



ABBREVIATED SAMPLING PLAN
Groundwater and Soil Sampling
For the TCE Havertown Site

SITE NAME: TCE Havertown Site

TDD#: WS01-10-08-003

Amendment C

SITE LOCATION: Delaware County, Pennsylvania

DCN#: W0018.1A.00206

SITE OR FACILITY TYPE: Commercial

DATE: October 27, 2011

EPA OSC: Ruth Scharr

START PREPARER: Paul Landry/Charles Rapone

QA REVIEWER: Robert McGlade

EPA APPROVAL: 

Objective: This abbreviated sampling plan is prepared as an addendum to the *Field Sampling and Analysis Plan for the TCE Havertown Site submitted February 2011*. The objective of this sampling effort is to provide additional data to support a vapor intrusion evaluation at the TCE Havertown site and to assess the Site for the presence of a potential trichloroethene (TCE) source area.

In July 2011, EPA contractors installed two well pairs (MW-1S/I and MW-2S/I) in the Eagle Road Business Park, one on the western boundary of the Havertown PCP Site cap and the other to the north and west of the capped area. No TCE was found in these wells; however, it was concluded that additional information is needed in order to rule out businesses directly north of the capped area and businesses that were west and slightly south of the capped area as a potential TCE source area.

To meet these objectives EPA contractors will complete the following scope of work:

- Weston & Geoprobe[®] Subcontractor will each submit PA-One Call clearances in advance of the field work to identify any potential underground utilities in the area of the newly proposed borings/temporary wells. In addition, Weston's subcontractor will perform Electromagnetic (EM) and Ground Penetrating Radar (GPR) surveys of the boring locations to identify any ferrous and non-ferrous metallic objects or other buried objects/utilities in the area of the borings prior to any intrusive activities. The locations of the proposed and existing wells on site are shown on the attached site map (**Figure 1**).
- Following clearance of the drilling locations, Geoprobe[®] direct-push drilling techniques will be used to collect continuous, 4-ft long, 2-inch diameter soil cores within clean, dedicated acetate liners to depths of 20 feet below ground surface. One of the 5 proposed borings will be drilled to Geoprobe[®] refusal (inferred as the top of bedrock) to assess the depth to bedrock in this area of the Eagle Road Business Park, as bedrock was not encountered during the air rotary drilling of wells MW-1S/I and MW-2S/I in July 2011.

- The acetate liners will be extracted, cut open and inspected for evidence of staining, odors and screened with a field calibrated organic vapor analyzer (PID or FID). In addition, the lithologic characteristics of each core will be logged and described in the field in accordance with the unified soil classification system (USCS). Any interval exhibiting noticeable staining, odors or elevated instrument readings above background will be sampled for VOCs (via Encore™ Samplers) and SVOCs and analyzed via the Contract Laboratory Program (CLP) Statement of Work for Multi-Media, Multi-Concentration, Organic Analytical Service for Superfund (SOM01.2). Samples will be placed on ice in coolers and retained until the completion of each boring to prevent volatilization of the samples. Only the depth interval containing the most elevated instrument readings/field evidence of staining/odors from each boring will be retained for shipment to the laboratory, unless otherwise requested by EPA personnel. If no staining, odors or elevated readings above background are found in a given boring, then no soil sample will be collected for analysis.
- At the completion of each soil boring, a 1-inch diameter, temporary well will be installed to a depth of approximately 20 ft below grade using 10 ft lengths of 10-slot screen. Based on groundwater levels observed at the site to date, this will put each well approximately 15 feet into the water table aquifer. This is deemed sufficient for this follow-on investigation as the most TCE-impacted well on the nearby Havertown PCP Site is well CW-1S, which is completed to an elevation of approximately 290 ft MSL. As shown on the attached cross-section (**Figure 2**), completing the proposed temporary wells to depths of 20 ft below grade will result in screened intervals from 285 to 295 ft MSL, which would effectively straddle the screened interval in well CW-1S.
- At the completion of the temporary well installations, each well will be developed using a dedicated, ¾-inch diameter, polyethylene bailer to remove excess turbidity from the wells. Sampling of the wells would be performed the following day after allowing the wells to stabilize overnight. Due to the minimal disturbance of the aquifer materials by the Geoprobe® drilling process (no air injection as with air rotary methods), overnight stabilization of the temporary wells is considered sufficient for obtaining representative aquifer samples. All 5 temporary wells (*along with existing permanent wells MW-1 S/I and MW-2 S/I*) will be sampled using low-flow sampling methods. One set of duplicate samples will be collected from 1 of the 5 temporary wells and from 1 of the 4 permanent wells for QA purposes. In addition, a trip blank and field rinse blank will be collected and sent along with the sample shipment. All groundwater samples will be placed on ice and submitted to a CLP laboratory for analysis of VOCs and SVOCs via CLP SOW SOM01.2.
- Temporary protective casings will be placed over each of the 5 temporary wells to allow for a licensed Pennsylvania surveyor to survey the horizontal and vertical coordinates/elevations of each temporary well. Prior to project completion, the temporary wells will be removed and abandoned using bentonite pellet seals. Any temporary wells completed in asphalt areas will be patched and returned to pre-existing conditions.

- All drill cuttings will be containerized in DOT-approved 55 gallon drums, labeled and prepared for IDW handling as directed by the site OSC. Purging and development water will be containerized temporarily and transferred into the Havertown PCP site groundwater treatment system for disposal.
- At the completion of the above drilling/sampling activities, completed well/lithologic logs and field sampling sheets will be provided to EPA in a follow-on trip report, pending analytical results. All site activities for the July/August field activities as well as this sampling event will be summarized in the trip report for EPA review. Photographs of site activities and/or core samples can also be provided for documentation purposes.

The Geoprobe® Subcontractors have been scheduled to perform the intrusive portion of this work beginning 8 November 2011. Prior to any intrusive activities, the Subcontractor will perform EM and GPR surveys of the boring locations to identify any ferrous and non-ferrous metallic objects or other buried objects/utilities in the area of the borings. This underground utility survey will be performed on 7 November 2011, prior to the Geoprobe® activities, and is anticipated to be completed for all 5 locations in 1 day.

OBJECTIVE OF SAMPLING: The objectives of this sampling effort are to collect groundwater and soil samples for analysis of Target Compound List (TCL) volatile organic compounds (VOCs) and TCL semivolatile organic compounds (SVOCs), per the direction of the EPA On-Scene Coordinator (OSC). Up to one soil sample per boring may be retained and submitted for analysis of VOCs (via Encore™ Samplers) and SVOCs if field screening of soil samples indicates the presence of potential impacts. The samples collected will be submitted to a CLP laboratory for analysis. All data will be generated in accordance with the quality requirements described in the *START-4 Program-Wide Uniform Federal Policy Act Quality Assurance Project Plan*. Data from this sampling event will be used to characterize TCE concentrations in the shallow groundwater and soil at the TCE Havertown Site.

Analytical methods are listed in Table 1. Table 2 lists the Contract Required Quantitation Limits (CRQLs) for TCL VOCs; and Table 3 lists the CRQLs for SVOCs. Preliminary data deliverables are requested within 21 days and the final/validated data deliverables are requested within 35 days.

Table 1- Sampling and Analysis Summary

| No. of Sample† | Matrix | Container Type (Per Sample) | Parameter/Analysis | Preservative | Requested Detection Limit |
|----------------|-------------|-----------------------------|-------------------------------|-----------------------|---------------------------|
| 13 | Groundwater | Three 40 ml VOA vials | TCL VOCs/ CLP SOW SOM01.2 | Ice 4°C, HCl, pH<2 | CRQL (See Table 2) |
| 12 | Groundwater | Two 1-Liter Ambers | TCL SVOCs/ CLP SOW SOM01.2 | Ice 4°C | CRQL (See Table 2) |
| 6* | Soil | Three ECORE® Samplers | TCL VOCs/ CLP SOW SOM01.2 | Ice 4°C | CRQL (See Table 2) |
| 6* | Soil | 8 oz Amber Jar | TCL SVOCs/ CLP SOW SOM01.2 | Ice 4°C | CRQL (See Table 2) |

Notes: * Up to six samples



† Sample count will include count of field samples plus 1 duplicate. Additionally, a trip blank and equipment blank will also be included in the total number of samples for VOCs.

CLP = Contract Laboratory Program C= Celsius
 HCL = hydrochloric acid
 ml = milliliter
 SOW = Statement of work
 VOA = volatile organic analysis

Table 2 CRQLs for TCL VOCs

| <u>TCL Volatiles</u> | Low Water (µg/L) | Low Soil (µg/kg) |
|---------------------------------------|-----------------------------|-----------------------------|
| Dichlorodifluoromethane | 5 | 5 |
| Chloromethane | 5 | 5 |
| Vinyl Chloride | 5 | 5 |
| Bromomethane | 5 | 5 |
| Chloroethane | 5 | 5 |
| Trichlorofluoromethane | 5 | 5 |
| 1,1-Dichloroethene | 5 | 5 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | 5 | 5 |
| Acetone | 10 | 10 |
| Carbon Disulfide | 5 | 5 |
| Methyl acetate | 5 | 5 |
| Methylene chloride | 5 | 5 |
| trans-1,2-Dichloroethene | 5 | 5 |
| Methyl tert-butyl ether | 5 | 5 |
| 1,1-Dichloroethane | 5 | 5 |
| cis-1,2-Dichloroethene | 5 | 5 |
| 2-Butanone | 10 | 10 |
| Bromochloromethane | 5 | 5 |
| Chloroform | 5 | 5 |
| 1,1,1-Trichloroethane | 5 | 5 |
| Cyclohexane | 5 | 5 |
| Carbon tetrachloride | 5 | 5 |
| Benzene | 5 | 5 |
| 1,2-Dichloroethane | 5 | 5 |
| 1,4-Dioxane | 100 | 100 |
| Trichloroethene | 5 | 5 |

| <u>TCL Volatiles</u> | Low Water (µg/L) | Low Soil (µg/kg) |
|-----------------------------|-----------------------------|-----------------------------|
| Methylcyclohexane | 5 | 5 |
| 1,2-Dichloropropane | 5 | 5 |
| Bromodichloromethane | 5 | 5 |
| cis-1,3-Dichloropropene | 5 | 5 |
| 4-Methyl-2-pentanone | 10 | 10 |
| Toluene | 5 | 5 |
| trans-1,3-Dichloropropene | 5 | 5 |
| 1,1,2-Trichloroethane | 5 | 5 |
| Tetrachloroethene | 5 | 5 |
| 2-Hexanone | 10 | 10 |
| Dibromochloromethane | 5 | 5 |
| 1,2-Dibromoethane | 5 | 5 |
| Chlorobenzene | 5 | 5 |
| Ethylbenzene | 5 | 5 |
| o-Xylene | 5 | 5 |
| m, p-Xylene | 5 | 5 |
| Styrene | 5 | 5 |
| Bromoform | 5 | 5 |
| Isopropylbenzene | 5 | 5 |
| 1,1,2,2-Tetrachloroethane | 5 | 5 |
| 1,3-Dichlorobenzene | 5 | 5 |
| 1,4-Dichlorobenzene | 5 | 5 |
| 1,2-Dichlorobenzene | 5 | 5 |
| 1,2-Dibromo-3-chloropropane | 5 | 5 |
| 1,2,4-Trichlorobenzene | 5 | 5 |
| 1,2,3-Trichlorobenzene | 5 | 5 |



Table 3 CRQLs for TCL SVOCs

| <u>SEMIVOLATILES</u> | <u>Low Water (ug/L)</u> | <u>Low Soil (ug/kg)</u> |
|-------------------------------|-------------------------|-------------------------|
| Benzaldehyde | 5 | 170 |
| Phenol | 5 | 170 |
| bis-(2-chloroethyl) ether | 5 | 170 |
| 2-Chlorophenol | 5 | 170 |
| 2-Methylphenol | 5 | 170 |
| 2,2'-Oxybis (1-chloropropane) | 5 | 170 |
| Acetophenone | 5 | 170 |
| 4-Methylphenol | 5 | 170 |
| N-Nitroso-di-n propylamine | 5 | 170 |
| Hexachloroethane | 5 | 170 |
| Nitrobenzene | 5 | 170 |
| Isophorone | 5 | 170 |
| 2-Nitrophenol | 5 | 170 |
| 2,4-Dimethylphenol | 5 | 170 |
| Bis (2-chloroethoxy) methane | 5 | 170 |
| 2,4-Dichlorophenol | 5 | 170 |
| Napthalene | 5 | 170 |
| 4-Chloroaniline | 5 | 170 |
| Hexachlorobutadiene | 5 | 170 |
| Caprolactam | 5 | 170 |
| 4-Chloro-3-methylphenol | 5 | 170 |
| 2-Methylnapthalene | 5 | 170 |
| Hexachlorocyclo-pentadiene | 5 | 170 |
| 2,4,6-Trichlorophenol | 5 | 170 |
| 2,4,5-Trichlorophenol | 5 | 170 |
| 1,1'-Biphenyl | 5 | 170 |
| 2-Chloronapthalene | 5 | 170 |
| 2-Nitroaniline | 10 | 330 |
| Dimethylphthalate | 5 | 170 |
| 2,6-Dinitrotoluene | 5 | 170 |
| Acenaphthylene | 5 | 170 |
| 3-Nitroaniline | 10 | 330 |
| Acenaphthene | 5 | 170 |

| <u>SEMIVOLATILES</u> | <u>Low Water (ug/L)</u> | <u>Low Soil (ug/kg)</u> |
|------------------------------|-------------------------|-------------------------|
| 2,4-Dinitrophenol | 10 | 330 |
| 4-Nitrophenol | 10 | 330 |
| Dibenzofuran | 5 | 170 |
| 2,4-Dinitrotoluene | 5 | 170 |
| Diethylphthalate | 5 | 170 |
| Fluorene | 5 | 170 |
| 4-Chlorophenyl-phenyl ether | 5 | 170 |
| 4-Nitroaniline | 10 | 330 |
| 4,6-Dinitro-2-methylphenol | 10 | 330 |
| N-Nitrosodiphenylamine | 5 | 170 |
| 1,2,4,5-Tetrachlorobenzene | 5 | 170 |
| 4-Bromophenyl-phenylether | 5 | 170 |
| Hexachlorobenzene | 5 | 170 |
| Atrazine | 5 | 170 |
| Pentachlorophenol | 10 | |
| Phenanthrene | 5 | 170 |
| Anthracene | 5 | 170 |
| Carbazole | 5 | 170 |
| Di-n-butylphthalate | 5 | 170 |
| Fluoranthene | 5 | 170 |
| Pyrene | 5 | 170 |
| Butylbenzylphthalate | 5 | 170 |
| 3,3'-Dichlorobenzidine | 5 | 170 |
| Benzo (a) anthracene | 5 | 170 |
| Chrysene | 5 | 170 |
| Bis (2-ethylhexyl) phthalate | 5 | 170 |
| Di-n-octylphthalate | 5 | 170 |
| Benzo (b) fluoroanthene | 5 | 170 |
| Benzo (k) fluoroanthene | 5 | 170 |
| Benzo (a) pyrene | 5 | 170 |
| Indeno (1,2,3-cd)-pyrene | 5 | 170 |
| Dibenzo (a,h)-anthracene | 5 | 170 |
| Benzo (g,h,i) perylene | 5 | 170 |
| 2,3,4,6-Tetrachlorophenol | 5 | 170 |



SAMPLING METHOD: Groundwater samples for TCL VOCs and TCL SVOCs analyses will be collected from the five newly installed temporary wells and from the four previously installed permanent wells on 9-10 November 2011.

Prior to conducting sampling at any newly installed wells, WESTON will gauge the water level in each well. The wells will then be sampled using low-flow micropurge technology, in accordance with EPA ERT SOP No. 2007, *Groundwater Well Sampling (EPA ERT, 2006)* using either a 2-in Grundfos or peristaltic pump. Water quality parameters, including pH, turbidity, specific conductivity, dissolved oxygen (DO), oxidation/reduction potential (ORP) and temperature will be monitored using a water quality meter equipped with a flow-thru cell prior to sampling. Water quality parameters and water levels will be recorded at approximate 5-minute intervals until at least three consecutive parameter readings stabilize within 10 percent of each other. Once all parameters are stabilized, samples will be collected and preserved as indicated in Table 1. The samples will be shipped to an approved CLP laboratory for analysis.

DECONTAMINATION: Dedicated, disposable sampling equipment and personal protective equipment (PPE) will be used wherever applicable. Disposable sampling equipment and PPE will be double-bagged and disposed of as dry industrial waste. The need for utilizing non-dedicated equipment will require these to be grossly decontaminated with Alconox and rinse with distilled water in between each sample, in accordance with Weston SOP 301, *Decontamination Procedures*.

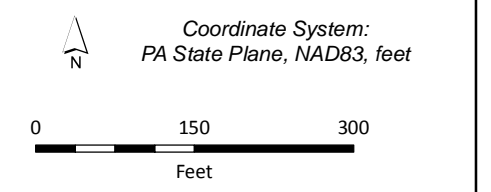
SAMPLE HANDLING: Each sample will be noted in the site logbook in accordance with Weston SOP 101, *Logbook Documentation*; Weston SOP 102, *Field Notes*; and Weston SOP 104, *Photographic and Video Documentation*. Chain-of-custody tracking will be provided by the carbon-less EPA forms in SCRIBE, and shall be filled out to correspond with the transfer of samples from the field in accordance with Weston SOP 103, *Chain-of-Custody Documentation*. Samples will be shipped via Federal Express to a laboratory assigned through the Contract Laboratory Program. Weston will follow all applicable IATA regulations.

QUALITY ASSURANCE/QUALITY CONTROL: Field QA/QC measures will be applied in accordance with the procedures detailed in the *START-4 Program-Wide Uniform Federal Policy Act Quality Assurance Project Plan*. QA staff at the EPA Region 3 Central Regional Laboratory will validate data for the field samples sent to the CLP laboratory. The data will be validated in accordance with EPA Region 3 modifications to the CLP national functional guidelines for data review, and will be validated to the organic M2. After the data are validated, the Office of Analytical Services and Quality Assurance staff will prepare a data usability report.



- Legend**
- Monitoring Well
 - Proposed Monitoring Well (not installed)
 - Proposed Temporary Wells for Geoprobe Program
 - Property Boundary
 - Havertown PCP Site Capped Area

Data Sources:
Imagery - ESRI Bing Hybrid Map Service, 2010

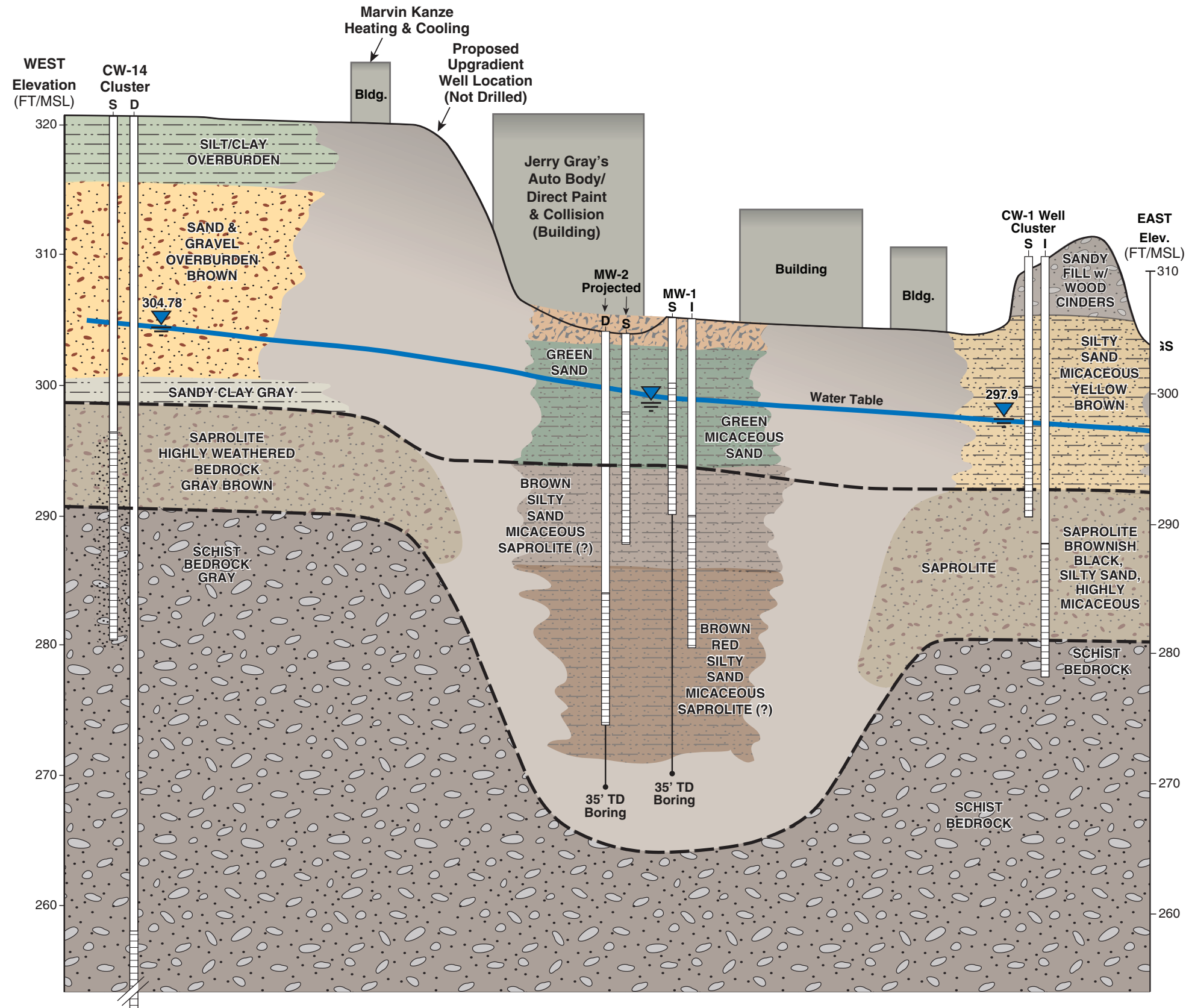


TCE Havertown
Havertown, Pennsylvania

Figure 1
Monitoring Well Locations

TDD#: WS01-10-08-003
Contract: EP-S3-10-05
Created: 10/27/2011





LEGEND

- Groundwater Levels
- Monitor Well
- 36' Total Depth Drilled (ft.)

Notes:

- (1) Water Levels Estimated from August 2011 Sampling Event.
 - (2) Water Level at CW-14S is Estimated Based on Historical Comparison to CW-1S Water Levels.
 - (3) MW-1 & MW-2 Well Pairs Are Approximate Ground Elevations - Not Yet Surveyed.
- (FT/MSL) Elevations in Feet Above Sea Level.

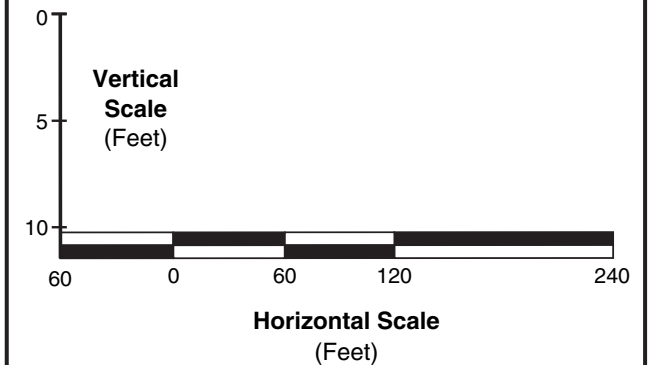


FIGURE 2
PRELIMINARY HYDROGEOLOGIC
CROSS SECTION
TCE - HAVERTOWN SITE