700	D
Chloromethane	3.200	U	3.100	U	28	U	12	U	2.900	U
cis-1,2-Dichloroethylene	6.200	U	5.900	U	54	U	23	U	5.600	U
cis-1,3-Dichloropropylene	7	U	6.800	U	62	U	26	U	6.400	U

OCTOBER 2017
VOLATILE ORGANIC COMPOUND ANALYSIS OF SOIL VAPOR SAMPLES
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK
BROWNFIELD CLEANUP PROGRAM SITE #C360143

Sample ID	VW-7		VW-8		VW-9		VW-12		VW-19	
York ID	17J0914-03		17J0914-02		17J0914-01		17J0914-04		17J0914-05	
Sampling Date	10/20/2017		10/20/2017		10/20/2017		10/20/2017		10/20/2017	
Client Matrix	Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor	
Compound	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Cyclohexane	5.300	U	5.100	U	52	D	20	U	4.900	U
Dibromochloromethane	13	U	13	U	120	U	49	U	12	U
Dichlorodifluoromethane	1,500	D	84	D	180,000	D	3,300	D	290	D
Ethyl acetate	11	U	11	U	99	U	42	U	10	U
Ethyl Benzene	6.700	U	6.500	U	59	U	25	U	6.100	U
Hexachlorobutadiene	17	U	16	U	150	U	61	U	15	U
Isopropanol	7.600	U	26	D	67	U	28	U	9	D
Methyl Methacrylate	6.400	U	6.100	U	56	U	24	U	5.800	U
Methyl tert-butyl ether (MTBE)	5.600	U	5.400	U	49	U	21	U	5.100	U
Methylene chloride	17	D	10	U	95	U	40	U	9.800	U
n-Heptane	6.400	U	6.100	U	100	D	24	U	5.800	U
n-Hexane	5.500	U	5.200	U	110	D	20	U	5	U
o-Xylene	6.700	U	6.500	U	59	U	25	U	6.100	U
p- & m- Xylenes	13	U	13	U	120	U	50	U	12	U
p-Ethyltoluene	7.600	U	7.300	U	67	U	28	U	7	U
Propylene	2.700	U	3.600	D	900	D	9.900	U	10	D
Styrene	6.600	U	6.300	U	58	U	25	U	6	U
Tetrachloroethylene	360	D	2.500	U	46	D	9,100	D	370	D
Tetrahydrofuran	9.200	U	8.800	U	81	U	34	U	8.300	U
Toluene	5.900	U	5.600	U	52	U	22	U	5.300	U
trans-1,2-Dichloroethylene	6.200	U	5.900	U	54	U	23	U	5.600	U
trans-1,3-Dichloropropylene	7	U	6.800	U	62	U	26	U	6.400	U
Trichloroethylene	35	D	2	U	29	D	250	D	620	D
Trichlorofluoromethane (Freon 11)	160	D	8.400	U	11,000	D	180	D	18	D
Vinyl acetate	5.500	U	5.200	U	48	U	20	U	5	U
Vinyl bromide	6.800	U	6.500	U	60	U	25	U	6.200	U
Vinyl Chloride	4	U	3.800	U	35	U	15	U	3.600	U

NOTES:

Any Regulatory Exceedences are color coded by Regulation

Q is the Qualifier Column with definitions as follows:

D=result is from an analysis that required a dilution

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

U=analyte not detected at or above the level indicated

B=analyte found in the analysis batch blank

E=result is estimated and cannot be accurately reported due to levels encountered or interferences

P=this flag is used for pesticide and PCB (Aroclor) target compounds when there is a % difference for detected concentrations that exceed method dictated limits between the two GC columns used for analysis

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

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

Attachment 2

MARBLEDALE ROAD
TUCKAHOE, NEW YORK

SOIL VAPOR EXTRACTION SYSTEM

DECEMBER 2018

DuBois & King inc.

PROJECT LOCATION PLAN

SCALE: 1" = 1000 FEET ±

LIST OF DRAWINGS

OVERALL PROJECT LEGEND

APPROXIMATE INTERPOLATED CONTAMINANTS OF CONCERN DISTRIBUTION BASED ON MOST RECENT SOIL VAPOR RESULTS

- BENZENE >100 µg/m³
- FREONS >15,000,000 µg/m³
- FREONS >5,000,000 µg/m³
- FREONS >1,000,000 µg/m³
- FREONS >500,000 µg/m³
- FREONS >100,000 µg/m³
- PCE, TCE, VC >1,000 µg/m³
- PCE, TCE, VC >500 µg/m³
- PCE, TCE, VC >100 µg/m³

OTHER SYMBOLS

- VAPOR POINT
- VAPOR WELL
- SVE WELL
- SVE PIPING

DuBois & King inc.

25 UNION STREET
BRANDON, VT 05733
TEL: (802) 465-8396
www.dubois-king.com

PROFESSIONAL SEAL

STATE OF NEW YORK — LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION
PRELIMINARY PLANS

NO.	DATE	DESCRIPTION	BY	CK'D

HYDRO-ENVIRONMENTAL SOLUTIONS, INC.

ONE DEANS BRIDGE RD.
SOMERS, NY 10589

109 MARBLEDALE ROAD

TUCKAHOE, NY

SHEET TITLE

TITLE SHEET

DRAWN BY	DATE
TJD	12-17-18
CHECKED BY	D&K PROJECT #
WAC (HES)	223060
PROJ. ENG.	D&K ARCHIVE #
JBA	

SHEET NUMBER

G 1

SHEET 1 OF 6

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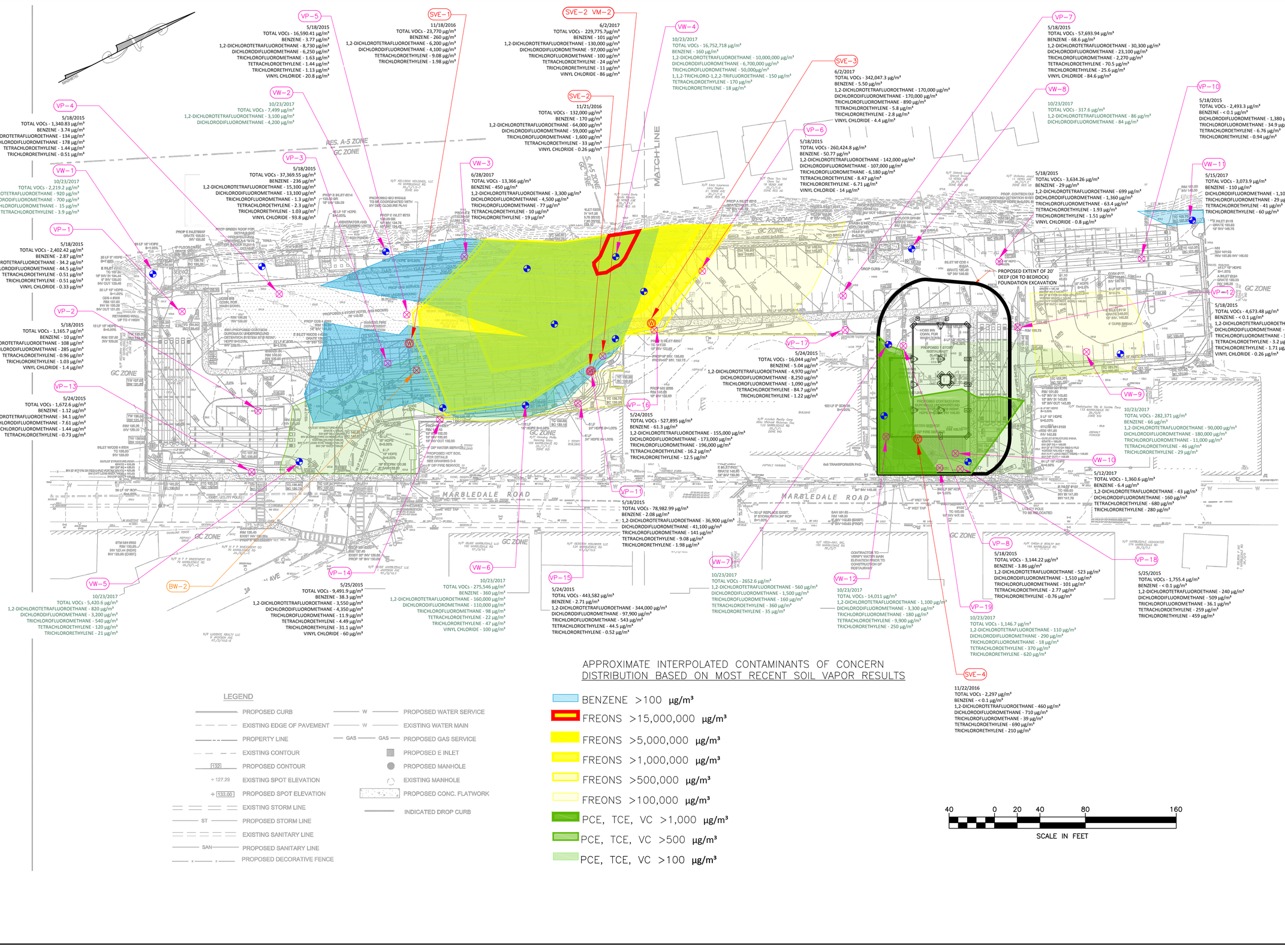

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PROFESSIONAL SEAL

NOT FOR CONSTRUCTION PRELIMINARY PLANS

NO.	DATE	DESCRIPTION	BY	CK'D

HYDRO-ENVIRONMENTAL SOLUTIONS, INC.
ONE DEANS BRIDGE RD.
SOMERS, NY 10589

109 MARBLEDALE ROAD
TUCKAHOE, NY

SHEET TITLE
SOIL VAPOR CONTAMINANTS OF CONCERN DISTRIBUTION PLAN

DRAWN BY	DATE
TJD	12-17-18
CHECKED BY	D&K PROJECT #
WAC (HES)	223060
PROJ. ENG.	D&K ARCHIVE #
JBA	

SHEET NUMBER
SV 1

SHEET 2 OF 6

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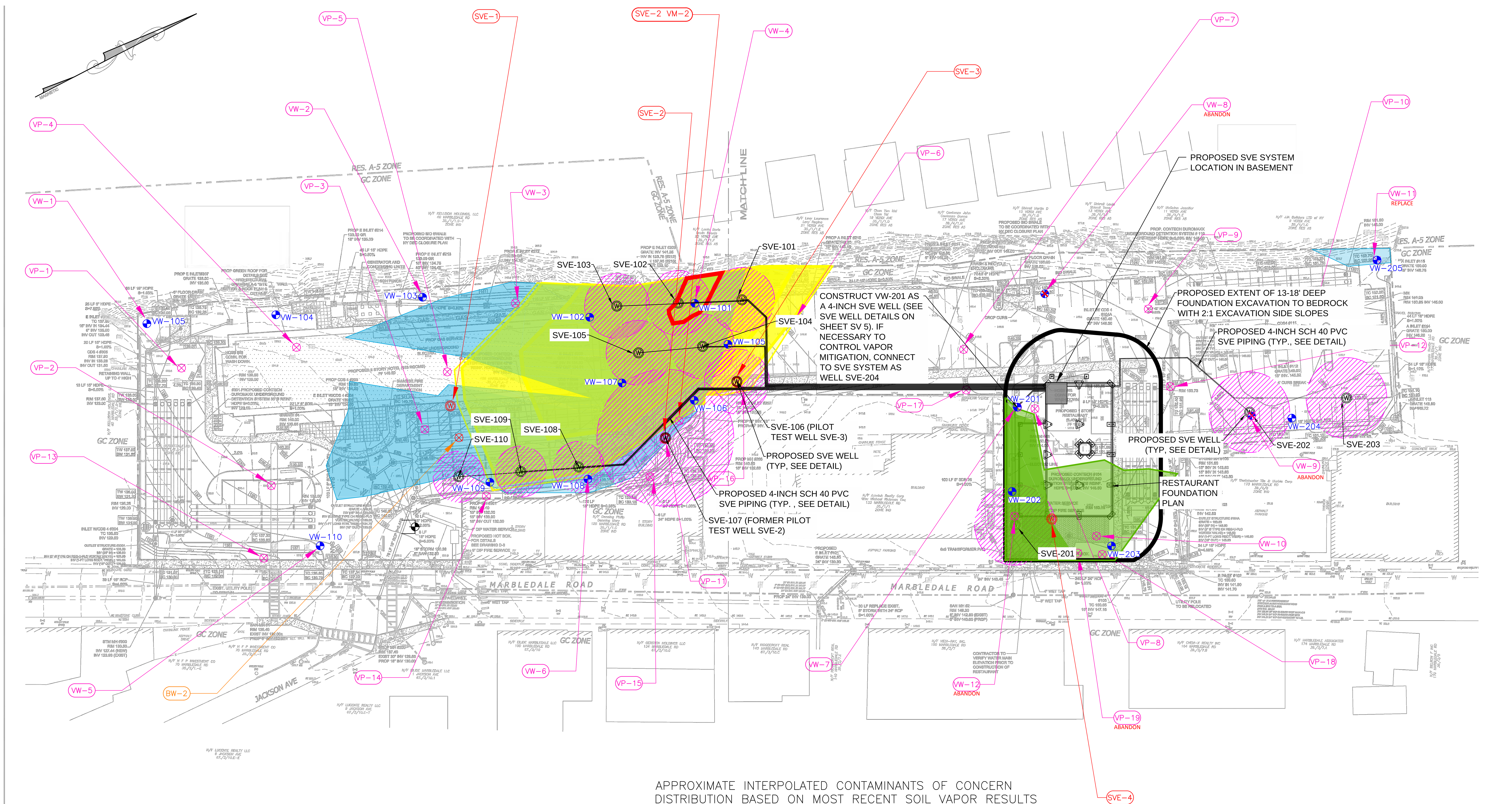

APPROXIMATE INTERPOLATED CONTAMINANTS OF CONCERN DISTRIBUTION BASED ON MOST RECENT SOIL VAPOR RESULTS

- BENZENE >100 μg/m³
- FREONS >15,000,000 μg/m³
- FREONS >5,000,000 μg/m³
- FREONS >1,000,000 μg/m³
- FREONS >500,000 μg/m³
- PCE, TCE, VC >1,000 μg/m³
- PCE, TCE, VC >500 μg/m³

LEGEND

- PROPOSED CURB
- EXISTING EDGE OF PAVEMENT
- PROPERTY LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXISTING SPOT ELEVATION
- PROPOSED SPOT ELEVATION
- EXISTING STORM LINE
- PROPOSED STORM LINE
- EXISTING SANITARY LINE
- PROPOSED SANITARY LINE
- PROPOSED DECORATIVE FENCE
- PROPOSED WATER SERVICE
- EXISTING WATER MAIN
- PROPOSED GAS SERVICE
- PROPOSED E INLET
- PROPOSED MANHOLE
- EXISTING MANHOLE
- PROPOSED CONC. FLATWORK
- INDICATED DROP CURB

40 0 20 40 80 160
SCALE IN FEET

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PRELIMINARY PLANS

NO.	DATE	DESCRIPTION	BY	CK'D

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ONE DEANS BRIDGE RD.
SOMERS, NY 10589

109 MARBLEDALE ROAD
TUCKAHOE, NY

SHEET TITLE
SOIL VAPOR EXTRACTION SYSTEM LAYOUT

DRAWN BY	DATE
TJD	12-17-18
CHECKED BY WAC (HES)	D&K PROJECT # 223060
PROJ. ENG. JBA	D&K ARCHIVE #

SHEET NUMBER
SV 2

PROPOSED EXTENT OF 13-18' DEEP FOUNDATION EXCAVATION TO BEDROCK WITH 2:1 EXCAVATION SIDE SLOPES

PROPOSED 4-INCH SCH 40 PVC SVE PIPING (TYP., SEE DETAIL)

CONSTRUCT VW-201 AS A 4-INCH SVE WELL (SEE SVE WELL DETAILS ON SHEET SV 5). IF NECESSARY TO CONTROL VAPOR MITIGATION, CONNECT TO SVE SYSTEM AS WELL SVE-204

PROPOSED SVE WELL (TYP, SEE DETAIL)

PROPOSED HOT BOX. FOR DETAILS SEE DRAWING D-3

RESTAURANT FOUNDATION PLAN

N/F Westchester Tile & Marble Corp
173 MARBLEDALE RD
39./4/8
ZONE IND

DuBois & King inc.

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TEL: (802) 465-8396
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PROFESSIONAL SEAL

STATE OF NEW YORK — LICENSED PROFESSIONAL ENGINEER

NOT FOR CONSTRUCTION
PRELIMINARY PLANS

NO.	DATE	DESCRIPTION	CK'D

HYDRO-ENVIRONMENTAL SOLUTIONS, INC.

ONE DEANS BRIDGE RD.
SOMERS, NY 10589

109 MARBLEDALE ROAD

TUCKAHOE, NY

SHEET TITLE

RESTAURANT SOIL VAPOR EXTRACTION SYSTEM LAYOUT

DRAWN BY	DATE
TJD	12-17-18
CHECKED BY	D&K PROJECT #
WAC (HES)	223060
PROJ. ENG.	D&K ARCHIVE #
JBA	

SCALE IN FEET: 10 0 5 10 20 40

SHEET NUMBER

SV 3

SHEET 4 OF 6

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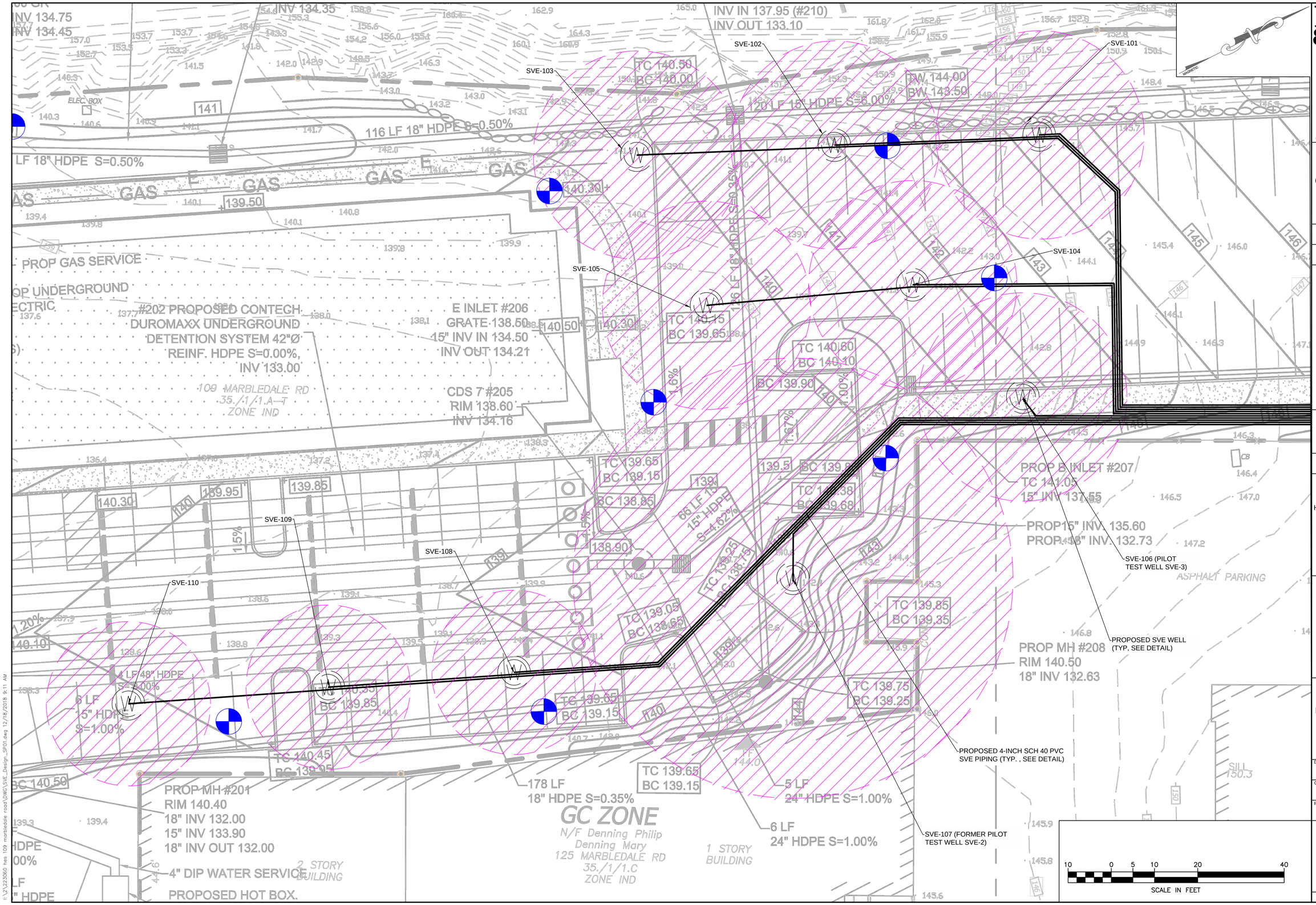

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PROFESSIONAL SEAL

STATE OF NEW YORK

NOT FOR CONSTRUCTION PRELIMINARY PLANS

NO.	DESCRIPTION	DATE	CK'D

HYDRO-ENVIRONMENTAL SOLUTIONS, INC.

ONE DEANS BRIDGE RD.
SOMERS, NY 10589

109 MARBLEDALE ROAD

TUCKAHOE, NY

SHEET TITLE

HOTEL SOIL VAPOR EXTRACTION SYSTEM LAYOUT

DRAWN BY	DATE
TJD	12-17-18
CHECKED BY	D&K PROJECT #
WAC (HES)	223060
PROJ. ENG.	D&K ARCHIVE #
JBA	

SHEET NUMBER

SV 4

SHEET 5 OF 6

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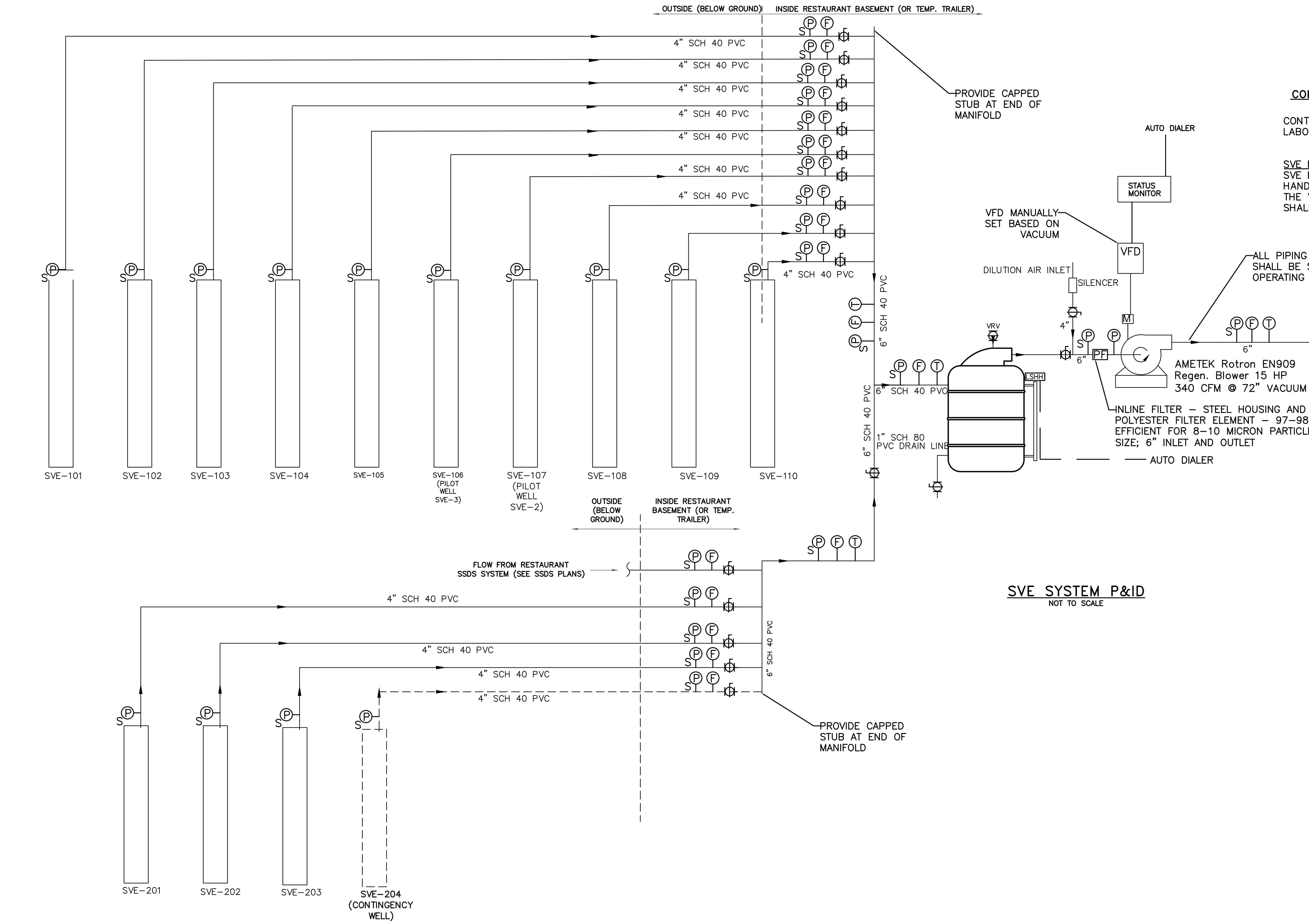


SVE SYSTEM P&ID
NOT TO SCALE

CONTROL SEQUENCE

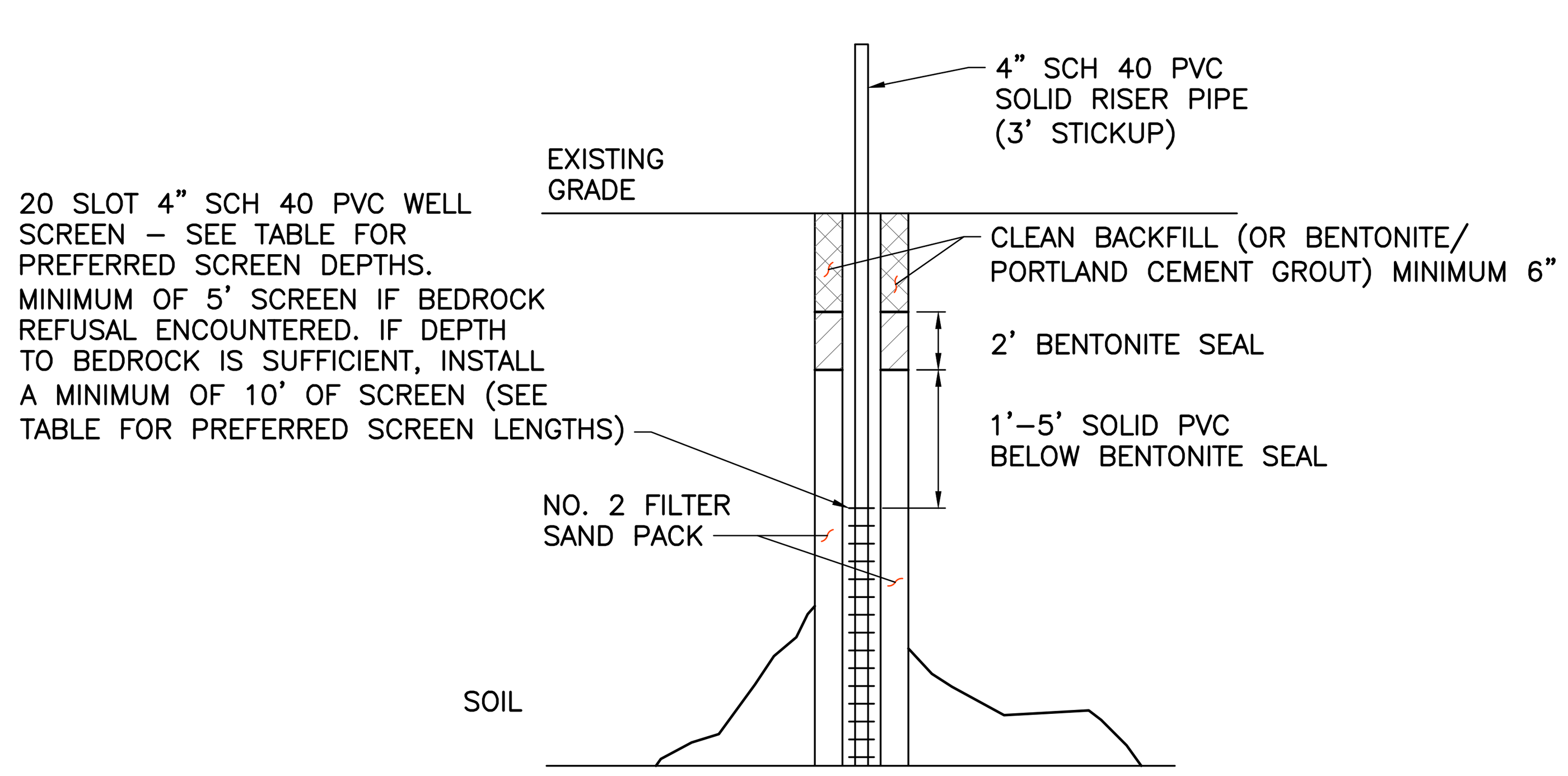
CONTRACTOR SHALL PROVIDE ALL MATERIAL, HARDWARE, WIRING, SENSORS, LABOR, PROGRAMMING TO ACCOMPLISH THE FOLLOWING:

SVE BLOWER
SVE BLOWER SHALL BE MANUALLY STARTED AND STOPPED VIA A HAND–OFF–AUTO SWITCH. SVE BLOWER SPEED SHALL BE MANUALLY SET AT THE VFD BASED ON PRESSURE AND VACUUM REQUIREMENTS. SVE BLOWER SHALL BE DISABLED UPON ACTIVATION OF MOISTURE KNOCKOUT HIGH LEVEL.

LEGEND

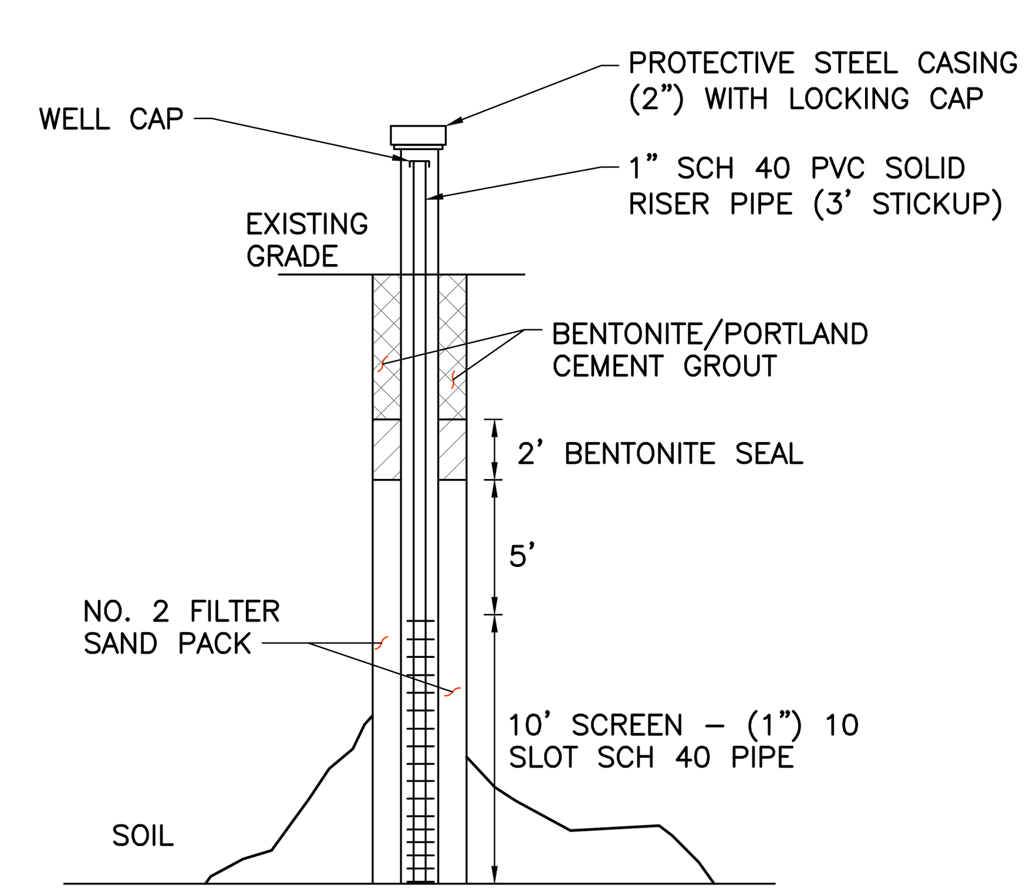
Ⓟ	PRESSURE (VACUUM) GAUGE, DIRECT READ
S	SAMPLE PORT
Ⓕ	FLOW ELEMENT (PITOT TUBE)
VFD	VARIABLE FREQUENCY DRIVE
Ⓣ	TEMPERATURE GAUGE (DIRECT READ)
VRV	VACUUM RELIEF VALVE – SET FOR 120" WATER VACUUM

NOTE:
1. DISCHARGE SHALL NOT BE LESS THAN 25–FT FROM THE PROPERTY LINE, ANY WINDOW, DOOR, OR OTHER OPENING OF THE BUILDING, INCLUDING HEATING, VENTILATING AND AIR CONDITIONING INTAKE POINTS, AND FROM RECEPTORS INCLUDING OUTDOOR SEATING AREAS.

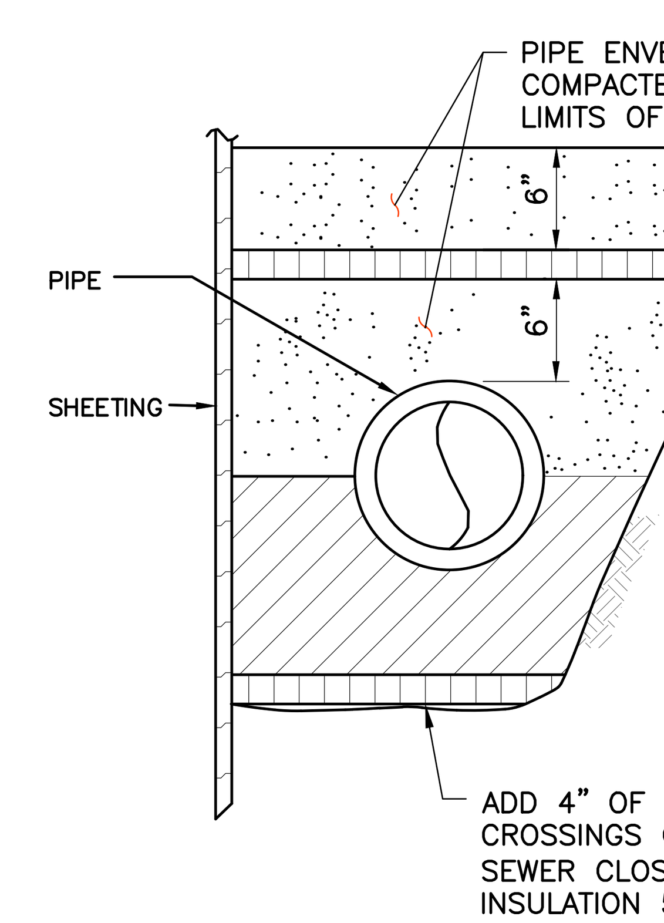


SVE WELL DETAIL
NOT TO SCALE

NOTE:
MINIMUM OF 4" BENTONITE SEAL BETWEEN BOTTOM OF SCREEN AND BEDROCK IF BEDROCK REFUSAL IS ENCOUNTERED.



SVE SOIL VAPOR POINT DETAIL
NOT TO SCALE

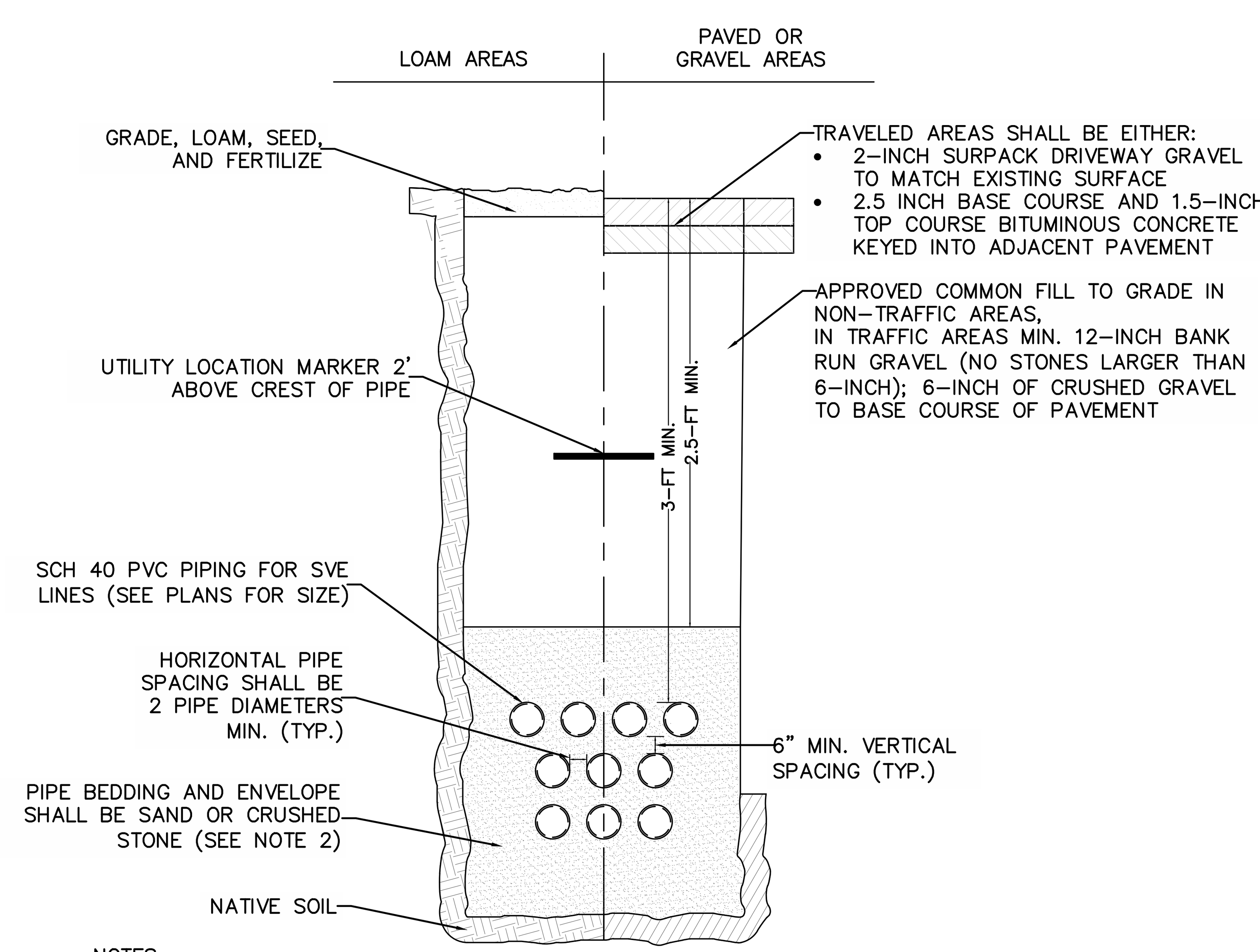


TRENCH INSULATION DETAIL TABLE

COVER (FEET)	RIGID INSULATION THICKNESS (IN)
5'–1" – 5'–6"	0
4'–1" – 5'–0"	0
3'–1" – 4'–0"	0
2'–0" – 3'–0"	1

TRENCH INSULATION DETAIL
NOT TO SCALE

NOTE:
TRENCH RESTORATION IS PER SITE COVER DESIGN.



NOTES:
1. ALL EXCAVATION MUST MEET OSHA STANDARDS.
2. BEDDING MATERIAL SHALL BE FULL WIDTH OF TRENCH. BEDDING MATERIAL SHALL BE 6" BELOW PIPE (IN EARTH) OR 12" BELOW PIPE (IN LEDGE) UP TO SPRING LINE OF PIPE.
3. PIPE COVER MATERIAL SHALL BE FULL WIDTH OF TRENCH FROM SPRING LINE UP TO 12" (MINIMUM) ABOVE CREST OF PIPE. [PIPE COVER MATERIAL SHALL BE SCREENED SAND].

SVE PIPE TRENCH DETAIL
NOT TO SCALE

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PROFESSIONAL SEAL
NOT FOR CONSTRUCTION PRELIMINARY PLANS

NO.	DATE	DESCRIPTION	BY	CK'D

HYDRO-ENVIRONMENTAL SOLUTIONS, INC.
ONE DEANS BRIDGE RD.
SOMERS, NY 10589

109 MARBLEDALE ROAD
TUCKAHOE, NY

SHEET TITLE
DETAILS

DRAWN BY	DATE
TJD	12-17-18
CHECKED BY	D&K PROJECT #
WAC (HES)	223060
PROJ. ENG.	D&K ARCHIVE #
JBA	

SHEET NUMBER
SV 5

Attachment 3

Soil Vapor Extraction
Data Sheet
SVE-1 Pilot Test
109-125 Marbledale Road, Tuckahoe, New York

Soil Vapor Extraction Well: SVE-1 **Date:** 11/18/2016 **Personnel:** MJS, WAC

SVE Well Diameter (inches): 4" **Screened Inverval Thickness:** 15-5 ftbg

	Carbon Influent																Carbon Mid Stream		Carbon Effluent		Removal Efficiency		Removal Efficiency		Ambient Air	
Time:	Vacuum ("$H_2$0)	Pressure ("$H_2$0)	Absolute Pressure (atm)	Velocity Before Pump (ft/min)	Standard Flow Rate Before Pump (scfm)	Actual Flow Rate Before Pump (acfm)	Temp. (°F)	Temp. (K)	Velocity After Pump (ft/min)	Standard Flow Rate After Pump (scfm)	Actual Flow Rate After Pump (acfm)	PID (ppm)	Estimated COC Conc. (mg/m^3)	FID (ppm)	Estimated COC Conc. (mg/m^3)	COC Mass Removal Rate (lb/day)	PID (ppm)	FID(ppm)	PID (ppm)	FID(ppm)	VOCs Removal - 1st Carbon Drum (%)	FID-Based Removal - 1st Carbon Drum (%)	VOCs Removal - 2nd Carbon Drum (%)	FID-Based Removal - 2nd Carbon Drum (%)	PID (ppm)	FID(ppm)
8:58	8.5		0.98	718	63.5							28.2	20.5				<0.1	0								
9:12	15		0.96	1,000	88.4							27.5	20.0	18,000	24.2		0.3	4,985	0.6	2,200	98.9%	72.3%	97.8%	87.8%		
9:28	15		0.96						3,700	327.1																
9:40	15		0.96						3,200	282.9		5.5	4.0				0.1		0.1		98.2%		98.2%			
9:50	15		0.96	502	44.4				3,200	282.9		7.7	5.6				0.2		0.1		97.4%		98.7%			
10:03	30	2	0.93	805	71.2				2,890	255.5		13.4	9.7	9,546	12.8	0.34	0.1	9,078	0.1	3,975	99.3%	4.9%	99.3%	58.4%	0.4	12.64
10:30	30	2	0.93	1,290	114.0	131.9	66.8	292.5	2,827	249.9	289.0	11.2	8.1		5.9	0.15	0.5		<0.1		95.5%		99.1%		0.2	
10:56	30	3.8	0.93	690	61.0	71.1	71.0	294.8	2,890	255.5	297.8	15.2	11.1	11,500	15.4	0.41	0.1	11,400	0.1	4,763	99.3%	0.9%	99.3%	58.6%	0.4	0.68
11:28	60	2.3	0.85	3,700	327.1	438.5	102.0	312.0	1,930	170.6	228.7	20.7	15.1	18,700	25.1	0.52	<0.1	18,000	<0.1	7,630	99.5%	3.7%	99.5%	59.2%	<0.1	2.82
12:50	60	2.55	0.85	1,900	168.0	219.6	88.0	304.3	2,300	203.3	265.8	18.3	13.3	17,700	23.8	0.57	<0.1	16,800	<0.1	10,800	99.5%	5.1%	99.5%	39.0%	<0.1	10
13:25	60	2.55	0.85									19.9	14.5				<0.1		<0.1		99.5%		99.5%		0.2	
13:30	78		0.81																							

Soil Vapor Extraction Data Sheet
SVE-1 Pilot Test
Monitoring Well Readings
109-125 Marbledale Road, Tuckahoe, New York

Soil Vapor Extraction Well: SVE-1 **Date:** 11/18/2016 **Personnel:** MJS, WAC

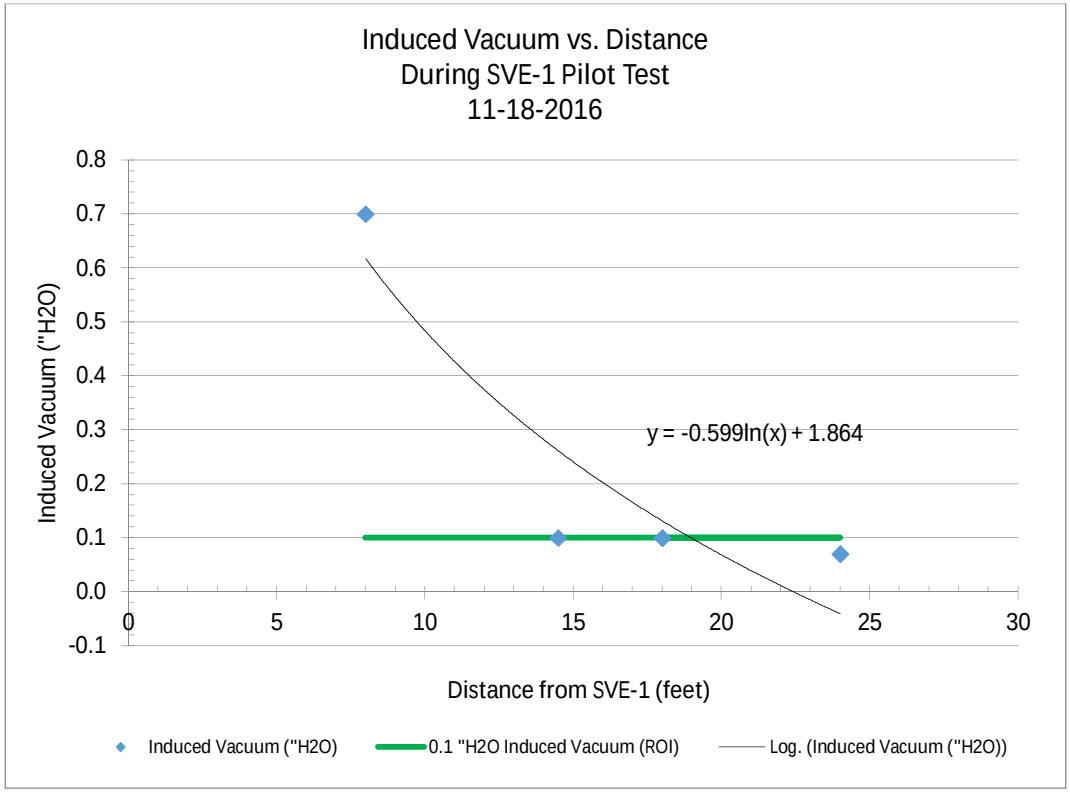
		VM-1			VM-2			VM-3			OW-2		
		Well Diameter (inches): 1"			Well Diameter (inches): 1"			Well Diameter (inches): 1"			Well Diameter (inches): 4"		
		Screened Inverval Thickness: 13.1-5.1 ftbg			Screened Inverval Thickness: 15-5 ftbg			Screened Inverval Thickness: 15-5 ftbg			Screened Inverval Thickness: 38-28 ftbg		
		Distance From SVE-1 (ft): 8			Distance From SVE-1 (ft): 14.5			Distance From SVE-1 (ft): 24			Distance From SVE-1 (ft): 18		
Time:	Vacuum at SVE-1 ("H_20)	Vacuum ("H_20)	PID (ppm)	FID (ppm)	Vacuum ("H_20)	PID (ppm)	FID (ppm)	Vacuum ("H_20)	PID (ppm)	FID (ppm)	Vacuum ("H_20)	PID (ppm)	FID (ppm)
9:03	8.5	0.0	46.7		0.0	43.9		0.0	28				
9:10	15	0.09	25.3	24.67	0.01	21.2	28.03	0.015	26.8	25.43	0.0		4,200
9:30	15	0.08	14.5		0.02	5.3		0.02	9.3				
9:50	15	0.11	10.1		0.03	3.6		0.02	4.4		0.02	7.1	
10:03	30	0.2	5.5	8.69	0.005	1.7	21.72	0.04	1.7	7.21			
10:30	30	0.21	4.2		0.05	1.0		0.05	1.1		0.03	4.9	
10:56	30	0.22	8.7	17.22	0.05	4.1	13.18	0.04	3.9	26.11	0.03	4.3	4,945
11:28	60	0.6	3.4	6.57	0.1	3.5	4.16	0.07	5.3	13.03	0.05	1.2	2,308
12:50	60	0.65	1.0	1.8	0.09	1.2	9.51	0.07	4.4	20.77	0.1	0.1	21.89
13:25	60	0.7	1.3		0.09	0.4		0.06	0.5		0.5	0.3	
13:30	78	0.95			0.12			0.08					

TABLE 1

Induced Vacuum vs. Distance During 60 "H_2O Applied Vacuum Test

Project Name: HES 109-125 Marbledale Road
Project #: 223060
Date: November 18, 2016

Monitoring Location	Max. Induced Vacuum ("H_2O)	Distance from DPE-1 (feet)
VM-1 @ SVE-1	0.7	8
VM-2 @ SVE-1	0.1	14.5
VM-3 @ SVE-1	0.07	24
OW-2	0.1	18



Calculate Distance (x) at Which Induced Vacuum (y) = 0.1 "H_2O : 2.944908 =LN(x) x = **19.0 feet ROI**

Soil Vapor Extraction
Data Sheet
SVE-2 Pilot Test
109-125 Marbledale Road, Tuckahoe, New York

Soil Vapor Extraction Well: SVE-2 **Date:** 11/21/2016 **Personnel:** MJS, WAC

SVE Well Diameter (inches): 4" **Screened Inverval Thickness:** 15-5 ftbg

	Carbon Influent															Carbon Mid Stream		Carbon Effluent		Removal Efficiency		Removal Efficiency		Ambient Air	
Time:	Vacuum ("$H_2$0)	Pressure ("$H_2$0)	Pressure (atm)	Velocity Before Pump (ft/min)	Standard Flow Rate Before Pump (scfm)	Actual Flow Rate Before Pump (acfm)	Temp. (°F)	Temp. (K)	Velocity After Pump (ft/min)	Standard Flow Rate After Pump (scfm)	Actual Flow Rate After Pump (acfm)	PID (ppm)	FID (ppm)	Estimated COC Conc. (mg/m^3)	COC Mass Removal Rate (lb/day)	PID (ppm)	FID(ppm)	PID (ppm)	FID(ppm)	VOCs Removal - 1st Carbon Drum (%)	FID-Based Removal - 1st Carbon Drum (%)	VOCs Removal - 2nd Carbon Drum (%)	FID-Based Removal - 2nd Carbon Drum (%)	PID (ppm)	FID(ppm)
9:30	0											2.0	192	2.0										0.1	
9:55	3.5	37	0.99	520	46.0																				
10:24	3.5	38	0.99	570	50.4	51.4	37.5	276.2	2,920	258.1	263.4	10.1	17,200	179	4.2	<0.1	14,500	<0.1	21,100	99.0%	15.7%	99.01%	-22.67%	0.1	11.91
10:54	15	34	0.96	225	19.9				3,020	267.0		20.7		3.3	0.079	0.2		0.2		99.0%		99.03%		0.5	
11:40	15	32	0.96	1,660	146.7				2,870	253.7		25.2	14,300	149	3.4	0.2	12,500	0.2	1,335	99.2%	12.6%	99.21%	90.66%	0.8	5.58
12:06	30	25	0.93	2,700	238.7				2,200	194.5		33.4		5.3	0.093	0.3		0.3		99.1%		99.10%		0.9	
12:45	30											34.0		5.4											
13:10	30	28	0.93	2,700	238.7		78.0	298.7	2,400	212.2	250.6	39.0	12,700	132	3.0	<0.1	11,000	<0.1	2,258	99.7%	13.4%	99.74%	82.22%	0.2	1.35
14:40	28	28	0.93	2,900	256.4	300.1	76.0	297.6	2,211	195.5	228.8	46.3		7.4	0.15	<0.1		0.1						0.2	

Soil Vapor Extraction Data Sheet
SVE-2 Pilot Test
Monitoring Well Readings
109-125 Marbledale Road, Tuckahoe, New York

Soil Vapor Extraction Well: SVE-2 **Date:** 11/21/2016 **Personnel:** MJS, WAC

		VM-1			VM-2			VM-3		
		Well Diameter (inches): 1"			Well Diameter (inches): 1"			Well Diameter (inches): 1"		
		Screened Inverval Thickness: 8-5 ftbg			Screened Inverval Thickness: 13.8-5.8 ftbg			Screened Inverval Thickness: 13.2-5.2 ftbg		
		Distance From SVE-2 (ft): 8.5			Distance From SVE-2 (ft): 15.75			Distance From SVE-2 (ft): 25.5		
Time:	Vacuum at SVE-2 ("H_20)	Vacuum ("H_20)	PID (ppm)	FID (ppm)	Vacuum ("H_20)	PID (ppm)	FID (ppm)	Vacuum ("H_20)	PID (ppm)	FID (ppm)
9:30	0		8.3	25,500		7.0	12,900		4.3	25,500
9:55	3.5	0.25			0.04			0.03		
10:24	3.5	0.18	0.2	24.70	0.2	0.6	9.88	0.30	0.9	5.96
10:54	15	0.90	0.1		0.14	0.3		0.13	0.3	
11:28	15	0.95	0.1	15.09	0.08	0.2	13.85	0.12	0.3	10.55
12:00	30	1.7	0.4		0.2	0.3		0.25	0.3	
13:10	30	1.7	0.1	62.50	0.15	0.2	15.15	0.20	0.2	19.84
14:40	28	1.8								

Soil Vapor Extraction Data Sheet
SVE-2 Pilot Test
Monitoring Well Readings
109-125 Marbledale Road, Tuckahoe, New York

Soil Vapor Extraction Well: SVE-2 **Date:** 11/21/2016 **Personnel:** MJS, WAC

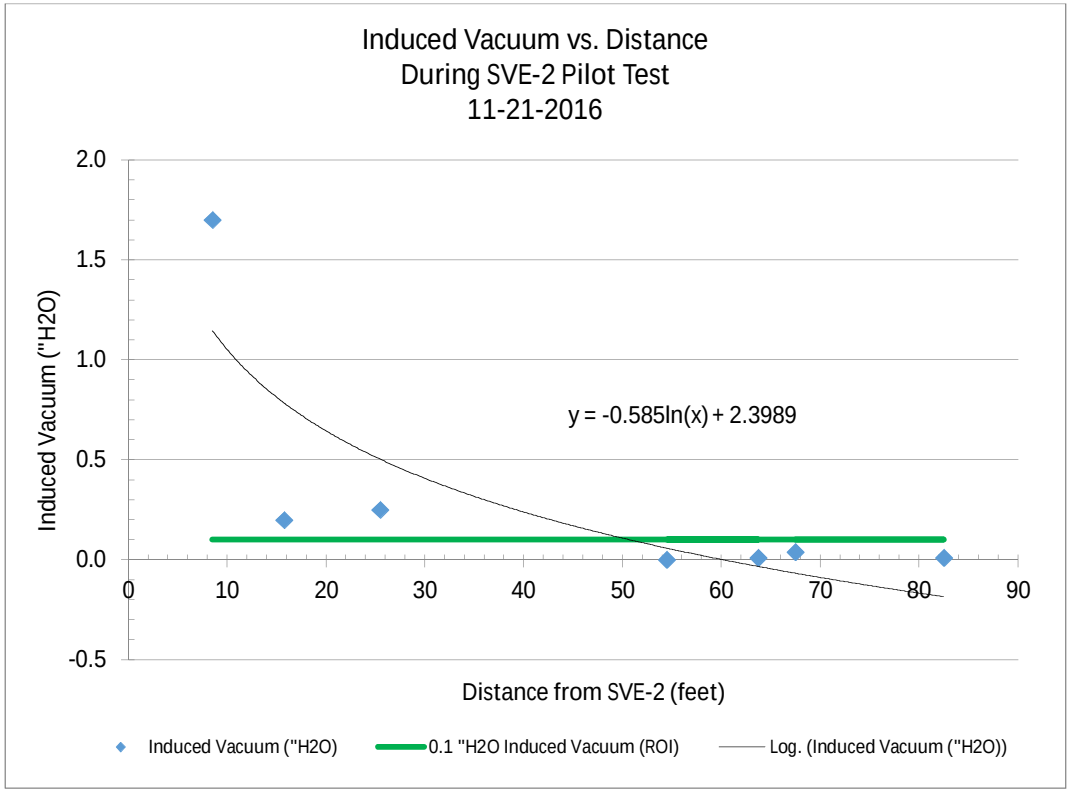
		VM-1 at SVE-3			VM-2 at SVE-3			VM-3 at SVE-3			SVE-3		
		Well Diameter (inches): 1"			Well Diameter (inches): 1"			Well Diameter (inches): 1"			Well Diameter (inches): 4"		
		Screened Inverval Thickness: 9.2-5.2 ftbg			Screened Inverval Thickness: 9-5 ftbg			Screened Inverval Thickness: 8.5-5.5 ftbg			Screened Inverval Thickness: 15-5 ftbg		
		Distance From SVE-2 (ft): 63.75			Distance From SVE-2 (ft): 54.5			Distance From SVE-2 (ft): 82.5			Distance From SVE-2 (ft): 67.5		
Time:	Vacuum at SVEW ("H20)	Vacuum ("H20)	PID (ppm)	FID (ppm)	Vacuum ("H20)	PID (ppm)	FID (ppm)	Vacuum ("H20)	PID (ppm)	FID (ppm)	Vacuum ("H20)	PID (ppm)	FID (ppm)
9:30	0.0		10.2	2,340,000		1.2	139,000		1.0	69,000		4.9	21,900
9:55	3.5	0.10			0			0		0			
10:24	3.5	0	6.5	297	0	1.4	8.84	0.01	1.9	32,800	0.01	4.5	21,300
10:54	15	0.01	7.4		0	1.8		0	1.7		0.03	4.7	
11:28	15	0	6.5	8.60	0	1.5	6.37	0	1.2	9.04	0	4.5	9.32
12:00	30	0	5.0		0	0.8		0	0.7		0	5.7	
13:10	30	0.01	3.5	20.67	0	0.5	15.44	0.01	0.7	18.54	0.04	6.2	5.24

TABLE 2

Induced Vacuum vs. Distance During 30 "H_2O Applied Vacuum Test

Project Name: HES 109-125 Marbledale Road
Project #: 223060
Date: November 21, 2016

Monitoring Location	Max. Induced Vacuum ("H_2O)	Distance from DPE-1 (feet)
VM-1 @ SVE-2	1.7	8.5
VM-2 @ SVE-2	0.2	15.75
VM-3 @ SVE-2	0.25	25.5
VM-1 @ SVE-3	0.01	63.75
VM-2 @ SVE-3	0.0	54.5
VM-3 @ SVE-3	0.01	82.5
SVE-3	0.04	67.5



Calculate Distance (x) at Which Induced Vacuum (y) = 0.1 "H_2O : 3.929744 =LN(x) x = **50.9 feet ROI**

Soil Vapor Extraction
Data Sheet
SVE-3 Pilot Test
109-125 Marbledale Road, Tuckahoe, New York

Soil Vapor Extraction Well: SVE-3

Date: 11/22/2016

Personnel: MJS, WAC

SVE Well Diameter (inches): 4"

Screened Inverval Thickness: 15-5 ftbg

	Carbon Influent																Carbon Mid Stream		Carbon Effluent		Removal Efficiency		Removal Efficiency		Ambient Air	
Time:	Vacuum ("$H_2$0)	Pressure ("$H_2$0)	Pressure (atm)	Velocity Before Pump (ft/min)	Standard Flow Rate Before Pump (scfm)	Actual Flow Rate Before Pump (acfm)	Temp. (°F)	Temp. (K)	Velocity After Pump (ft/min)	Standard Flow Rate After Pump (scfm)	Actual Flow Rate After Pump (acfm)	PID (ppm)	Estimated COC Conc. (mg/m^3)	FID (ppm)	Estimated COC Conc. (mg/m^3)	COC Mass Removal Rate (lb/day)	PID (ppm)	FID(ppm)	PID (ppm)	FID(ppm)	VOCs Removal - 1st Carbon Drum (%)	FID-Based Removal - 1st Carbon Drum (%)	VOCs Removal - 2nd Carbon Drum (%)	FID-Based Removal - 2nd Carbon Drum (%)	PID (ppm)	FID(ppm)
13:35	0		1.00									4.6	0.45	2.74	0.021										0.1	10.32
13:55	10	3	0.98	4,100	362.4	386.9	52.0	284.3	580	51.3	54.7	0.6	0.059				0.1		0.1		83.33%		83.33%			
14:15	8	3	0.98	3,621	320.1	344.8	59.2	288.3	480	42.4	45.7	0.7	0.069	332	2.5	0.010	0.1	355	0.1	332	85.71%	-6.93%	85.71%	0%		
14:40	30	4	0.93	3,300	291.7	326.3	49.5	282.9	1,400	123.8	138.4	2.2	0.22	1,760	13.4	0.17	0.1	1,860	<0.1	1,421	95.45%	-5.68%	95.45%	19.26%		
15:05	65	2	0.84	1,760	155.6	191.8			1,700	150.3				3,749	28.6	0.43		1,690		928		54.92%		75.25%		61
16:30	75		0.82																							

Soil Vapor Extraction Data Sheet
SVE-3 Pilot Test
Monitoring Well Readings
109-125 Marbledale Road, Tuckahoe, New York

Soil Vapor Extraction Well: SVE-3 **Date:** 11/22/2016 **Personnel:** MJS, WAC

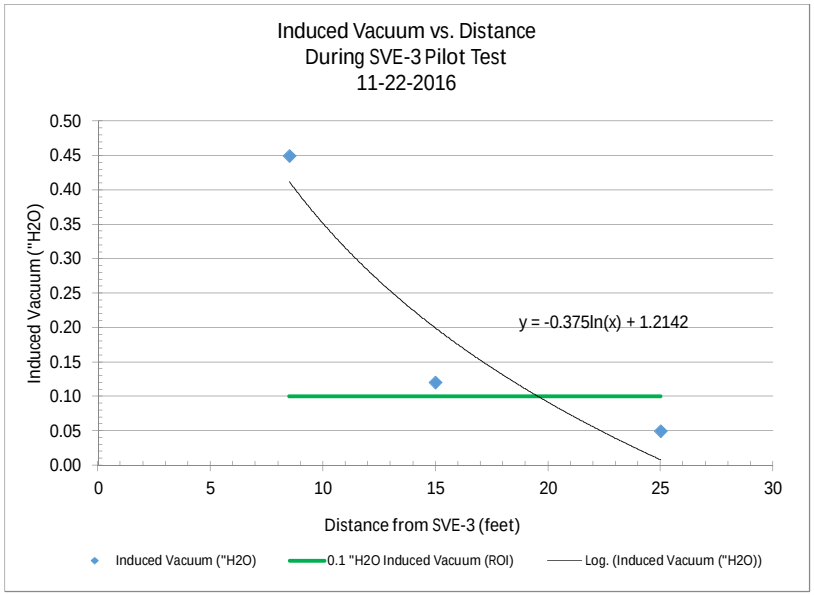
		VM-1			VM-2			VM-3		
		Well Diameter (inches): 1"			Well Diameter (inches): 1"			Well Diameter (inches): 1"		
		Screened Inverval Thickness: 9.2-5.2 ftbg			Screened Inverval Thickness: 9-5 ftbg			Screened Inverval Thickness: 8.5-5.5 ftbg		
		Distance From SVE-3 (ft): 8.5			Distance From SVE-3 (ft): 15			Distance From SVE-3 (ft): 25		
Time:	Vacuum at SVE-3 ("H_20)	Vacuum ("H_20)	PID (ppm)	FID (ppm)	Vacuum ("H_20)	PID (ppm)	FID (ppm)	Vacuum ("H_20)	PID (ppm)	FID (ppm)
13:55	0		8.4	254		1.1	112		1.3	271
13:55	10	0.01			0.01			0		
14:15	8	0.02	4.5		0.02	0.9		0		
14:30	30	0.07	1.0	3.80	0.02	0.2	3.40	0.02	0.4	1.45
14:56	30	0.13	0.6		0.02	0.2		0.05	0.3	
15:05	65	0.45	0.4	542	0.12	0.1	147	0.05	0.2	150
16:30	75	0.80	0.1		0.25	<0.1		0.15	<0.1	

TABLE 3

Induced Vacuum vs. Distance During 65 "H_2O Applied Vacuum Test

Project Name: HES 109-125 Marbledale Road
Project #: 223060
Date: November 22, 2016

Monitoring Location	Max. Induced Vacuum ("H_2O)	Distance from DPE-1 (feet)
VM-1 @ SVE-3	0.45	8.5
VM-2 @ SVE-3	0.12	15
VM-3 @ SVE-3	0.05	25



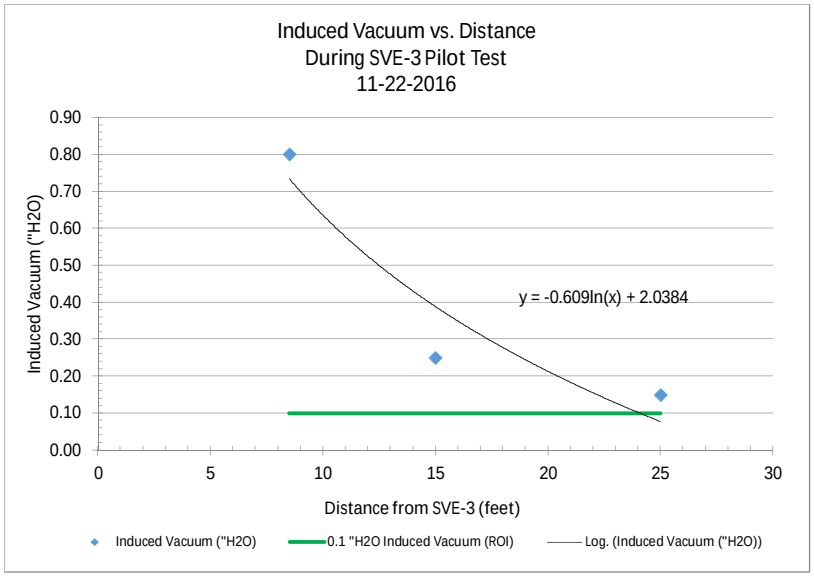
Calculate Distance (x) at Which Induced Vacuum (y) = 0.1 "H_2O : 2.9712 =LN(x) x = **19.5 feet ROI**

TABLE 3A

Induced Vacuum vs. Distance During 75 "H_2O Applied Vacuum Test

Project Name: HES 109-125 Marbledale Road
Project #: 223060
Date: November 22, 2016

Monitoring Location	Max. Induced Vacuum ("H_2O)	Distance from DPE-1 (feet)
VM-1 @ SVE-3	0.8	8.5
VM-2 @ SVE-3	0.25	15
VM-3 @ SVE-3	0.15	25



Calculate Distance (x) at Which Induced Vacuum (y) = 0.1 "H_2O : 3.182923 =LN(x) x = **24.1 feet ROI**

Soil Vapor Extraction
Data Sheet
SVE-4 Pilot Test
109-125 Marbledale Road, Tuckahoe, New York

Soil Vapor Extraction Well: SVE-4 **Date:** 11/22/2016 **Personnel:** MJS, WAC

SVE Well Diameter (inches): 4" **Screened Inverval Thickness:** 15-5 ftbg

	Carbon Influent																Carbon Mid Stream		Carbon Effluent		Removal Efficiency		Removal Efficiency		Ambient Air	
Time:	Vacuum ("$H_2$0)	Pressure ("$H_2$0)	Pressure (atm)	Velocity Before Pump (ft/min)	Standard Flow Rate Before Pump (scfm)	Actual Flow Rate Before Pump (acfm)	Temp. (°F)	Temp. (K)	Velocity After Pump (ft/min)	Standard Flow Rate After Pump (scfm)	Actual Flow Rate After Pump (acfm)	PID (ppm)	Estimated COC Conc. (mg/m^3)	FID (ppm)	Estimated COC Conc. (mg/m^3)	COC Mass Removal Rate (lb/day)	PID (ppm)	FID(ppm)	PID (ppm)	FID(ppm)	VOCs Removal - 1st Carbon Drum (%)	FID-Based Removal - 1st Carbon Drum (%)	VOCs Removal - 2nd Carbon Drum (%)	FID-Based Removal - 2nd Carbon Drum (%)	PID (ppm)	FID(ppm)
9:25	0		1									0.6	0.31												0	4.14
9:39	2	4	1	1,350	119.3	125.4	54	285.4	3,843	339.7	356.9	0.6	0.31	5.02	3.1	0.10	<0.1	8.85	<0.1	4.48	83.33%	-76.29%	83.33%	10.76%	0	4.26
10:15	2.8	4.5	0.99														<0.1		<0.1						0	
10:40	10	4	0.98	650	57.5	61.7	55	285.9	3,340	295.3	317.0	2.3	1.2	3.3	2.0	0.058	0.2	3.3	<0.1	2.11	91.30%	0%	95.65%	36.06%	0	1.52
11:10	12	4	0.97	3,200	282.9	307.1	58	287.6	3,423	302.6	328.5	1.9	1.0		0.5	0.015	0.2		0.1		89.47%		94.74%			
12:00	12	4	0.97	3,300	291.7	316.6			3,020	267.0				3.7	2.3	0.060										3.27

Soil Vapor Extraction Data Sheet
SVE-4 Pilot Test
Monitoring Well Readings
109-125 Marbledale Road, Tuckahoe, New York

Soil Vapor Extraction Well: SVE-4 **Date:** 11/21/2016 **Personnel:** MJS, WAC

		VM-1			VM-2			VM-3			MW-8		
		Well Diameter (inches): 1"			Well Diameter (inches): 1"			Well Diameter (inches): 1"			Well Diameter (inches): 4"		
		Screened Inverval Thickness: 8.3-5.3 ftbg			Screened Inverval Thickness: 6.3-4.3 ftbg			Screened Inverval Thickness: 14.8-4.9 ftbg			Screened Inverval Thickness: 36-26 ftbg		
		Distance From SVE-4 (ft): 7.5			Distance From SVE-4 (ft): 14.5			Distance From SVE-4 (ft): 25			Distance From SVE-4 (ft): 14		
Time:	Vacuum at SVE-4 ("H_20)	Vacuum ("H_20)	PID (ppm)	FID (ppm)	Vacuum ("H_20)	PID (ppm)	FID (ppm)	Vacuum ("H_20)	PID (ppm)	FID (ppm)	Vacuum ("H_20)	PID (ppm)	FID (ppm)
9:30	0	0	0.3	4.97	0	0.3	3.84	0	4.2	3.09	0	1.2	4.35
9:40	2	0.10	0.1	4.30	0.05	<0.1	4.07	0.14	0.1	4.16	0	1.3	4.01
10:15	2.8	0.09	0.1		0.07	0.1		0.05	0.1		0	1.4	
10:40	10	0.30	0.1	1.79	0.18	0.1	2.12	0.30	0.1	2.06	0.02	1.4	2.22
11:10	12	0.41	0.1		0.25	0.1		0.36	0.1		0.01	1.4	
11:55	12	0.36	0.1	3.07	0.24	0.1	3.23	0.36	0.1	3.40	0.01	1.4	3.18
12:25	12	0.38			0.23			0.34			0.01		

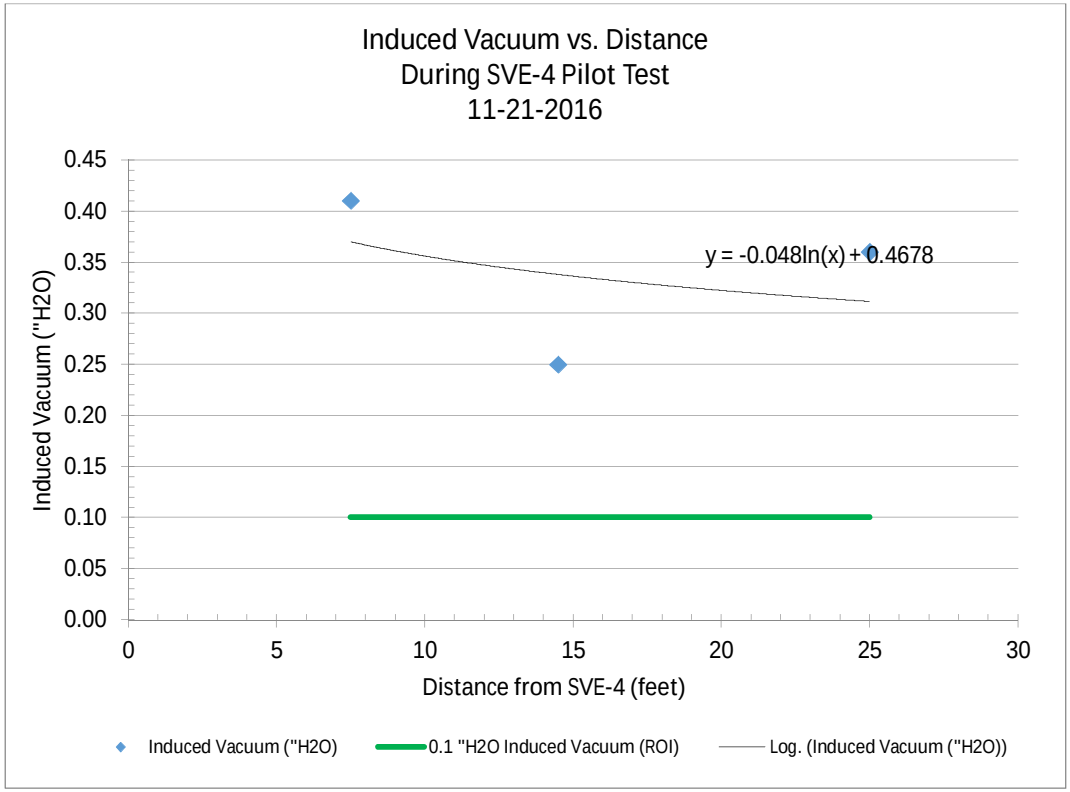
TABLE 4

Induced Vacuum vs. Distance During 12 "H_2O Applied Vacuum Test

Project Name: HES 109-125 Marbledale Road
Project #: 223060
Date: November 21, 2016

Monitoring Location	Max. Induced Vacuum ("H_2O)	Distance from DPE-1 (feet)
VP-1 @ SVE-4	0.41	7.5
VP-2 @ SVE-4	0.25	14.5
VP-3 @ SVE-4	0.36	25
MW-8*		

*MW-8 data not used because the depth of screened interval is much deeper than the VP screened intervals. This appeared to result in outlying data, suggesting MW-8 was not a valid monitoring point due to vertical discontinuities.



Calculate Distance (x) at Which Induced Vacuum (y) = 0.1 "H_2O : 7.6625 =LN(x) x = >2,000 feet ROI **

**The data for SVE-4 does not appear to fit a traditional logarithmic curve and the resulting ROI calculation appears to be skewed, possibly due to discontinuities in the subsurface in the vicinity of SVE-4. Based on the data collected, the ROI at SVE-4 appears to be > 26.8 feet ROI (based on VP-1/VP-2 data only)

Attachment 4

Date: 8/21/17

Personnel: PWD

109 Marbledale Road
Tuckahoe, New York
BCP #C360143

HydroEnvironmental Solutions, Inc.

Vapor Monitoring

MW-1

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

MW-3

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

MW-4

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0.0	9600	9600	20.9	16
2	0.0	870	620	20.9	6
3					
4					

MW-5

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	7.5	1.45%	1.3%	6.2	>100
2	7.5	1.5%	1.3%	5.9	>100
3					
4					

MW-7

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

MW-9

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

OW-2

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0.0	>3%	>3%	20.0	>100
2	0.0	>3%	>3%	20.9	>100
3					
4					

SVE-1

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	5.1	1.98%	1.85%	6.3	>100
2	5.2	2.12%	1.99%	6.5	>100
3					
4					

VW-1

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VW-2

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0.0	3100	2900	6.2	9
2	0.0	2775	2700	5.9	7
3					
4					

VW-3

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0.0	6100	5400	6.9	16
2	0.0	5300	4980	6.1	6
3					
4					

VW-4

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0.0	5500	3700	8.3	35
2	0.0	7600	6800	11.3	>100
3					
4					

VW-5

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VW-6

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	49.7	5500	5450	6.6	5
2	55.8	5600	5500	6.0	2
3					
4					

VW-7

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

Round 1 MW-5 H_2S = 4.1 ppm
H_2S = 3.4 ppm

SVE-1 Round 1 H_2S = 7.3 ppm

VW-6 Round 1 H_2S = 4.5 ppm

Date: 8/21/17

Personnel: PWD

109 Marbledale Road
Tuckahoe, New York
BCP #C360143

HydroEnvironmental Solutions, Inc.

VW-8

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VW-9

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VW-12

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VP-19

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

Drill Rig

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0	0	0	20.9	0
2	0	0	0	20.9	0
3					
4					

Ambient Readings

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0	0	0	20.9	0
2	0	0	0	20.9	0
3					
4					

Temporary SVE System Well: VW-7

Influent

Time	PID	FID (U)	FID (F)	% Oxygen	%LEL
8:45	1.8	76	69	18.4	1%
3:10	0.4	735	610	18.0	5%

Round	Start	End
1	9:48	11:08
2	2:00	3:08
3		

Notes:

Regenerative blower running at 15 mm of water vacuum

Blower effluent velocity = 3280 ft/min (effluent)
= 5610 ft/min (influent)
= 1215 ft/min (midfluent)

Midfluent

Time	PID	FID (U)	FID (F)	% Oxygen	%LEL
8:45	0.3	18	18	20.9	0
3:10	0.1	148	110	20.2	0

Effluent

Time	PID	FID (U)	FID (F)	% Oxygen	%LEL
8:45	0.1	18	18	20.9	0
3:10	0.0	140	109	20.9	0

Pressure Readings:

Well: VW-12	Well: VP-19	Well: SVE-4	Well:
Magnehelic: -0.01 in	Magnehelic: 0.00	Magnehelic: 0.00	Magnehelic:
Manometer: -0.02 in	Manometer: -0.01 in	Manometer: 0.00	Manometer:
Velocity Meter: 2 ft/min	Velocity Meter: 0	Velocity Meter: 0	Velocity Meter:

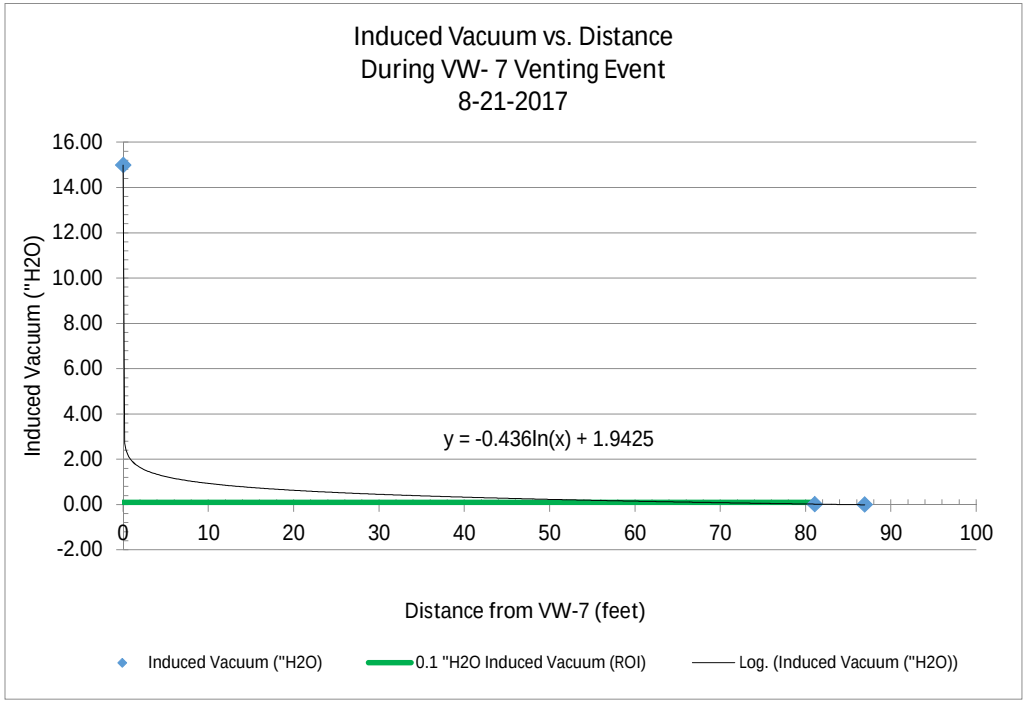
* Pressure readings in inches of water.

TABLE 5

Induced Vacuum vs. Distance

Project Name: HES 109 Marbledale Road
Project #: 223060
Date: August 21, 2017

Monitoring Location	Max. Induced Vacuum ("H_2O)	Distance from VW-7 (feet)
VW-7	15.0	0
VW-12 (from VW-7)	0.02	81.1
VW-19 (from VW-7)*		
SVE-4 VM-1 (from VW-7)	0.0	86.9



Calculate Distance (x) at Which Induced Vacuum (y) = 0.1 "H_2O : 4.23 =LN(x) x = **68.4 feet ROI**

Air flow rate from VW-7 was not measured prior to dilution air

*Given the absence of vacuum at well SVE-4 VM-1 (which is closer to VW-7 than VW-19), the 0.01" vacuum measured at VW-19 appears to be an outlier that would skew the ROI calculation high. Therefore, the VW-19 data was excluded from the ROI plot and calculation.

Date: 8/22/17

Personnel: PWM

109 Marbledale Road
Tuckahoe, New York
BCP #C360143

HydroEnvironmental Solutions, Inc.

Vapor Monitoring

MW-1

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

MW-3

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

MW-4

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0	1500	1200	20.9	0
2	0	950	770	20.9	0
3					
4					

H_2S (ppm) 3.0 2.1

MW-5

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	6.9	1.5%	1.5%	6.7	>100
2	5.3	1.15%	1.15%	5.3	>100
3					
4					

MW-7

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

MW-9

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

OW-2

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0	>3%	>3%	19.6	>100
2	0	>3%	>3%	19.4	>100
3					
4					

SVE-1

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	6.7	1.8%	1.0%	6.0	7100
2	5.1			7.0	>100
3					
4					

VW-1

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

H_2S 0 1.0

VW-2

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0	3200	2800	6.3	0
2	0	3300	4400	5.7	0
3					
4					

VW-3

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	1.5	5200	4800	6.5	11
2	1.7	4300	3200	5.6	0
3					
4					

VW-4

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0	1.15%	1.15%	6.0	>100
2	0	1.0%	1.0%	5.7	0
3					
4					

VW-5

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VW-6

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	72.0	6000	5300	5.7	0
2	59.0	4500	3000	0.9	0
3					
4					

VW-7

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VW-4 Rnd 2 H_2S = 4.9 ppm

MW-5 Rnd

VW-6 Rnd 1 H_2S = 7 ppm

" 2 H_2S = 8.5 ppm

CO = 5 ppm

SVE-1 Rnd 1 H_2S = 54.7 ppm

" 2 H_2S = 90 ppm CO = 9 ppm

VW-3 Rnd 2 CO = 6 ppm

Date: 8/22/19

Personnel: PWM

109 Marbledale Road
Tuckahoe, New York
BCP #C360143

HydroEnvironmental Solutions, Inc.

VW-8

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VW-9

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VW-12

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VP-19

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

Drill Rig

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0	0	0	20.9	0
2	0	0	0	20.9	0
3					
4					

Ambient Readings

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0	0	0	20.9	0
2	0	0	0	20.9	0
3					
4					

Temporary SVE System

Well: 7/12

7/12 Influent

Time	PID	FID (U)	FID (F)	% Oxygen	%LEL
12:30	0.9/5.8	170/7.1	140/6.2	18%/18.7	0/0

Midfluent

Time	PID	FID (U)	FID (F)	% Oxygen	%LEL
12:30	1.4	24	21	20.9	0

Effluent

Time	PID	FID (U)	FID (F)	% Oxygen	%LEL
12:30	0.2	23.5	21.8	20.9	0

Notes:

Blower on at 12:15 - VW-7 + VW-12

Blower off at 4:20

Round	Start	End
1	9:15	10:15
2	2:40	3:50
3		

Pressure Readings: Mag + Man in in of H_2O, VELO in Ft/Min

Well: 7 In	Well: 12 In	Well: Mid	Well: EFF
Magnehelic: 5.5	Magnehelic: 5.0	Magnehelic: 0.35	Magnehelic: 1.0
Manometer: 5.60	Manometer: 4.75	Manometer: 1.35	Manometer: 0.6
Velocity Meter: 7000	Velocity Meter: 6250	Velocity Meter: 5000	Velocity Meter: 3250

SVE-3 VP

Mag 0.03 PID: 0.4

Man 0.05 FID F/U: 0/0

Velo 30 O2: 20.9 LEL: 0

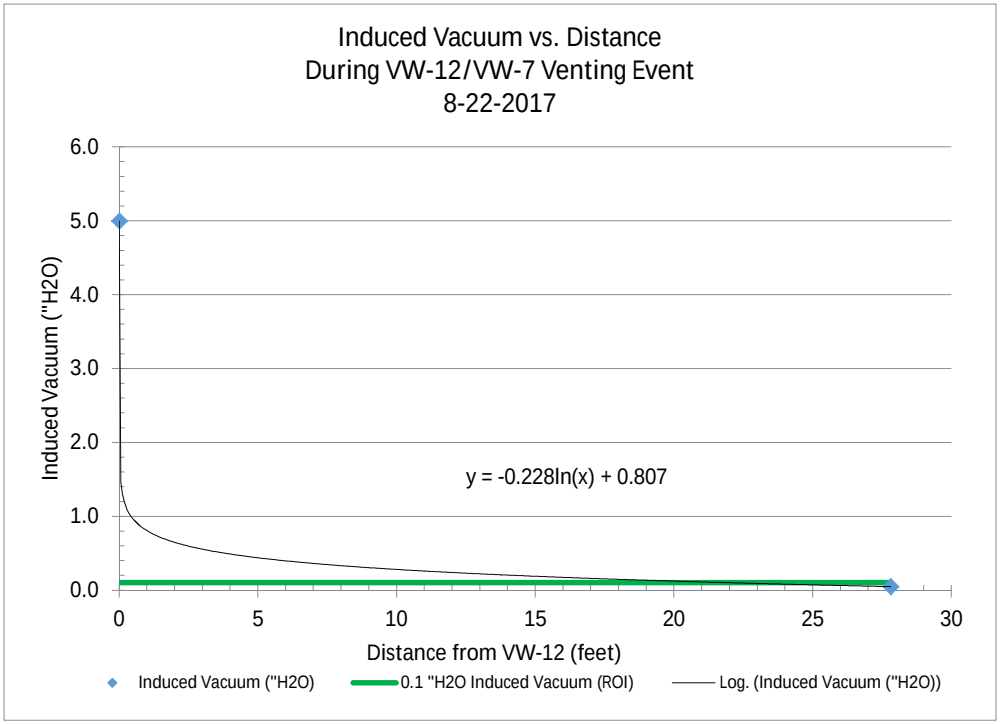
Actually SVE-4 VM-1

TABLE 6

Induced Vacuum vs. Distance

Project Name: HES 109 Marbledale Road
Project #: 223060
Date: August 22, 2017

Monitoring Location	Max. Induced Vacuum ("H_2O)	Distance from VW-12 (feet)
VW-12	5	0
SVE-4 VM-1 (from VW-12)	0.05	27.8



Calculate Distance (x) at Which Induced Vacuum (y) = 0.1 "H_2O :

Air flow rate from VW-12 =	34.1	scfm

3.10 =LN(x) x = **22.2 feet ROI**

Date: 8/23/17

Personnel: DRS

109 Marbledale Road
Tuckahoe, New York
BCP #C360143

HydroEnvironmental Solutions, Inc.

VW-8					
Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VW-9					
Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VW-12					
Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VP-19					
Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

Drill Rig					
Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

Ambient Readings					
Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0	1.0	0.8	20.9	0
2	0	0.7	0.5	20.9	0
3	0	1.1	0.6	20.9	0
4					

Temporary SVE System Well: VW-7 / VW-12

Influent					
Time	PID	FID (U)	FID (F)	% Oxygen	%LEL
09:30	0.5	18.3	18.3	20.9	0

Midfluent					
Time	PID	FID (U)	FID (F)	% Oxygen	%LEL
09:30	0	17.3	17.3	20.9	0

Effluent					
Time	PID	FID (U)	FID (F)	% Oxygen	%LEL
09:30	0	17.3	17.3	20.9	0

Round	Start	End
1		
2		
3		

Notes:
Start blower @ 09:30 → (-20 in of H_2O)
• no drilling today.
Stop blower @ 14:30. (wait for new carbon drums)

Pressure Readings:

Well: VW-7 In	Well: VW-12 In	Well: Mid	Well: Eff.
Magnehelic: 6	Magnehelic: 6	Magnehelic: —	Magnehelic: —
Manometer: —	Manometer: —	Manometer: —	Manometer: —
Velocity Meter: 6350	Velocity Meter: 7800	Velocity Meter: 930	Velocity Meter: 3400

	VP-19	SVE-3 VP
Mag	0	.01

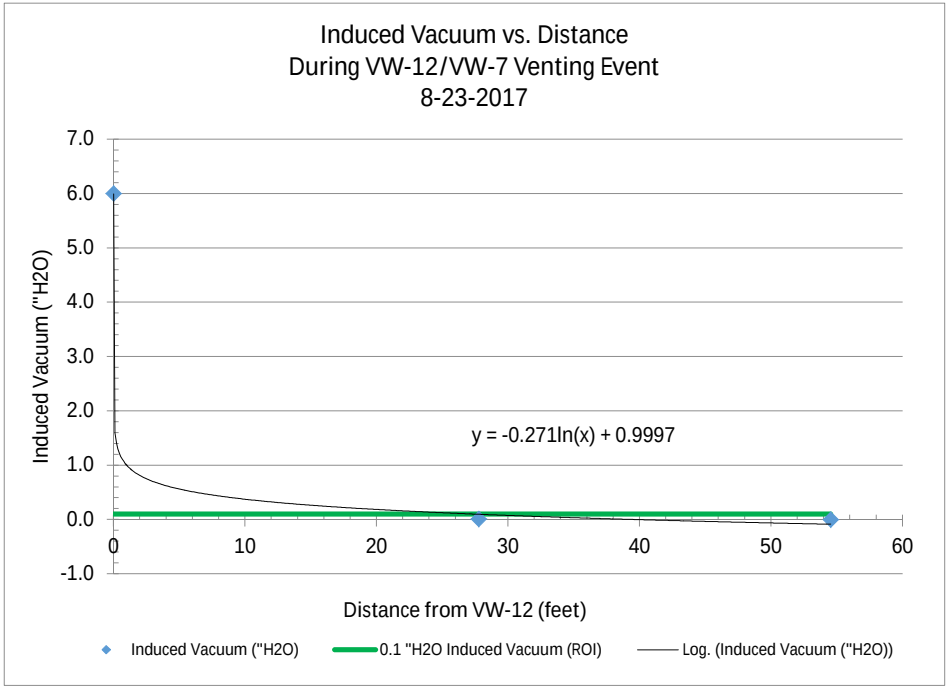
Actually SVE-4 VM-1

TABLE 7

Induced Vacuum vs. Distance

Project Name: HES 109 Marbledale Road
Project #: 223060
Date: August 23, 2017

Monitoring Location	Max. Induced Vacuum ("H_2O)	Distance from VW-12 (feet)
VW-12	6	0
SVE-4 VM-1 (from VW-12)	0.01	27.8
VP-19 (from VW-12)	0	54.5



Calculate Distance (x) at Which Induced Vacuum (y) = 0.1 "H_2O :

Air flow rate from VW-12 =	42.5	scfm

3.32 =LN(x) x = **27.7 feet ROI**

Date: 9/1/17

Personnel: PWM

109 Marbledale Road
Tuckahoe, New York
BCP #C360143

HydroEnvironmental Solutions, Inc.

Vapor Monitoring

MW-1

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

MW-3

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	3.3	2.5%	2.5%	19.6	61
2	3.4	>3%	>3%	18.6	>100
3					
4					

MW-4

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

MW-5

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

MW-7

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

MW-9

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0.1	3400	2600	20.3	9
2	0.8	2800	2800	20.9	8
3					
4					

OW-2

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

SVE-1

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VW-1

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VW-2

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VW-3

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VW-4

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VW-5

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

SVE-4 VW-1 ~~VW-2~~

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0	0	0	20.9	0
2	0.8	0.8	0.8	20.9	0
3					
4					

VW-7 – In

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2	1.5	2.2	0.5	19.2	0
3					
4					

Date: 9/1/17

Personnel: PWM

109 Marbledale Road
Tuckahoe, New York
BCP #C360143

HydroEnvironmental Solutions, Inc.

VW-8

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	8.7	~~6000~~	610	20.3	0
2	13.4	1580	~~1580~~	20.9	0
3					
4					

VW-9

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0	6000	4600	5.3	0
2	1.8	~~4500~~ 6000	~~4500~~	5.7	0
3		6000	4500		
4					

VW-12 – 1in

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2	9.5	1.2	0	18.7	0
3					
4					

VP-19 – 1in

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0				
2	0.7	0	0	20.9	0
3					
4					

Drill Rig

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0	0	0	20.9	0
2	0	0	0	20.9	0
3					
4					

Ambient Readings

Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0	0	0	20.9	0
2	0	0	0	20.9	0
3					
4					

Temporary SVE System Well: VP-19/VW-12/VW-7

Influent

Time	PID	FID (U)	FID (F)	% Oxygen	%LEL
9:00	0/0.4/0.7	0/1.9/1.6	0/0/.8	20.9/18.1/19.30	0/0/0
14:30	SEE	Well	tables	above	

Midfluent

Time	PID	FID (U)	FID (F)	% Oxygen	%LEL
	0	0	0	20.9	0
	0.4	0	0	20.9	0

Effluent

Time	PID	FID (U)	FID (F)	% Oxygen	%LEL
	0	0	0	20.9	0
	~~0.6~~ 0.2	0	0	20.9	0

Round	Start	End
1	~~8:30~~ 10:00	10:55
2	14:30	15:30
3		

Notes:

GBI Drilling test borings on restaurant footprint today.
Venting w/ new 6-3 drums and generator begins at 7:45. Drilling begins @ 8:00
No Velo's recorded today. Will have meter back on site for pile drilling

Blower Pressure: 3 in of H_2O
Blower Temp @ 9:00 : 82°F

Pressure Readings: RM

Well: VP-19-1in	(2)	Well: VW-12-1in	(2)	Well: VW-7-1in	(2)	Well: Mid	(2)
Magnehelic: 1.4	1.5	Magnehelic: 2.0	2.0	Magnehelic: 1.9	2.0	Magnehelic: 0.39	0.35
Manometer: 1.05	1.2	Manometer: 1.70	1.82	Manometer: 1.60	1.8	Manometer: 0.67	~~0.35~~ 0.55
Velocity Meter:		Velocity Meter:		Velocity Meter:		Velocity Meter:	

EFF (2) SVE-4-VM-1 (2)
Mag: 0.30 | 0.20 Mag: 0 | 0
Man: 0.35 | 0.20 Man: 0.30 | 0.20
~~Ve.~~

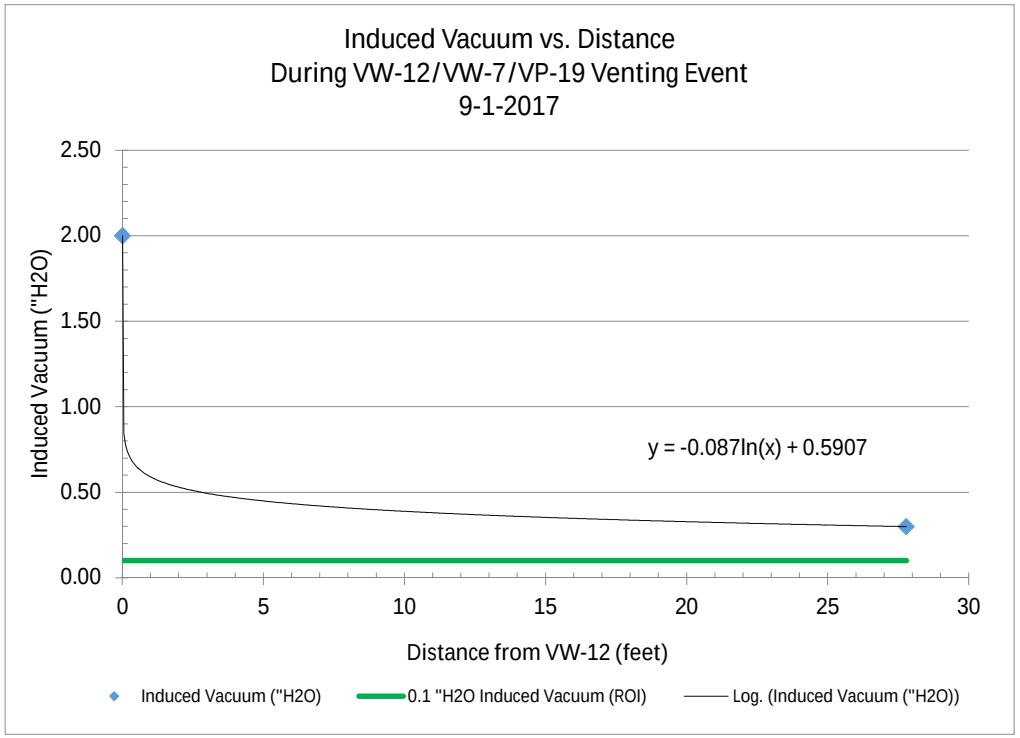
Blower off at 15:30

TABLE 8

Induced Vacuum vs. Distance

Project Name: HES 109 Marbledale Road
Project #: 223060
Date: September 1, 2017

Monitoring Location	Max. Induced Vacuum ("H_2O)	Distance from VW-12 (feet)
VW-12	2.0	0
SVE-4-VM-1 (from VW-12)	0.3	27.8



Calculate Distance (x) at Which Induced Vacuum (y) = 0.1 "H_2O : 5.64 =LN(x) x = **281.5 feet ROI***

Air flow rate from VW-12 was not measured during the test

*This result is substantially larger than the ROIs calculated during any of the previous testing, and is considered to be an outlier. This ROI will not be used in final design calculations for the SVE system design.

Date: 9/6/17

Personnel: PWD

109 Marbledale Road
Tuckahoe, New York
BCP #C360143

HydroEnvironmental Solutions, Inc.

[redacted]					
Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

VW-9					
Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1					
2					
3					
4					

[redacted] SVE-4					
Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0.2ppm	0.6ppm	1.0ppm	20.9	0
2					
3					
4					

[redacted] VW-8					
Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	3.5	19.1	19.0	20.9	0
2					
3					
4					

Drill Rig					
Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0	0	0	20.9	0
2					
3					
4					

Ambient Readings					
Round	PID	FID (U)	FID (F)	% Oxygen	% LEL
1	0	0	0	20.9	0
2					
3					
4					

12.4ppm

Temporary SVE System

Well: VW-12, VW-7, VP-19

	Influent					
	[redacted]	PID	FID (U)	FID (F)	% Oxygen	%LEL
VP-19 and VW-12	[redacted]	[redacted]	4.1ppm	0.9ppm	18.6	0
VW-7		0.8ppm	69ppm	37ppm	19.2	0

Midfluent					
Time	PID	FID (U)	FID (F)	% Oxygen	%LEL
	1.2ppm	18.2	15.8	19.3	0

Effluent					
Time	PID	FID (U)	FID (F)	% Oxygen	%LEL
	0.7ppm	18.5	17.6	19.4	0

Round	Start	End
1		
2		
3		

Notes:

Blower system started at 8:30AM
Blower is operating with a vacuum of -25 in of water
12:10 Blower system shut down.

Pressure Readings:

Well: VW-12 and VP-19	Well: VW-7	SVE-4 Well: [redacted]	Well: VW-8
Magnehelic: -1.5	Magnehelic: -1.6	Magnehelic: -0.05	Magnehelic: -0.01
Manometer: -14.48	Manometer: -14.94	Manometer: -0.03	Manometer: -0.01
Velocity Meter: —	Velocity Meter: —	Velocity Meter: —	Velocity Meter: —

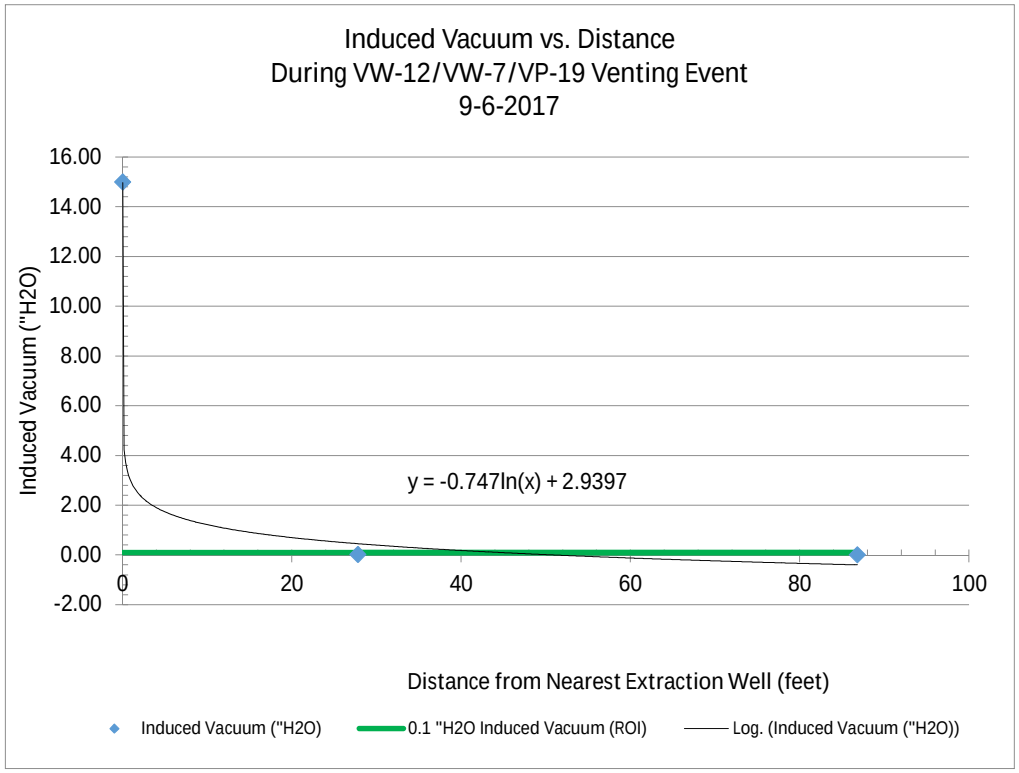
* Pressure readings are in inches of water
* VW-12, VW-7, and VP-19 pressure readings were taken at influent locations.

TABLE 9

Induced Vacuum vs. Distance

Project Name: HES 109 Marbledale Road
Project #: 223060
Date: September 6, 2017

Monitoring Location	Max. Induced Vacuum ("H_2O)	Distance from VW-12 (feet)
VW-12	15	0
VW-8 (from VW-7)	0.01	86.8
SVE-4 VM-1(from VW-12)	0.03	27.8



Calculate Distance (x) at Which Induced Vacuum (y) = 0.1 "H_2O :

3.80 =LN(x) x = **44.8 feet ROI**

Air flow rate from VW-12 was not measured during the test

Attachment 5

SVE Wells Design Basis
109 Marbledale Road
Tuckahoe, New York
Brownfield Cleanup Program No. C360143

Proposed SVE wells will be constructed according to the detail on **Sheet SV 5**. To minimize short-circuiting of air flow through the surface, the minimum screen depth below proposed finish grade is 3.5 feet as shown on **Sheet SV 5**. The maximum proposed SVE well screen length is 15 feet, and the screens shall be terminated at least 5 feet above the perched groundwater table (where present). New utilities placed in the vicinity of the SVE wells will be bedded in backfill that is compacted, and that is similar in texture to the adjacent soils (to minimize preferential pathways along utilities which could cause short-circuiting of the air flow).

Boring logs for nearby wells were reviewed to identify depths that should be targeted for SVE treatment due to higher contaminant concentrations within the unsaturated soil profile. Based on a review of the available boring logs, following is the proposed approach for installation of the proposed SVE wells, which will be constructed according to the well detail on **Sheet SV 5**.

Hotel Area Wells

Proposed SVE Well	Nearby Boring(s)	Notes from Nearby Borings	Approximate Grades (Pre-Construction and Proposed Finish Grade)	Depths to Target for SVE Well Screen Placement (below Proposed FG)
SVE-101	SA-4-3	FID >200 ppm 4-8' b.g. Refusal at 8.5' b.g.	Pre: 144.6' Prop. FG: 144.4' Change: 0.2' cut	5' to 15' if no refusal encountered
SVE-102	SB-13-112816	FID ppm 99 4-8' b.g. Refusal at 8.5' b.g.	Pre: 141.7' Prop. FG: 142' Change: 0.3' fill	5' to 15' if no refusal encountered
SVE-103	None	None	Pre: 141.3' Prop. FG: 140.1' Change: 1.2' cut	To be determined by split spoon sampling; tentatively 5 to 15'
SVE-104	Between SB-13-112816 & SB-14-112816	FID 99 ppm 4-8' b.g.; Ref. at 8.5' FID/PID increased at bottom (8-11.5' b.g.); Refusal at 11.5' b.g.	Pre: 141.1' Prop. FG: 141.5' Change: 0.4' fill	5' to 15' if no refusal encountered
SVE-105	SB-13-112816	FID 99 ppm 4-8' b.g.; Ref. at 8.5'	Pre: 138.7' Prop. FG: 139.8' Change: 1.1' fill	5' to 15' if no refusal encountered
SVE-106	SB-14-112816	FID/PID increased at bottom (8-11.5' b.g.); Refusal at 11.5' b.g.	Pre: 142.9' Prop. FG: 142.3' Change: 0.6' cut	5' to 15' if no refusal encountered
SVE-107 *(former pilot well SVE-2)* SVE-107A	TB-10	PID >200 ppm 22-24' b.g. and 32-34' b.g.; wet at 32' b.g.	Pre: 142.4' Prop. FG: 139.8' Change: 2.6' cut	Well already exists (pilot test well SVE-2), screened 2.4' to 12.4'. Add a nested SVE well screened 14' to 24'
SVE-108	TB-5 & SB-11-112816	PIDs increased with depth; refusal at 14.3' b.g. PID 28.1 ppm 1.25-4' b.g.; refusal at 5.33' b.g.	Pre: 140.5' Prop. FG: 139.1' Change: 1.4' cut	5' to 15' if no refusal encountered
SVE-109	TB-5	PIDs increased with depth; refusal at 14.3' b.g.	Pre: 139.8' Prop. FG: 139.6' Change: 0.2' cut	5' to 15' if no refusal encountered

Proposed SVE Well	Nearby Boring(s)	Notes from Nearby Borings	Approximate Grades (Pre-Construction and Proposed Finish Grade)	Depths to Target for SVE Well Screen Placement (below Proposed FG)
SVE-110	TB-4	PIDs increasing with depth, starting at 20' b.g.; wet at 30' b.g.; refusal at 34' b.g.	Pre: 139.0' Prop. FG: 140.0' Change: 1.0' fill	10' to 25' if no refusal encountered

The restaurant construction plans were revised by the Volunteer to include excavation and removal of a significant volume of contaminated soil from within the restaurant footprint, excavating down to bedrock beneath the proposed restaurant basement. This proposed excavation will remove a significant source of the soil vapors that were mapped during the Remedial Investigation and Supplemental Investigation. As such, the SVE Wells Design Basis that was submitted and approved in November 2017 was revisited and the number of SVE wells in the vicinity of the restaurant was reduced to focus on remediation of soils that will not be excavated during the restaurant construction. SVE wells are proposed in the restaurant area as described below and shown on the plans.

Restaurant Area Wells

Proposed SVE Well	Nearby Boring(s)	Notes from Nearby Borings	Approximate Grades (Pre-Construction and Proposed Finish Grade)	Depths to Target for SVE Well Screen Placement (below Proposed FG)
SVE-201 (formerly SVE-203 in 11-18-2017 submittal)	None	None; chlorinated solvent vapors and groundwater contamination in area; ledge probe by Siteworks indicates bedrock depth = 26'	Pre: 148.7' Prop. FG: 150.2' Change: 1.5' fill	10' to 25' b.g. if no refusal encountered
SVE-202 (formerly SVE-206 in 11-18-2017 submittal)	TB-12 SA-9-1	Highest PIDs 2-6' b.g. & 12-14' b.g.; wet at 28' b.g.	Pre: 150.4' Prop. FG: 150.4' Change: 0.0'	3.5' to 18' b.g. if no refusal encountered
SVE-203 (formerly SVE-207 in 11-18-2017 submittal)	SB-26-120216	No significant PID/FID readings; Refusal at 9.2' b.g.	Pre: 149.8' Prop. FG: 150.2' Change: 0.4' fill	10' to 20' b.g. if no refusal encountered
SVE-204 (contingency well VW-201)	SA-5-1 & DB-4	Highest PID 20-22' b.g.; refusal at 22' b.g.	Pre: 148.4' Prop. FG: 150.0' Change: 1.6' fill	8' to 18' b.g. if no refusal and no perched water table encountered

Attachment 6

DuBois and King Inc.

109 MARBLEDALE ROAD SVE BASIS OF DESIGN

Project No.:	223060		
Project Name:	109 Marbledale Road		
Site:	Tuckahoe, NY		
Date:	29-Oct-18		
Preparer:	JBA	*Checked by:*	WAC

Vapor Extraction System

Hotel Area Wells SVE System Design Basis

Three pilot tests were conducted in the area using SVE-1, SVE-2, and SVE-3.

Based on the vapor phase contaminant distribution, the primary areas of focus for SVE remediation are in the vicinity of SVE-2 and SVE-3, but some SVE wells will be located in the vicinity of SVE-1 as well to reduce the on-site soil vapor concentrations near adjacent off-site buildings.

Pilot testing results for SVE-1, SVE-2 and SVE-3 showed the following conditions:

Well	Applied Vacuum ("H_2O)	Air Flow (cfm)	Radius of Influence (feet)
SVE-1	60	220	19.0
SVE-2	30	240	50.9
SVE-3	75	190	24.1

Based on proximity to the pilot tested wells, design conditions for the proposed SVE wells in the hotel area were estimated as follows:

Proposed SVE Well	Assumed Applicable SVE Pilot Test Well	Design Radius of Influence for Well Spacing (feet)
SVE-101	SVE-3	24.1
SVE-102	SVE-3	24.1
SVE-103	SVE-3	24.1
SVE-104	SVE-3	24.1
SVE-105	SVE-3	24.1
SVE-106	SVE-3	24.1
SVE-107	SVE-2	50.9
SVE-108	SVE-1	19.0
SVE-109	SVE-1	19.0
SVE-110	SVE-1	19.0

The pilot tests were conducted prior to development of the site, and the majority of the ground surface in the area of the pilot tests was gravel or vegetated. The proposed site development plan includes paving or constructing buildings over a majority of the property and installing a low permeability cap in unpaved areas. This will substantially decrease the air flow required to achieve the radii of influence observed during the pilot testing.

Restaurant Area Wells SVE System Design Basis

One pilot test was conducted in the area using SVE-4.

Pilot testing results for SVE-4 showed the following conditions:

Well	Applied Vacuum ("H_2O)	Air Flow (cfm)	Radius of Influence (feet)
SVE-4	12	310	26.8

Additional testing results from venting events in August and September 2017 showed the following conditions:

Well	Applied Vacuum ("H_2O)	Air Flow (cfm)	Radius of Influence (feet)
VW-7	15	Not Measured	68.4
VW-12	5	34.1	22.2
VW-12	6	42.5	27.7
VW-12	15	Not Measured	44.8

The design Radius of Influence for SVE wells in the area of the restaurant was estimated using the average of the 5 tested wells, excluding the highest ROI to be conservative: 30 feet. This was applied to wells SVE-201, SVE-202, and SVE-203.

Comparing the SVE-4 pilot test results to the VW-12 testing results, after the impervious and low permeability surfaces in the area were only partially constructed, only approximately 1/7 of the air flow was required to achieve a comparable radius of influence.

Based on these results, assume 1/4 of the pilot testing air flows will be required from each extraction well after the completion of the site development work to achieve a comparable radius of influence.

SVE System Operations

The proposed SVE blower shall be capable of operating at least four wells at any given time. With this approach, 9 or more SVE wells will not be in operation at any given time. Pulsed operation (in which wells are used for extraction, then allowed to "rest") is an efficient method of operating remedial systems because it minimizes periods of diminishing returns (where SVE is diffusion limited) by allowing vapor phase contaminant rebound to occur during the "rest" periods.

Friction Loss Calculations

For the purposes of selecting design conditions for the proposed SVE blower, worst-case friction loss calculations will be used (for the wells located farthest from the SVE blower):

Well	Vac. at Well Head ("H_2O)	Pipe Diameter (inch)	Airflow (cfm per well)	Pipe Length	Headloss (" H_2O)
SVE-103	75	4	48	374	0.6
SVE-107 (Pilot Well SVE-2)	30	4	60	305	0.5
SVE-110	60	4	55	461	0.8
SVE-203	15	4	44	240	0.4
			Additional Allowance for Fittings:		0.2

Pipe Diameter (inches)	Flow (acfm)	Friction Loss Per Foot of Tubing "H_2O)
4	48	0.0016
4	55	0.0017
4	60	0.0018
4	240	0.034
6	416	0.015
6	240	0.005

DuBois and King Inc.

109 MARBLEDALE ROAD SVE BASIS OF DESIGN

Project No.: 223060
Project Name: 109 Marbledale Road
Site: Tuckahoe, NY
Date: 29-Oct-18
Preparer: JBA *Checked by:* WAC

Equivalent Pipe Lengths for Remediation System

Vacuum Side of Blower	Quantity	Equivalent Length Per Unit	Total Equivalent Length	
4" Pipe	15	1.0	15	feet
4" 90° El	0	13.0	0	feet
4" 45° El	0	5.5	0	feet
4" Tee - Line Flow	0	17.0	0	feet
4" Tee - Branch Flow	0	21.0	0	feet
4" Gate Valve	1	2.5	2.5	feet
		Subtotal	17.5	feet
		Friction Losses	0.6	" H_20
6" Pipe	35	1.0	35	feet
6" 90° El	4	17.0	68	feet
6" 45° El	0	11.3	0	feet
6" Tee - Line Flow	6	27.0	162	feet
6" Tee - Branch Flow	1	29.0	29	feet
6" Gate Valve	0	3.7	0	feet
		Subtotal	294	feet
		Friction Losses	4.4	" H_20
		Subtotal Friction Losses	**5.0**	**" H_20**
		Moisture Knockout	0.8	" H_20
		Total Vacuum Side Losses Hotel Side	6.7	" H_20
		Total Vacuum Side Losses Restaurant Side	6.3	" H_20

Pressure Side of Blower	Quantity	Equivalent Length Per Unit	Total Equivalent Length	
4" Pipe	0	1.0	0	feet
4" 90° El	0	13.0	0	feet
4" 45° El	0	5.5	0	feet
4" Tee - Line Flow	0	17.0	0	feet
4" Tee - Branch Flow	0	21.0	0	feet
4" Gate Valve	0	2.5	0	feet
		Subtotal	0	feet
		Friction Losses		" H_20
6" Pipe	75	1.0	75	feet
6" 90° El	7	17.0	119	feet
6" 45° El	0	11.3	0	feet
6" Tee - Line Flow	0	27.0	0	feet
6" Tee - Branch Flow	0	29.0	0	feet
6" Gate Valve	0	3.7	0	feet
		Subtotal	194	feet
		Friction Losses	1.0	" H_20
		Subtotal Friction Losses	**1.0**	**" H_20**
		Vapor Phase Carbon (2 GPC-13R Adsorbers)	4	" H_20
		Total Pressure Side Losses	5.0	" H_20

Proposed Blower Parameters

Flow	240	CFM	AMETEK Rotron EN909 with 15HP XP Motor, 3 Ph, 460 V
Pressure	72	" H_20	(or approved equal)

The blower also will be used to provide air flow for the restaurant's SSDS; add an allowance for that flow:

SSDS Flow	100	CFM

Blower performance requirements = 340 CFM at 72 " H_20

Variance in actual operating conditions is expected as compared to the pilot testing and venting events results because:

- The testing events were conducted prior to development of the site. The site development will likely affect air flows, vacuum, and radii of influence.
- Paving, construction of the proposed buildings, low permeability capping, and installation of subsurface utilities are all expected to affect operating conditions.
- The nature of the site fill is heterogeneous because of the history of quarrying, landfilling, and site use, which will cause variability of operating conditions across the site that can't be anticipated by the testing events.

SSDS Pilot Testing will be needed to determine design flow and vacuum after the SSDS and foundation are constructed (see SSDS plans).

Attachment 7

Estimated Average Influent Air Concentrations
Hotel and Restaurant SVE System

			Most Recent Soil Vapor Concentration in Planned SVE Area of Influence (µg/m³)												
Target Analyte Detected During SVE Pilot Tests and in Soil Vapor Monitoring Wells	**SGC (µg/m³)**	**AGC (µg/m³)**	**VP-3 5-18-2015**	**VP-11 5-18-2015**	**VP-14 8-24-2015**	**VP-15 8-24-2015**	**VP-16 8-24-2015**	**VP-19 10-20-2017**	**SVE-2 VM-2 6-22-2017**	**VW-6 10-20-2017**	**VW-9 10-20-2017**	**VW-12 10-23-2017**	**Estimated Average Concentration[1] (µg/m³)**	**Anticipated Influent to Effluent Percent Reduction**	**Basis for Influent to Effluent Reduction**	**Estimated Concentration After Treatment (µg/m³)**
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	960,000.0	180,000.0	<1.	13.6	1.51	5.18	178	11.0	14	84	100	44	45.2	0.00%	Little information available on adsorption of Freon 113	45.2
1,2,4-Trimethylbenzene	------	6.0	<1.	4.49	<1.	4.66	<1.	7.0	48	81	<67.	28	24.3	88.70%	SVE-2 pilot test	2.75
1,2-Dichlorotetrafluoroethane	------	17,000.0	15,100.00	36,900	3,550	344,000	155,000	110.0	130,000	160,000	82	35	84,478	99.63%	Average reduction from SVE-1, SVE-2, and SVE-3 pilot tests	310
2-Butanone (Methyl ethyl ketone)	13,000.0	5,000.0	34.20	4.83	8.16	3.74	6.57	64.00	8.4	32.0	40.0	17	21.9	45.50%	SVE-2 pilot test	11.9
4-Methyl 2-pentanone (Methyl isobutyl ketone)	4,000.0	30.0	<1.	<1.	<1.	5.73	<1.	5.80	<6.9	45	56.0	24	14.7	99.40%	SVE-1 pilot test	0.088
Acetone	180,000.0	30,000.0	<1.	97.6	<1.	138	297	150.00	180	52	68.0	36	102	94.10%	SVE-1 pilot test	6.02
Benzene	1,300.0	0.13	236.00	2.08	38.3	2.71	61.3	4.50	110	360	66.0	18.0	89.9	99.90%	Reduced to non-detect in SVE-1, SVE-2, SVE-3 pilot tests	0.090
Carbon disulfide	6,200.0	700.0	1.810	<1.	2.96	2.11	8.03	4.40	13	34	43.0	18	12.8	77.30%	SVE-1 pilot test	2.91
Chloroform	150	14.7	<1.	3.95	<1.	6.0	66.4	9.70	<8.2	53	67.0	45	26.1	82.10%	SVE-4 pilot test	4.68
Cyclohexane	------	6,000.0	1,320.00	16.3	151	2.07	433	4.90	300	780	52.0	20	308	98.85%	Average reduction from SVE-1 and SVE-2 pilot tests	3.5
Dichlorodifluoromethane	------	12,000.0	13,100.00	41,100	4,350	97,900	173,000	290.00	97,000	110,000	180,000.0	3,300	72,004	98.95%	Average reduction from SVE-1 and SVE-2 pilot tests	756
Ethyl acetate	------	3,400.0	<1.	<1.	<1.	3.18	<1.	10.00	<12.	330	99	42	50.0	95.00%	SVE-1 pilot test	2.50
n-Heptane	210,000.0	3,900.0	1,100.00	3.02	81.5	2.17	<120.	5.80	510	1,900	100	24	385	90.40%	Average reduction from SVE-1, SVE-2, and SVE-3 pilot tests	36.9
n-Hexane	------	700.0	5,210.00	30.4	281	3.08	326	5.00	830	2,200	110	20	902	97.20%	Average reduction from SVE-1, SVE-2, and SVE-3 pilot tests	25.2
Isopropanol (Isopropyl alcohol)	98,000.0	7,000.0	1,020.00	577	801	791	295	9.00	12	54	67	28	365	76.80%	SVE-1 pilot test	84.8
Methylene chloride (Dichloromethane)	14,000.0	60.0	<1.	4.27	9.16	1.12	6.91	9.80	<12.	76	95	40	25.5	99.90%	Reduced to non-detect in SVE-3 and SVE-4 pilot tests	0.026
o-Xylenes	22,000.0	100.0	2.18	1.45	3.88	5.08	7.07	6.10	20	52	59	25	18.2	99.90%	Reduced to non-detect in SVE-2 pilot test	0.018
p- & m-Xylenes	22,000.0	100.0	4.47	4.11	9.68	14.3	18.1	12.00	31	99	120	50.0	36.3	99.90%	Reduced to non-detect in SVE-2 pilot test	0.036
Propylene	------	3,000.0	<40.1	36.1	<40.1	<40.1	<40.1	10.00	250	19	900	10	139	98.60%	SVE-2 pilot test	1.94
Tetrachloroethylene	300.0	4.0	2.30	9.08	4.49	44.5	16.2	370.00	24	22	46	9,100	964	99.70%	Reduced to non-detect in SVE-1, SVE-2, and SVE-3 pilot tests and 99.1% reduced in SVE-4 test	2.89
Tetrahydrofuran	30,000.0	350.0	<1.	<1.	<1.	1.17	6.43	8.30	<9.9	64	81	34	20.8	99.90%	Reduced to non-detect in SVE-1 and SVE-4 pilot tests	0.021
Toluene	37,000.0	5,000.0	18.70	18.6	<1.	19	81.4	5.30	8.9	290.0	52.0	22	51.7	99.90%	Reduced to non-detect in SVE-1 pilot test	0.052
Trichloroethylene	20.0	0.20	4.73	1.98	31.1	0.52	12.5	620.00	11	47	29	250	101	99.90%	Reduced to non-detect in SVE-1 and SVE-2 pilot tests	0.10
Trichlorofluoromethane (Freon 11)	9,000.0	5,000.0	1.30	141	11.9	543	198,000	18.00	100	98	11,000	180	21,009	99.35%	Average reduction from SVE-2 and SVE-3 pilot tests	137
Vinyl chloride	180,000.0	0.11	93.80	<0.25	60	<0.25	<0.25	3.6	86	100	35	15	39.4	99.90%	Reduced to non-detect in SVE-1 and SVE-2 pilot tests	0.039

Notes:

1. The reduction for 1,3,5-Trimethylbenzene was assumed to be the same as 1,2,4-Trimethylbenzene.
2. Numbers highlighted in blue indicate the concentration exceeds the Short-term or Annual Guideline Concentrations. (SGC & AGC)