



ARM Group LLC

Engineers and Scientists

January 6, 2020

Ms. Barbara Brown
Project Coordinator
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230

Re: Supplemental Investigation Report:
CVOC Impacted Groundwater
Area A: Parcel A10
Tradepoint Atlantic
Sparrows Point, MD 21219

Dear Ms. Brown:

ARM Group LLC (ARM), on behalf of EnviroAnalytics Group (EAG), completed a Phase II Investigation of Parcel A10 (the Site) in July 2016. Parcel A10 is part of Area A of the Tradepoint Atlantic property located in Sparrows Point, Maryland. Following completion of the investigation, ARM prepared a Phase II Investigation Report (Revision 1) dated July 8, 2019, which was subsequently submitted to the Maryland Department of the Environment (MDE) and the United States Environmental Protection Agency (USEPA) and approved on August 20, 2019.

During the Phase II Investigation, 11 temporary groundwater sample collection points (commonly referred to as piezometers) were installed and sampled throughout the Site. Historical permanent well SG06-PDM001 was also sampled for the Phase II investigation. Following completion of the investigation, elevated groundwater concentrations of chlorinated volatile organic compounds (CVOCs), in particular tetrachloroethene (PCE) and trichloroethene (TCE), were identified in groundwater at the Site.

The groundwater data obtained from the 11 temporary piezometers and SG06-PDM001 were screened to determine whether individual sample results, or cumulative results summed by sample location, exceeded the applicable USEPA Vapor Intrusion Screening Levels (VISLs) which evaluate the vapor intrusion to indoor air risk pathway. The VISLs were determined using the USEPA's VISL Calculator, which was set for a Target Cancer Risk (TCR) of 1E-5 and Target Hazard Quotient (THQ) of 1.

The VISL screening evaluation identified elevated groundwater CVOC concentrations resulting in potentially unacceptable vapor intrusion risks/hazards at multiple locations. **Figure 1** provides a summary of detections of PCE and TCE in the groundwater during the Phase II Investigation, which were the primary drivers of the elevated vapor intrusion risks/hazards. Based on the elevated CVOC detections and associated risks/hazards, an additional investigation was warranted to further characterize the extent of these aqueous contaminants. The off-property areas to the east of the Site (outside of Tradepoint Atlantic) are also shown on **Figure 1**. As is evident on the figure, the highest concentrations of PCE and TCE in groundwater were present in sample locations positioned along the eastern property boundary, specifically at locations A10-025-PZ and A10-027-PZ. Based on the positions of these elevated concentrations the possibility of an off-property source was considered in the preparation of the sampling Work Plan.

The Phase II Investigation piezometers were screened in one of two distinct sand layers separated by a confining or semi-confining clay unit. Based on the specific conditions encountered at each location, the piezometers had either been screened in a sand unit below the clay or above the clay within an overlying saturated zone. These two hydrogeologic zones have been designated as the “shallow” zone and the “perched” zone, respectively. While the boring/construction log is not available for the historical monitoring well SG06-PDM001, it is believed to be installed in the shallow zone because the measured groundwater elevation at this location is more consistent with the shallow zone.

A Work Plan for Characterization of CVOCs in Groundwater in Area A: Parcel A10 dated September 5, 2019 was submitted to the MDE and the USEPA. Following review of the proposed sampling approach, the Work Plan was formally approved by the agencies on September 9, 2019, and the characterization activities were initiated in Parcel A10 on September 13, 2019. This Supplemental Investigation Report provides a summary of the field methods and findings of the characterization activities.

Field Methods

A total of 21 new temporary piezometers were installed between September 13, 2019 and September 25, 2019 to provide supplemental sampling points to determine the nature and extent of groundwater containing elevated concentrations of CVOCs throughout Parcel A10. Seven existing piezometers were also incorporated as additional sampling points, for a total of 28 proposed sample collection locations. The Work Plan had also specified that a limited number of locations were planned to be installed/sampled in the future (outside of Parcel A10) during the separate Phase II Investigations of Parcel A16 and Parcel A18, in order to further evaluate the dissolved-phase contaminant plume(s) in the downgradient direction. At this time, the supplemental sample locations outside of Parcel A10 have not yet been completed.



A total of 14 piezometer pairs were completed during this supplemental investigation. The locations of the piezometer pairs can be found on **Figure 2**. The locations targeted the eastern half of the parcel where the highest concentrations of CVOCs had previously been identified. All of the locations proposed in the Work Plan were successfully installed. Following the identification of all utilities in the study area, each groundwater collection point was installed in accordance with the procedures referenced in the Quality Assurance Project Plan (QAPP) Worksheet 21 – Field Standard Operating Procedures (SOPs), SOP No. 028 – Direct Push Installation and Construction of Temporary Groundwater Sample Collection Points. Pairs of piezometers were installed at the proposed locations to enable the collection of groundwater samples from both the perched and shallow groundwater zones. Regarding the seven piezometers that were sampled during the initial Phase II Investigation (A10-002-PZ, A10-015-PZ, A10-024-PZ, A10-025-PZ, A10-027-PZ, A10-029-PZ, and A10-034-PZ), additional piezometers were installed as pairs to the existing points. These piezometers were installed to investigate the corresponding groundwater zone (either perched or shallow) that the original piezometer was not targeting.

Soil cores at each location were screened and logged by ARM personnel. Soil boring logs and piezometer construction logs from this characterization investigation have been included in **Attachment 1**. All of the groundwater collection points were screened in accordance with the requirements given in the referenced SOP. The piezometer construction details (depths, screen intervals, etc.) are summarized on **Table 1**. Immediately after installation, 48 hours after installation, and immediately prior to sampling, each groundwater collection point was checked for the presence of non-aqueous phase liquid (NAPL) using an oil-water interface probe. NAPL was not detected in any of the locations.

Between October 9, 2019 and October 14, 2019, groundwater samples were collected from the 14 pairs of piezometers. Five piezometers in the perched zone (A10-024(P)-PZ, A10-025(P)-PZ, A10-027(P)-PZ, A10-034(P)-PZ, and A10-035(P)-PZ) did not yield adequate water to collect a sample. Groundwater samples were collected from a total of 23 piezometers in accordance with the procedures referenced in the QAPP Worksheet 21 – Field SOPs, SOP No. 006 – Groundwater Sampling. The sampling and purge logs are provided as **Attachment 2**. Laboratory samples were submitted to Pace Analytical Services, Inc. (PACE) and analyzed for VOCs via USEPA Method 8260. Sample containers, preservatives, and holding times for the VOCs analysis are listed in the QAPP Worksheet 19 & 30 – Sample Containers, Preservation, and Holding Times.

The groundwater sample collection points were surveyed by a Maryland-licensed surveyor to obtain top of casing (TOC) elevation data. A synoptic round of groundwater measurements was collected from each location on November 6, 2019. In addition to the sample collection points, supplemental locations were included throughout the parcel to enhance the groundwater contour maps. Surveyed TOC and ground surface elevations for all applicable locations can be found in **Table 1**, along with the depth to water (DTW) measurements from this date. It is notable that the



water levels in the perched piezometers with low water yields had risen significantly since the sampling attempt in October 2019. Localized potentiometric surface maps were constructed using the gauging measurements for the shallow zone and the perched zone, as provided on **Figure 3** and **Figure 4**, respectively.

Investigation-Derived Waste (IDW)

In accordance with the approved Work Plan and the requirements of the QAPP, potentially impacted material, or IDW, generated during this investigation was containerized in 55-gallon (DOT-UN1A2) drums. Since additional groundwater investigation activities may be completed, the IDW has not yet been characterized for disposal. IDW sampling will be performed in accordance with standard methods prior to disposal.

Characterization Results

Table 2 provides the analytical results for VOCs detected in groundwater for this investigation of Parcel A10. The laboratory reports for the supplemental characterization samples are included as electronic attachments. **Figure 5** displays the VOC concentrations in the groundwater samples which exceeded the Project Action Limits (PALs) established in the property-wide QAPP. The red highlighting in the figure indicates which of the groundwater sample locations had an elevated cumulative vapor intrusion risk potential based on the USEPA VISLs.

A summary of the cumulative vapor intrusion evaluation is provided on **Table 3**. Five of the characterization locations installed in the shallow zone (A10-025(S)-PZ, A10-027(S)-PZ, A10-034(S)-PZ, A10-035(S)-PZ, and A10-039(S)-PZ) had elevated CVOC concentrations that contributed to potentially unacceptable cumulative vapor intrusion cancer risks ($>1E-05$) and/or non-cancer hazards (>1). The primary CVOC causing the elevated vapor intrusion risks/hazards for all five locations was TCE. TCE was detected at concentrations of 256 ug/L, 218 ug/L, 134 ug/L, 1,670 ug/L, and 663 ug/L at locations A10-025(S)-PZ, A10-027(S)-PZ, A10-034(S)-PZ, A10-035(S)-PZ, and A10-039(S)-PZ, respectively. Each of the identified piezometers was screened in the shallow zone. PCE was detected above its individual non-cancer VISL (240 ug/L) in some instances; however, these detections did not cause the cumulative vapor intrusion non-cancer hazard index to exceed 1. It is notable that one detection of PCE during the initial Phase II Investigation (1,670 ug/L in the sample collected from A10-025(S)-PZ in July 2016) was significantly higher than the corresponding sample collected during this characterization investigation.

PCE and TCE were determined to be the most significant CVOCs in groundwater at the Site. **Figure 6** and **Figure 7** show shallow concentration isocontour maps for PCE and TCE, respectively. For both CVOCs, the elevated concentrations appear to be present in two localized hotspots along the eastern property boundary, with the highest concentrations observed in the northeastern corner of the Site. Both constituents are well defined to the west and south.



Conclusions

The concentrations of CVOCs in groundwater have been adequately defined along the eastern property boundary. Based on the localized groundwater potentiometric surface map for the shallow zone, groundwater is shown flowing in a north-northwestern direction. This supports the possibility of off-site sources causing the observed CVOC contamination in shallow groundwater along the eastern property boundary. CVOCs are well defined to the west and to the south. Additional data will be obtained to the north during the completion of the separate Parcel A16 and Parcel A18 Phase II Investigations.

Exceedances of the acceptable cumulative vapor intrusion criteria were limited to five shallow groundwater samples (A10-0025(S)-PZ, A10-027(S)-PZ, A10-034(S)-PZ, A10-035(S)-PZ, and A10-039(S)-PZ). An overlying sample from the perched zone at these five well locations was successfully collected from only one location (A10-039(P)-PZ), and the sample from this piezometer showed a lack of significant impacts in the overlying water-bearing zone. The presence of the low-permeability soil unit, and the presence of unimpacted perched groundwater above the shallow zone, will prohibit or significantly reduce the potential for vapor intrusion due to vertical migration of vapors from contaminants in the shallow zone.

In the future, it will be necessary to incorporate the characterization findings into a vapor intrusion assessment within a Response and Development Work Plan (RADWP) for this area of the property. The need for any additional action will be contingent on future development planning. The findings suggest that a vapor barrier may be required if an enclosed structure is proposed for construction; however, the positioning of any structure at the Site with respect to the delineated groundwater plume as well as the continuity of the clay layer and the perched water-bearing layer may in part determine the necessity of a vapor barrier.

Additional data may be collected at a later date (during a pre-development investigation) to further determine the need for a vapor barrier at the Site. Any activities outside of the scope proposed in the approved Work Plan would be coordinated with the MDE under separate cover.

If you have any questions, or if we can provide any additional information at this time, please do not hesitate to contact ARM Group LLC at 410-290-7775.

Respectfully Submitted,
ARM Group LLC



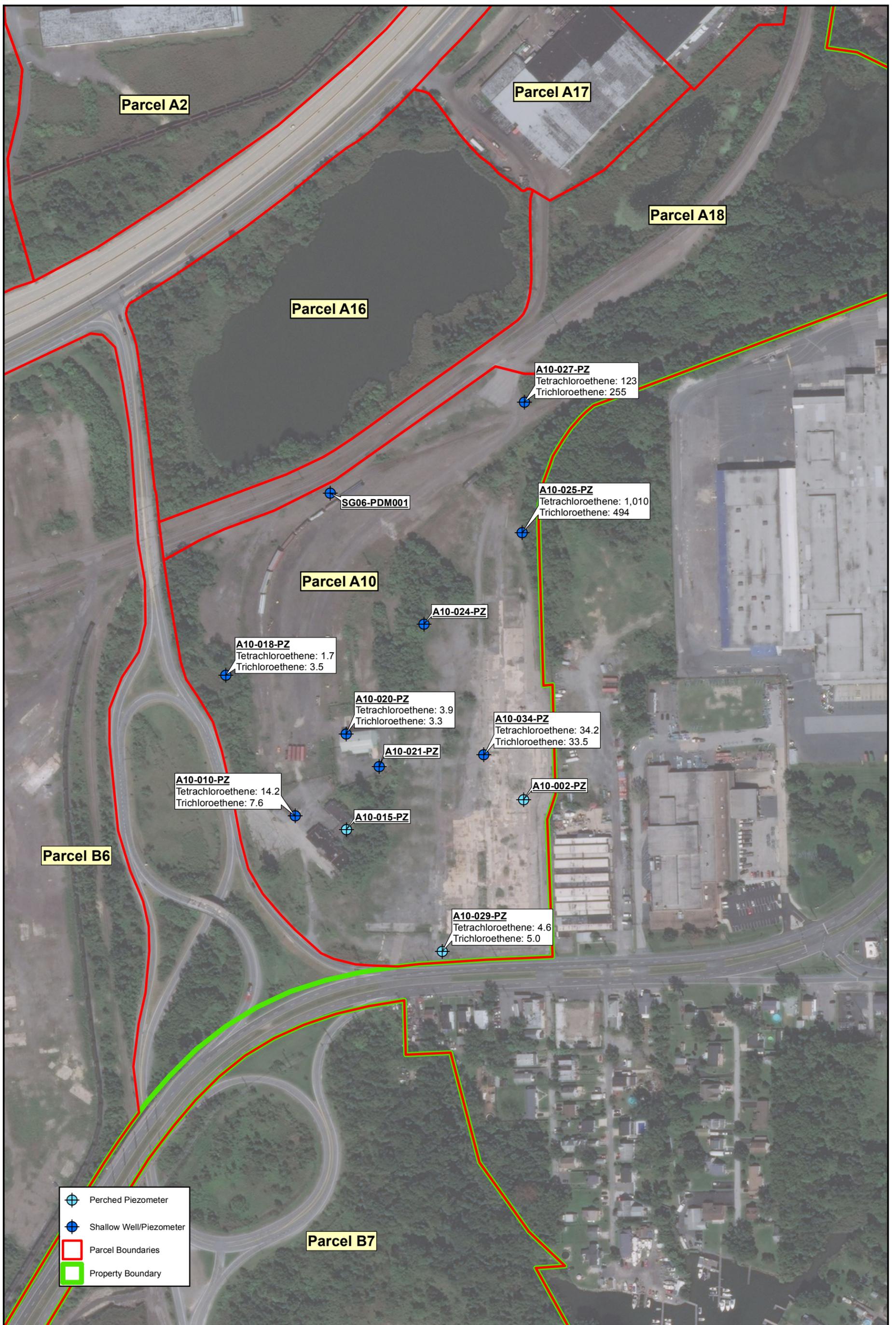
Taylor R. Smith, P.E.
Project Engineer

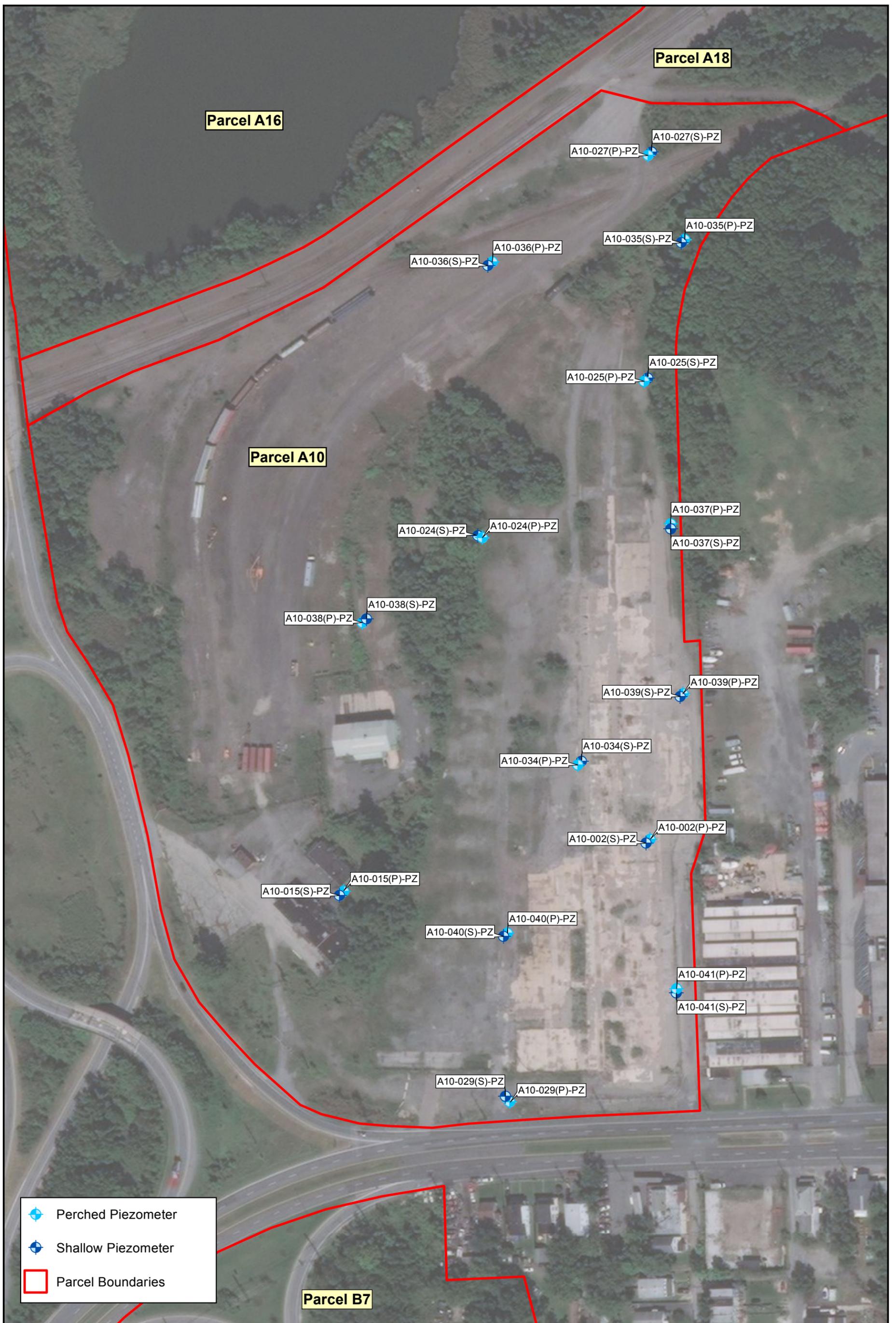


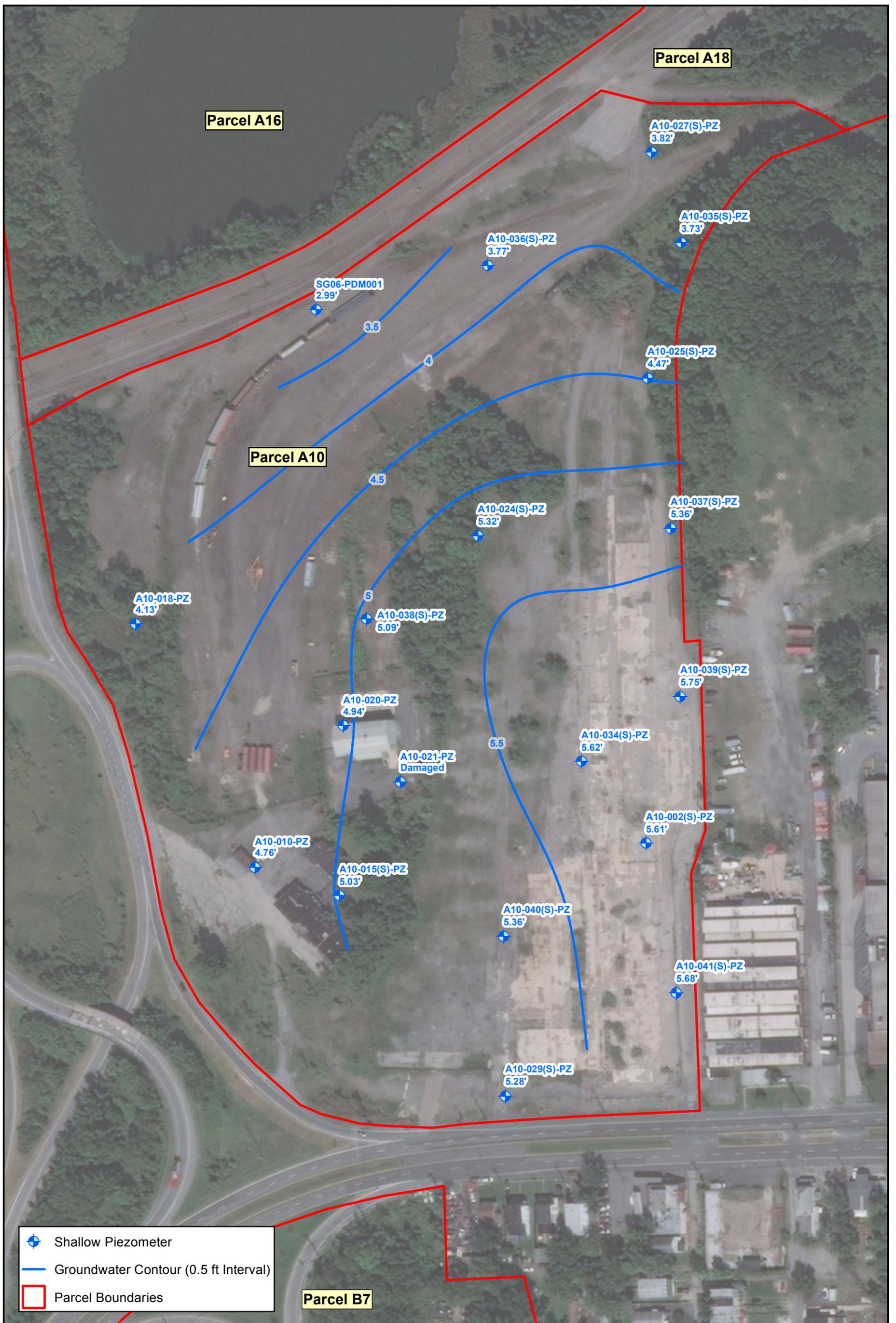
Eric S. Magdar, P.G.
Vice President



FIGURES







ARM Group LLC
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0 100 200 400
Feet

**Parcel A10 CVOC Characterization
Groundwater Contour Map (ft amsl)
Shallow Zone**

Rev. 6, 20GE

EnviroAnalytics Group
ARM Project 180716M

Tradeport Atlantic
Baltimore County, MD



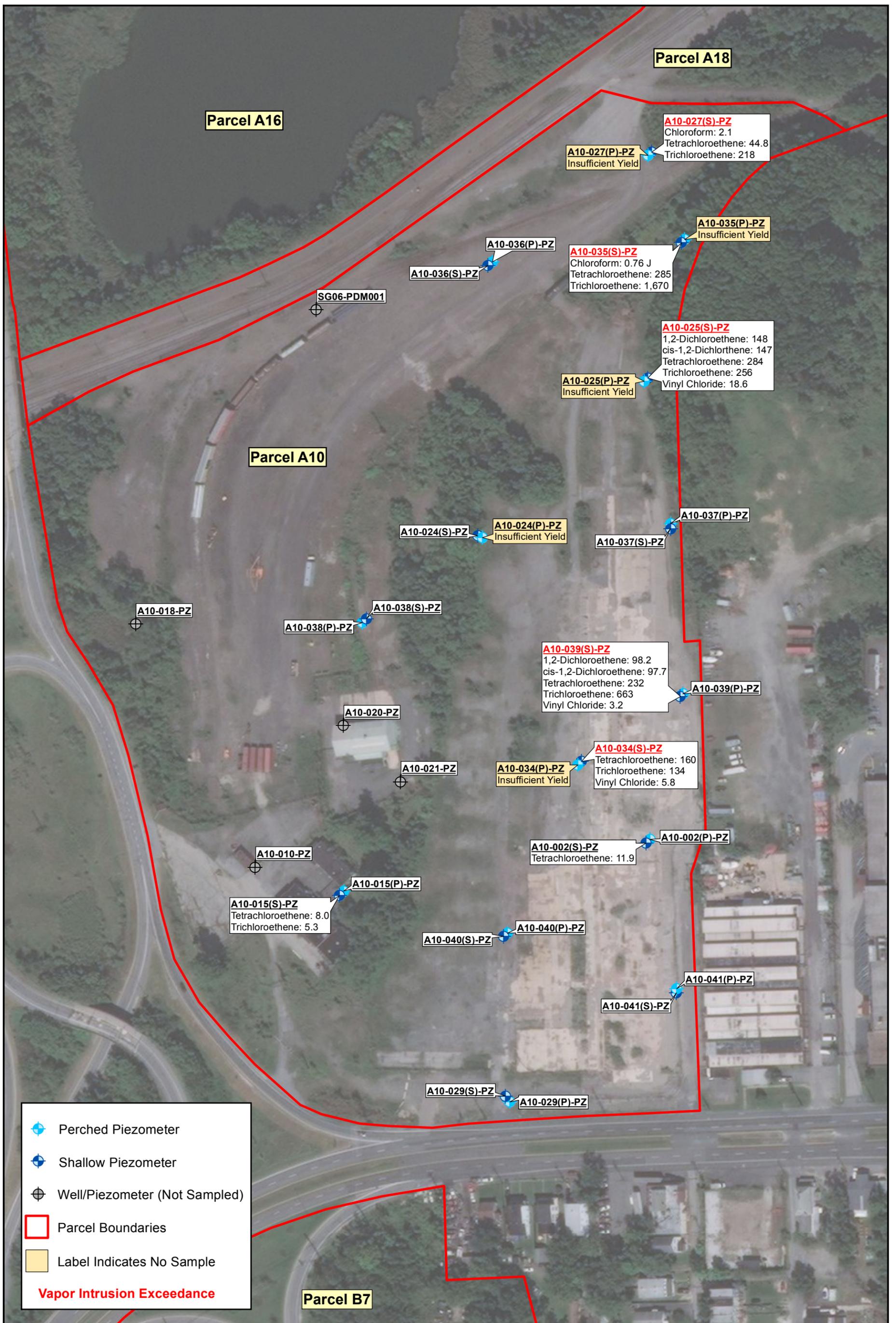
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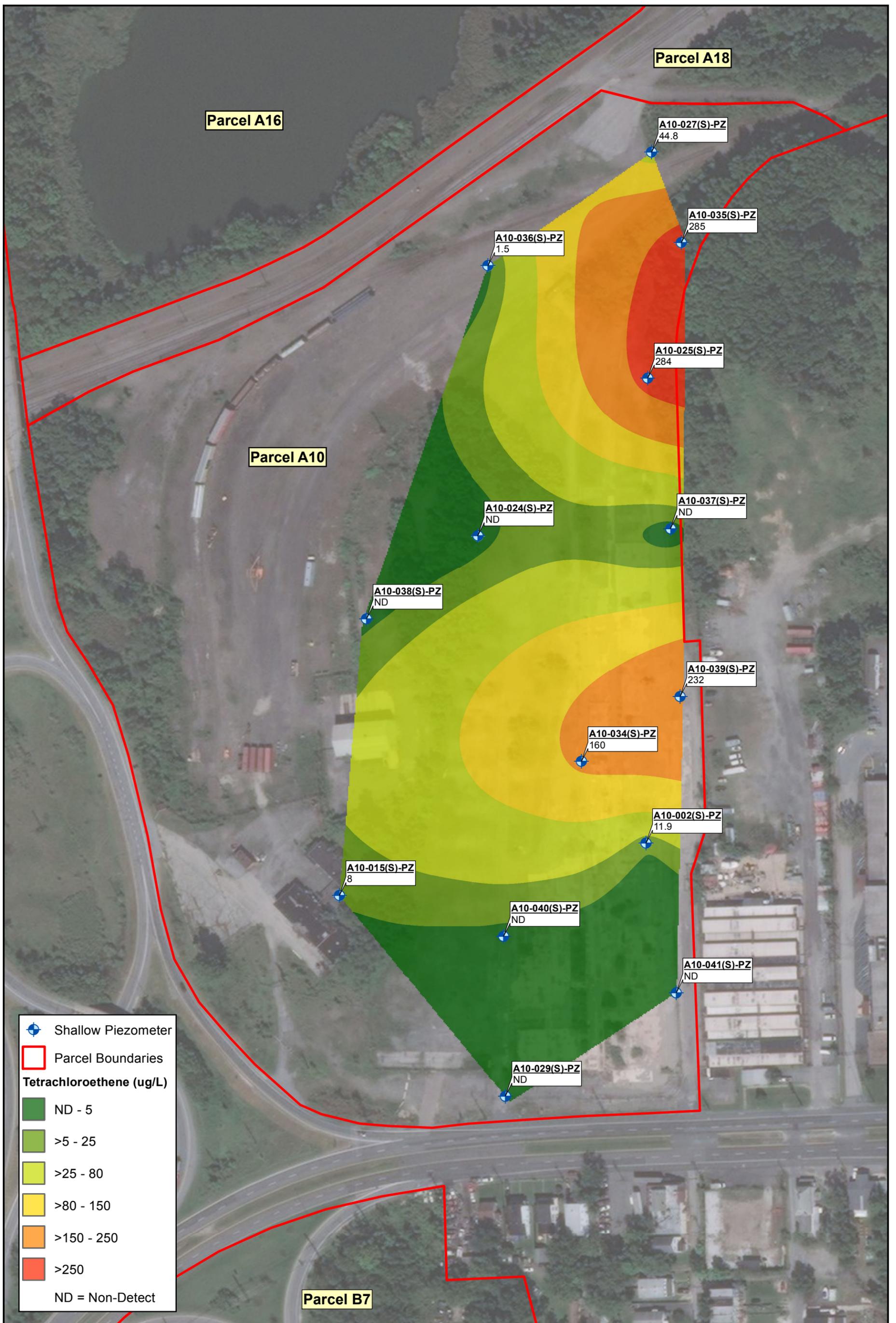
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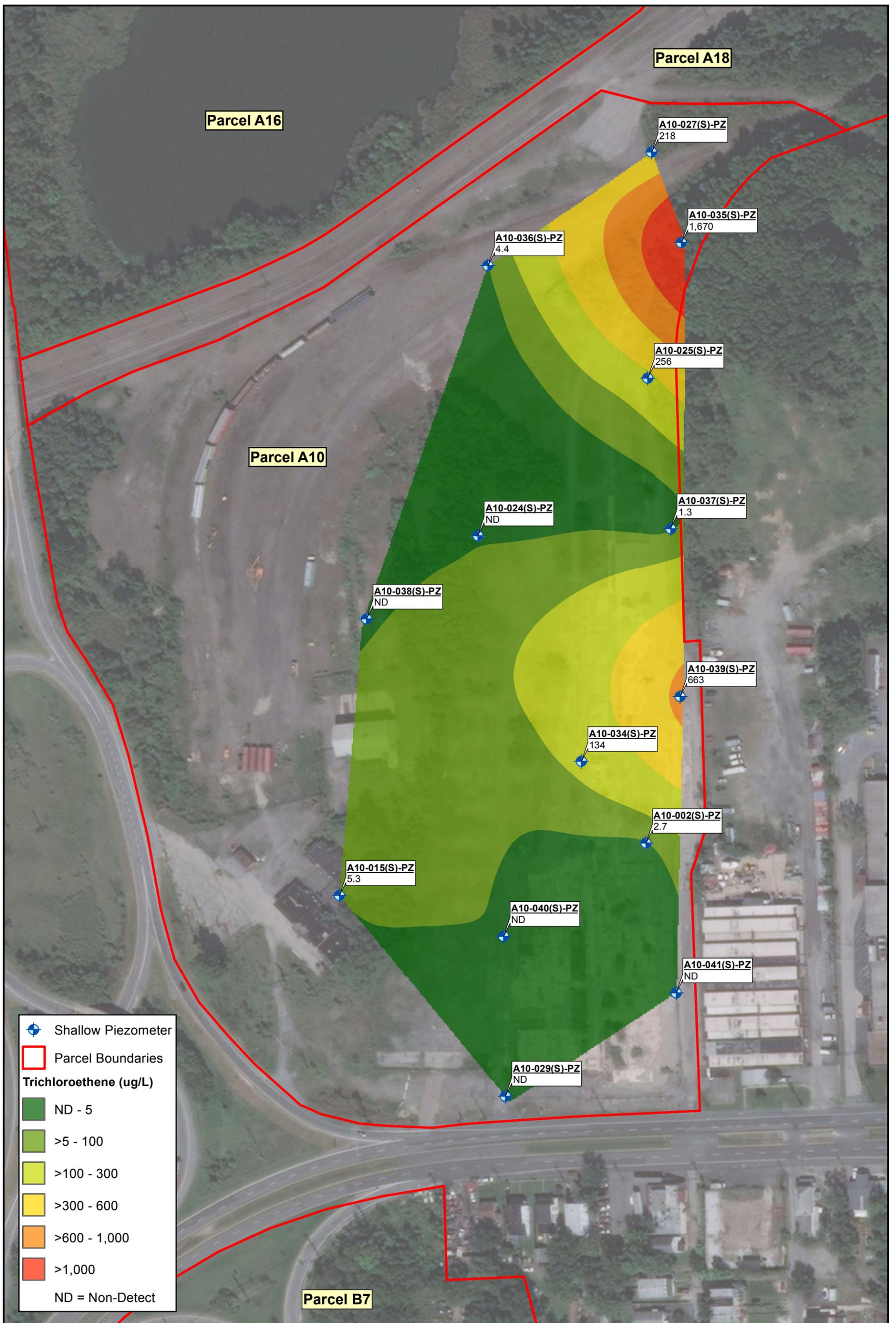
Parcel A10 CVOC Contamination
Groundwater Contour Map (ft amsl)
A10-010 Zone
Rev 6, 2020

EnviroAnalytics Group
ARM Project 180716M
Tradeport Atlantic
Baltimore County, MD

Figure
4







TABLES

**Table 1 - Parcel A10 CVOC Characterization
Piezometer Construction Details and Elevation Measurements**

Location ID	TOC Elevation (ft. AMSL)	Measured DTW (ft. TOC)	Groundwater Elevation (ft. amsl)	Ground Elevation (ft. amsl)	Screen Interval (ft. bgs)	Screen Bottom Elevation (ft. amsl)	Hydraulic Zone
Sample Locations (14 Paired Piezometers)							
A10-002(P)-PZ	22.13	10.08	12.05	18.90	7 to 17	1.9	Perched
A10-002(S)-PZ	22.06	16.45	5.61	18.99	15 to 25	-6.0	Shallow
A10-015(P)-PZ	20.09	9.30	10.79	16.32	3.5 to 13.5	2.8	Perched
A10-015(S)-PZ	18.39	13.36	5.03	16.33	18 to 28	-11.7	Shallow
A10-024(P)-PZ	13.99	8.34	5.65	11.66	3 to 9	2.7	Perched
A10-024(S)-PZ	14.36	9.04	5.32	11.43	10 to 20	-8.6	Shallow
A10-025(P)-PZ	17.33	7.67	9.66	14.70	3 to 10	4.7	Perched
A10-025(S)-PZ	16.94	12.47	4.47	14.14	10 to 20	-5.9	Shallow
A10-027(P)-PZ	15.02	5.67	9.35	13.01	3 to 8	5.0	Perched
A10-027(S)-PZ	16.38	12.56	3.82	12.59	12 to 22	-9.4	Shallow
A10-029(P)-PZ	23.11	6.62	16.49	19.64	4 to 14	5.6	Perched
A10-029(S)-PZ	23.20	17.92	5.28	19.70	22 to 32	-12.3	Shallow
A10-034(P)-PZ	19.74	8.80	10.94	17.03	3 to 10	7.0	Perched
A10-034(S)-PZ	20.10	14.48	5.62	17.11	20 to 25	-7.9	Shallow
A10-035(P)-PZ	17.46	10.91	6.55	14.67	3 to 13	1.7	Perched
A10-035(S)-PZ	17.16	13.43	3.73	14.76	14 to 24	-9.2	Shallow
A10-036(P)-PZ	15.13	9.03	6.10	12.87	3 to 13	-0.1	Perched
A10-036(S)-PZ	15.78	12.01	3.77	12.70	14 to 24	-11.3	Shallow
A10-037(P)-PZ	16.21	7.23	8.98	14.61	3 to 13	1.6	Perched
A10-037(S)-PZ	16.71	11.35	5.36	14.36	13 to 23	-8.6	Shallow
A10-038(P)-PZ	14.15	7.28	6.87	11.76	3 to 13	-1.2	Perched
A10-038(S)-PZ	14.60	9.51	5.09	11.69	14 to 24	-12.3	Shallow
A10-039(P)-PZ	17.36	8.99	8.37	15.14	3 to 13	2.1	Perched
A10-039(S)-PZ	18.06	12.31	5.75	15.13	14 to 24	-8.9	Shallow
A10-040(P)-PZ	19.71	5.73	13.98	18.75	4 to 14	4.8	Perched
A10-040(S)-PZ	21.16	15.80	5.36	18.81	18 to 28	-9.2	Shallow
A10-041(P)-PZ	17.51	3.44	14.07	15.65	3 to 13	2.7	Perched
A10-041(S)-PZ	18.80	13.12	5.68	15.94	16 to 26	-10.1	Shallow
Supplemental Gauging Locations							
A10-010-PZ	17.98	13.22	4.76	14.24	14 to 24	-9.8	Shallow
A10-018-PZ	18.65	14.52	4.13	15.11	17 to 27	-11.9	Shallow
A10-020-PZ	13.64	8.7	4.94	12.29	14 to 24	-11.7	Shallow
A10-021-PZ	13.26	NA	NA	11.76	14 to 24	-12.2	Shallow
SG06-PDM001	12.04	9.05	2.99	12.42	4 to 14	-1.6	Shallow

DTW = Depth to water

TOC = Top of casing

bgs = below ground surface

amsl = above mean sea level

NA = Not Applicable (due to piezometer damage)

**Table 2 - Parcel A10 CVOC Characterization
Summary of VOCs Detected in Groundwater**

Parameter	Units	PAL	A10-002(P)-PZ	A10-002(S)-PZ	A10-015(P)-PZ	A10-015(S)-PZ	A10-024(S)-PZ	A10-025(S)-PZ
			10/11/2019	10/15/2019	10/11/2019	10/10/2019	10/11/2019	10/15/2019
1,1-Dichloroethene	ug/L	7	1.0 U	2.6	1.0 U	0.71 J	1.0 U	0.77 J
1,2-Dichlorobenzene	ug/L	600	1.0 U	3.4				
1,2-Dichloroethene (Total)	ug/L	70	2.0 U	148				
1,4-Dichlorobenzene	ug/L	75	1.0 U	1.2				
2-Butanone (MEK)	ug/L	5,600	10.0 U					
Acetone	ug/L	14,000	5.9 J	10.0 U				
Bromomethane	ug/L	7.5	1.0 U					
Carbon disulfide	ug/L	810	1.0 U					
Carbon tetrachloride	ug/L	5	1.0 U					
Chlorobenzene	ug/L	100	1.0 U	0.93 J				
Chloroform	ug/L	0.22	1.0 U					
cis-1,2-Dichloroethene	ug/L	70	1.0 U	147				
Methyl acetate	ug/L	20,000	5.0 U					
Methyl-tert-butyl ether	ug/L	14	1.0 U	2.3	1.0 U	1.7	1.0 U	1.0 U
Tetrachloroethene	ug/L	5	1.0 U	11.9	1.0 U	8.0	1.0 U	284
Toluene	ug/L	1,000	0.40 J	1.0 U				
trans-1,2-Dichloroethene	ug/L	100	1.0 U	0.90 J				
Trichloroethene	ug/L	5	1.0 U	2.7	1.0 U	5.3	1.0 U	256
Vinyl chloride	ug/L	2	1.0 U	18.6				

Detections in bold

Values in red indicate an exceedance of the Project Action Limit (PAL)

U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.

J: The positive result reported for this analyte is a quantitative estimate.

**Table 2 - Parcel A10 CVOC Characterization
Summary of VOCs Detected in Groundwater**

Parameter	Units	PAL	A10-027(S)-PZ	A10-029(P)-PZ	A10-029(S)-PZ	A10-034(S)-PZ	A10-035(S)-PZ	A10-036(P)-PZ
			10/9/2019	10/11/2019	10/15/2019	10/15/2019	10/11/2019	10/11/2019
1,1-Dichloroethene	ug/L	7	1.0 U	1.0 U	1.0 U	0.87 J	1.2	1.0 U
1,2-Dichlorobenzene	ug/L	600	3.1	1.0 U	1.0 U	2.0	1.0 U	1.0 U
1,2-Dichloroethene (Total)	ug/L	70	8.3	2.0 U	2.0 U	33.6	23.1	2.0 U
1,4-Dichlorobenzene	ug/L	75	1.0 U					
2-Butanone (MEK)	ug/L	5,600	10.0 U	8.7 J	10.0 U	10.0 U	10.0 U	10.0 U
Acetone	ug/L	14,000	10.0 U	410 J	10.0 U	8.0 J	10.0 U	33.8 U
Bromomethane	ug/L	7.5	1.0 U					
Carbon disulfide	ug/L	810	1.0 U					
Carbon tetrachloride	ug/L	5	0.94 J	1.0 U				
Chlorobenzene	ug/L	100	1.0 U	1.0 U	1.0 U	2.1	1.0 U	1.0 U
Chloroform	ug/L	0.22	2.1	1.0 U	1.0 U	1.0 U	0.76 J	1.0 U
cis-1,2-Dichloroethene	ug/L	70	8.3	1.0 U	1.0 U	33.1	23.1	1.0 U
Methyl acetate	ug/L	20,000	5.0 U	5.0 U	0.86 J	5.0 U	5.0 U	5.0 U
Methyl-tert-butyl ether	ug/L	14	1.0 U	1.0 U	1.4	1.3	1.0 U	1.0 U
Tetrachloroethene	ug/L	5	44.8	1.0 U	1.0 U	160	285	1.0 U
Toluene	ug/L	1,000	1.0 U					
trans-1,2-Dichloroethene	ug/L	100	1.0 U	1.0 U	1.0 U	0.53 J	1.0 U	1.0 U
Trichloroethene	ug/L	5	218	1.0 U	1.0 U	134	1,670	1.0 U
Vinyl chloride	ug/L	2	1.0 U	1.0 U	1.0 U	5.8	0.59 J	1.0 U

Detections in bold

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**Table 2 - Parcel A10 CVOC Characterization
Summary of VOCs Detected in Groundwater**

Parameter	Units	PAL	A10-036(S)-PZ	A10-037(P)-PZ	A10-037(S)-PZ	A10-038(P)-PZ	A10-038(S)-PZ	A10-039(P)-PZ
			10/10/2019	10/11/2019	10/10/2019	10/11/2019	10/11/2019	10/11/2019
1,1-Dichloroethene	ug/L	7	1.0 U					
1,2-Dichlorobenzene	ug/L	600	1.0 U					
1,2-Dichloroethene (Total)	ug/L	70	1.8 J	2.0 U				
1,4-Dichlorobenzene	ug/L	75	1.0 U					
2-Butanone (MEK)	ug/L	5,600	10.0 U					
Acetone	ug/L	14,000	10.0 U	213	10.0 U	27.6	10.0 U	23.1
Bromomethane	ug/L	7.5	1.0 U					
Carbon disulfide	ug/L	810	1.0 U	1.0 U	1.0 U	7.8	1.0 U	1.0 U
Carbon tetrachloride	ug/L	5	1.0 U					
Chlorobenzene	ug/L	100	1.0 U					
Chloroform	ug/L	0.22	1.0 U					
cis-1,2-Dichloroethene	ug/L	70	1.8	1.0 U				
Methyl acetate	ug/L	20,000	5.0 U	5.0 U	5.0 U	2.3 J	5.0 U	5.0 U
Methyl-tert-butyl ether	ug/L	14	1.0 U					
Tetrachloroethene	ug/L	5	1.5	1.0 U				
Toluene	ug/L	1,000	1.0 U	0.74 J				
trans-1,2-Dichloroethene	ug/L	100	1.0 U					
Trichloroethene	ug/L	5	4.4	1.0 U	1.3	1.0 U	1.0 U	1.0 U
Vinyl chloride	ug/L	2	1.0 U					

Detections in bold

Values in red indicate an exceedance of the Project Action Limit (PAL)

U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.

J: The positive result reported for this analyte is a quantitative estimate.

**Table 2 - Parcel A10 CVOC Characterization
Summary of VOCs Detected in Groundwater**

Parameter	Units	PAL	A10-039(S)-PZ	A10-040(P)-PZ	A10-040(S)-PZ	A10-041(P)-PZ	A10-041(S)-PZ
			10/15/2019	10/11/2019	10/15/2019	10/10/2019	10/15/2019
1,1-Dichloroethene	ug/L	7	1.8	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichlorobenzene	ug/L	600	1.0 U				
1,2-Dichloroethene (Total)	ug/L	70	98.2	2.0 U	2.0 U	2.0 U	2.0 U
1,4-Dichlorobenzene	ug/L	75	1.0 U				
2-Butanone (MEK)	ug/L	5,600	10.0 U				
Acetone	ug/L	14,000	9.2 J	77.5	10.0 U	10.0 U	10.0 U
Bromomethane	ug/L	7.5	1.0 U	1.0 U	1.0 U	0.76 J	1.0 U
Carbon disulfide	ug/L	810	1.0 U				
Carbon tetrachloride	ug/L	5	1.0 U				
Chlorobenzene	ug/L	100	0.62 J	1.0 U	1.0 U	1.0 U	1.0 U
Chloroform	ug/L	0.22	1.0 U				
cis-1,2-Dichloroethene	ug/L	70	97.7	1.0 U	1.0 U	1.0 U	1.0 U
Methyl acetate	ug/L	20,000	5.0 U				
Methyl-tert-butyl ether	ug/L	14	0.78 J	1.0 U	1.2	1.0 U	1.0 U
Tetrachloroethene	ug/L	5	232	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	ug/L	1,000	1.0 U				
trans-1,2-Dichloroethene	ug/L	100	0.50 J	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	ug/L	5	663	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl chloride	ug/L	2	3.2	1.0 U	1.0 U	1.0 U	1.0 U

Detections in bold

Values in red indicate an exceedance of the Project Action Limit (PAL)

U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.

J: The positive result reported for this analyte is a quantitative estimate.

**Table 3 - Parcel A10 CVOC Characterization
Cumulative Vapor Intrusion Comparison**

Parameter	Type	Organ System	VI Screening Criteria (ug/L)	A10-002(P)-PZ		A10-002(S)-PZ		A10-015(P)-PZ		A10-015(S)-PZ	
				Conc. (ug/L)	Risk/Hazard						
Cancer Risk											
1,4-Dichlorobenzene	VOC		110	1 U	0	1 U	0	1 U	0	1 U	0
Carbon tetrachloride	VOC		18	1 U	0	1 U	0	1 U	0	1 U	0
Chloroform	VOC		36	1 U	0	1 U	0	1 U	0	1 U	0
Methyl tert-butyl ether	VOC		20,000	1 U	0	2.3	1.2E-09	1 U	0	1.7	8.5E-10
Vinyl chloride	VOC		25	1 U	0	1 U	0	1 U	0	1 U	0
Tetrachloroethene	VOC		650	1 U	0	11.9	1.8E-07	1 U	0	8	1.2E-07
Trichloroethene	VOC		74	1 U	0	2.7	3.6E-07	1 U	0	5.3	7.2E-07
Cumulative Vapor Intrusion Cancer Risk				0		5E-07		0		8E-07	
Non-Cancer Hazard											
Tetrachloroethene	VOC	Nervous; Ocular	240	1 U	0	11.9	0.05	1 U	0	8	0.03
Cumulative Vapor Intrusion Non-Cancer Hazard				0		0		0		0	
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	22	1 U	0	2.7	0.1	1 U	0	5.3	0.2
Cumulative Vapor Intrusion Non-Cancer Hazard				0		0		0		0	

Parameter	Type	Organ System	VI Screening Criteria (ug/L)	A10-024(S)-PZ		A10-025(S)-PZ		A10-027(S)-PZ		A10-029(P)-PZ	
				Conc. (ug/L)	Risk/Hazard						
Cancer Risk											
1,4-Dichlorobenzene	VOC		110	1 U	0	1.2	1.1E-07	1 U	0	1 U	0
Carbon tetrachloride	VOC		18	1 U	0	1 U	0	0.94 J	5.2E-07	1 U	0
Chloroform	VOC		36	1 U	0	1 U	0	2.1	5.8E-07	1 U	0
Methyl tert-butyl ether	VOC		20,000	1 U	0	1 U	0	1 U	0	1 U	0
Vinyl chloride	VOC		25	1 U	0	18.6	7.4E-06	1 U	0	1 U	0
Tetrachloroethene	VOC		650	1 U	0	284	4.4E-06	44.8	6.9E-07	1 U	0
Trichloroethene	VOC		74	1 U	0	256	3.5E-05	218	2.9E-05	1 U	0
Cumulative Vapor Intrusion Cancer Risk				0		5E-05		3E-05		0	
Non-Cancer Hazard											
Tetrachloroethene	VOC	Nervous; Ocular	240	1 U	0	284	1	44.8	0.2	1 U	0
Cumulative Vapor Intrusion Non-Cancer Hazard				0		1		0		0	
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	22	1 U	0	256	12	218	10	1 U	0
Cumulative Vapor Intrusion Non-Cancer Hazard				0		12		10		0	

Highlighted values indicate exceedances of the cumulative vapor intrusion criteria: TCR>1E-05 or THI>1

Conc. = Concentration

U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.

J: The positive result reported for this analyte is a quantitative estimate.

**Table 3 - Parcel A10 CVOC Characterization
Cumulative Vapor Intrusion Comparison**

Parameter	Type	Organ System	VI Screening Criteria (ug/L)	A10-029(S)-PZ		A10-034(S)-PZ		A10-035(S)-PZ		A10-036(P)-PZ	
				Conc. (ug/L)	Risk/Hazard						
Cancer Risk											
1,4-Dichlorobenzene	VOC		110	1 U	0	1 U	0	1 U	0	1 U	0
Carbon tetrachloride	VOC		18	1 U	0	1 U	0	1 U	0	1 U	0
Chloroform	VOC		36	1 U	0	1 U	0	0.76 J	2.1E-07	1 U	0
Methyl tert-butyl ether	VOC		20,000	1.4	7.0E-10	1.3	6.5E-10	1 U	0	1 U	0
Vinyl chloride	VOC		25	1 U	0	5.8	2.3E-06	0.59 J	2.4E-07	1 U	0
Tetrachloroethene	VOC		650	1 U	0	160	2.5E-06	285	4.4E-06	1 U	0
Trichloroethene	VOC		74	1 U	0	134	1.8E-05	1,670	2.3E-04	1 U	0
Cumulative Vapor Intrusion Cancer Risk					7E-10		2E-05		2E-04		0
Non-Cancer Hazard											
Tetrachloroethene	VOC	Nervous; Ocular	240	1 U	0	160	0.7	285	1	1 U	0
Cumulative Vapor Intrusion Non-Cancer Hazard					0		1		1		0
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	22	1 U	0	134	6	1,670	76	1 U	0
Cumulative Vapor Intrusion Non-Cancer Hazard					0		6		76		0

Parameter	Type	Organ System	VI Screening Criteria (ug/L)	A10-036(S)-PZ		A10-037(P)-PZ		A10-037(S)-PZ		A10-038(P)-PZ	
				Conc. (ug/L)	Risk/Hazard						
Cancer Risk											
1,4-Dichlorobenzene	VOC		110	1 U	0	1 U	0	1 U	0	1 U	0
Carbon tetrachloride	VOC		18	1 U	0	1 U	0	1 U	0	1 U	0
Chloroform	VOC		36	1 U	0	1 U	0	1 U	0	1 U	0
Methyl tert-butyl ether	VOC		20,000	1 U	0	1 U	0	1 U	0	1 U	0
Vinyl chloride	VOC		25	1 U	0	1 U	0	1 U	0	1 U	0
Tetrachloroethene	VOC		650	1.5	2.3E-08	1 U	0	1 U	0	1 U	0
Trichloroethene	VOC		74	4.4	5.9E-07	1 U	0	1.3	1.8E-07	1 U	0
Cumulative Vapor Intrusion Cancer Risk					6E-07		0		2E-07		0
Non-Cancer Hazard											
Tetrachloroethene	VOC	Nervous; Ocular	240	1.5	0.006	1 U	0	1 U	0	1 U	0
Cumulative Vapor Intrusion Non-Cancer Hazard					0		0		0		0
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	22	4.4	0.2	1 U	0	1.3	0.06	1 U	0
Cumulative Vapor Intrusion Non-Cancer Hazard					0		0		0		0

Highlighted values indicate exceedances of the cumulative vapor intrusion criteria: TCR>1E-05 or THI>1

Conc. = Concentration

U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.

J: The positive result reported for this analyte is a quantitative estimate.

**Table 3 - Parcel A10 CVOC Characterization
Cumulative Vapor Intrusion Comparison**

Parameter	Type	Organ System	VI Screening Criteria (ug/L)	A10-038(S)-PZ		A10-039(P)-PZ		A10-039(S)-PZ		A10-040(P)-PZ	
				Conc. (ug/L)	Risk/Hazard						
Cancer Risk											
1,4-Dichlorobenzene	VOC		110	1 U	0	1 U	0	1 U	0	1 U	0
Carbon tetrachloride	VOC		18	1 U	0	1 U	0	1 U	0	1 U	0
Chloroform	VOC		36	1 U	0	1 U	0	1 U	0	1 U	0
Methyl tert-butyl ether	VOC		20,000	1 U	0	1 U	0	0.78 J	3.9E-10	1 U	0
Vinyl chloride	VOC		25	1 U	0	1 U	0	3.2	1.3E-06	1 U	0
Tetrachloroethene	VOC		650	1 U	0	1 U	0	232	3.6E-06	1 U	0
Trichloroethene	VOC		74	1 U	0	1 U	0	663	9.0E-05	1 U	0
Cumulative Vapor Intrusion Cancer Risk				0		0		9E-05		0	
Non-Cancer Hazard											
Tetrachloroethene	VOC	Nervous; Ocular	240	1 U	0	1 U	0	232	1	1 U	0
Cumulative Vapor Intrusion Non-Cancer Hazard				0		0		1		0	
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	22	1 U	0	1 U	0	663	30	1 U	0
Cumulative Vapor Intrusion Non-Cancer Hazard				0		0		30		0	

Parameter	Type	Organ System	VI Screening Criteria (ug/L)	A10-040(S)-PZ		A10-041(P)-PZ		A10-041(S)-PZ	
				Conc. (ug/L)	Risk/Hazard	Conc. (ug/L)	Risk/Hazard	Conc. (ug/L)	Risk/Hazard
Cancer Risk									
1,4-Dichlorobenzene	VOC		110	1 U	0	1 U	0	1 U	0
Carbon tetrachloride	VOC		18	1 U	0	1 U	0	1 U	0
Chloroform	VOC		36	1 U	0	1 U	0	1 U	0
Methyl tert-butyl ether	VOC		20,000	1.2	6.0E-10	1 U	0	1 U	0
Vinyl chloride	VOC		25	1 U	0	1 U	0	1 U	0
Tetrachloroethene	VOC		650	1 U	0	1 U	0	1 U	0
Trichloroethene	VOC		74	1 U	0	1 U	0	1 U	0
Cumulative Vapor Intrusion Cancer Risk				6E-10		0		0	
Non-Cancer Hazard									
Tetrachloroethene	VOC	Nervous; Ocular	240	1 U	0	1 U	0	1 U	0
Cumulative Vapor Intrusion Non-Cancer Hazard				0		0		0	
Trichloroethene	VOC	Cardiovascular; Developmental; Immune	22	1 U	0	1 U	0	1 U	0
Cumulative Vapor Intrusion Non-Cancer Hazard				0		0		0	

Highlighted values indicate exceedances of the cumulative vapor intrusion criteria: TCR>1E-05 or THI>1

Conc. = Concentration

U: This analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.

J: The positive result reported for this analyte is a quantitative estimate.

Attachment 1



Client : EnviroAnalytics Group
 ARM Project No. : 180716M
 Project Description : Sparrows Point - Parcel A10
 Site Location : Sparrows Point, MD
 ARM Representative : L. Perrin / L. Glumac (S)
 Checked by : M. Replogle, E.I.T.
 Drilling Company : GSI
 Driller : D. Marchese / T. Niblett (S)
 Drilling Equipment : Geoprobe 7822DT

Piezometer Installation Date : 07/06/2016
 Piezometer Installation Date : 09/19/2019 (S)
 Casing/Riser/Screen Type : PVC
 Borehole Diameter : 2.25"
 Riser/Screen Diameter : 1"
 0-Hr DTW (ft TOC) : 9.20 / 17.57 (S)
 48-Hr DTW (ft TOC) : 9.50 / 17.35 (S)
 No LNAPL or DNAPL detected at 0 or 48 hours

Boring ID: A10-002-SB/PZ

(page 1 of 1)

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample ID/Interval	DESCRIPTION	USCS	A10-002-PZ	A10-002(S)-PZ	REMARKS
0	-	-	A10-002-SB-1	(0-0.5') CONCRETE				
20	-	-		(0.5-6') CLAY, medium, brown, dry, medium plasticity, cohesive	CH	Bentonite seal		N / E (US ft) 571161.93 / 1464918.46
5	0.0		A10-002-SB-5			1" PVC Riser		571153.14 / 1464909.62 (S)
60	0.0			(6-7.9') SANDY CLAY, medium, reddish brown, dry, low plasticity, cohesive	SC	Sand Pack	Bentonite seal	
10	0.0		A10-002-SB-10	(7.9-8.8') SAND, fine, dense, reddish tan, moist, no plasticity, no cohesion	SP		1" PVC Riser	
100	0.0			(8.8-16.4') CLAY, hard, light brown with light gray, dry, medium plasticity, cohesive	CH	1" PVC Screen		
15	0.0							
100	0.0			(16.4-17.9') SANDY CLAY, medium, light brown with light gray, dry, low plasticity, cohesive	CL			
20	0.0			(17.9-19.2') SANDY CLAY, soft, dark gray, moist, medium plasticity, cohesive	CH		Sand Pack	Wet at 19' bgs
82	-			(19.2-21') SILTY SAND, dense, dark gray, moist, no plasticity, no cohesion	SM		1" PVC Screen	
25	-			(21-25') SAND, very fine, dense, wet, reddish brown (21-22.6' bgs), dark red (22.6-22.9' bgs), reddish brown (22.9-23.2' bgs), dark red (23.2-23.6' bgs), reddish brown (23.6-24.3' bgs), light brown and pale brown (24.3-24.8' bgs), light gray (24.8-25' bgs), wet, no plasticity, no cohesion	SP			

Boring terminated at 25' bgs due to water and piezometer installation.
 TOC: Top of PVC casing
 DTW: Depth to water
 bgs: Below ground surface
 AMSL: Above mean sea level

Riser Stickup: 3.20' / 3.00' (S)
 Riser: 0 - 7' bgs / 0 - 15' bgs (S)
 Screen: 7 - 17' bgs / 15 - 25' bgs (S) [Slot Size: 0.010"]
 Sand Pack: 5 - 17' bgs / 13 - 25' bgs (S) [Grain Size: WG #2]
 Bentonite Seal: 0 - 5' bgs / 0 - 13' bgs (S) [chips/granular]



Client : EnviroAnalytics Group
 ARM Project No. : 180716M
 Project Description : Sparrows Point - Parcel A10
 Site Location : Sparrows Point, MD
 ARM Representative : L. Perrin / L. Glumac (S)
 Checked by : M. Replogle, E.I.T.
 Drilling Company : GSI
 Driller : D. Marchese/K. Pumphrey(S)
 Drilling Equipment : Geoprobe 7822DT

Piezometer Installation Date : 07/11/2016
 Piezometer Installation Date : 09/16/2019 (S)
 Casing/Riser/Screen Type : PVC
 Borehole Diameter : 2.25"
 Riser/Screen Diameter : 1"
 0-Hr DTW (ft TOC) : 9.1 / 14.33 (S)
 48-Hr DTW (ft TOC) : 9.1 / 14.11 (S)
 No LNAPL or DNAPL detected at 0 or 48 hours

Boring ID: A10-015-SB/PZ

(page 1 of 1)

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample ID/Interval	DESCRIPTION	USCS	A10-015-PZ	A10-015(S)-PZ	REMARKS
0	1.8		A10-015-SB-1	(0-2.6') SILT and SAND, loose, dark brown to black, dry, no plasticity, no cohesion	SW			N / E (US ft) 571116.39 / 1464272.67 571065.08 / 1464412.26 (S)
11.0	5.4			(2.6-5') CLAY, medium to hard, black then tan/brown at 4' bgs, dry, low plasticity, cohesive	CL			
5	0.0		A10-015-SB-5	(5-7.5') CLAY, medium to hard, black, dry, medium plasticity, cohesive	CH			
100	0.0			(7.5-10') SAND, very fine, very dense, yellowish red and tan, moist, no plasticity, no cohesion	SP			
15	0.0			(10-19.9') CLAY, soft to medium, pale brown and gray (10-13.5' bgs) then gray (13.5-15' bgs) then dark gray (15-19.9' bgs), dry, medium plasticity, cohesive	CH			
20	-			(19.9-28') SAND, very fine, very dense, pale brown with red (23-24' bgs), wet, no plasticity, no cohesion	SP			Wet at 20' bgs
30	-			End of Boring				

Boring terminated at 28' bgs due to water and piezometer installation.
 TOC: Top of PVC casing
 DTW: Depth to water
 bgs: Below ground surface
 AMSL: Above mean sea level

Riser Stickup: 3.80' / 2.09' (S)
 Riser: 0 - 3.5' bgs / 0 - 18' bgs (S)
 Screen: 3.5 - 13.5' bgs / 18 - 28' bgs (S) [Slot Size: 0.010"]
 Sand Pack: 2 - 13.5' bgs / 16 - 28' bgs (S) [Grain Size: WG #2]
 Bentonite Seal: 0 - 2' bgs / 0 - 16' bgs (S) [chips/granular]



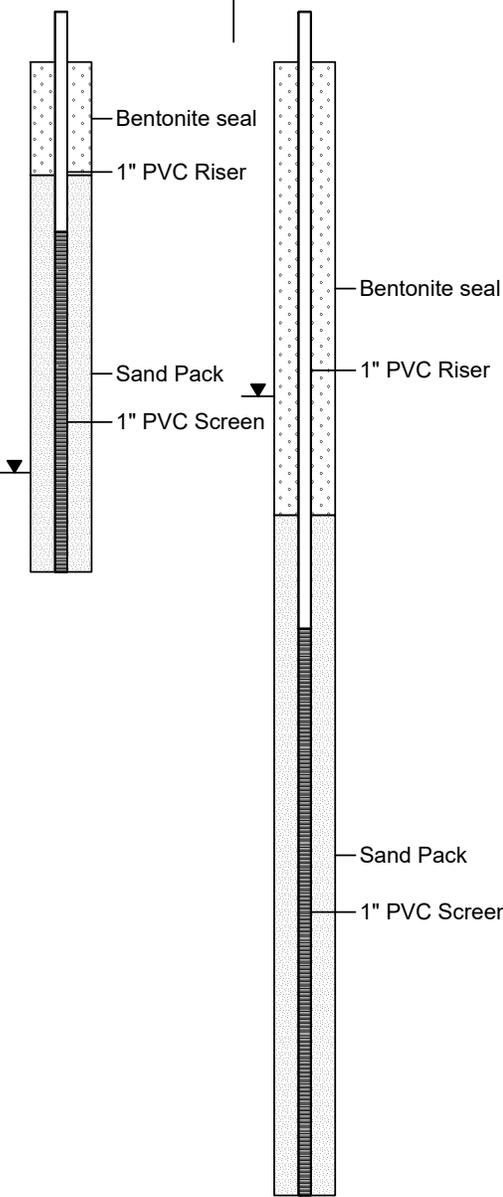
Client : EnviroAnalytics Group
 ARM Project No. : 180716M
 Project Description : Sparrows Point - Parcel A10
 Site Location : Sparrows Point, MD
 ARM Representative : L. Glumac (P) / L. Perrin
 Checked by : W. Mader P.G., CPSS
 Drilling Company : GSI
 Driller : Don Marchese
 Drilling Equipment : Geoprobe 7822DT

Piezometer Installation Date : 09/13/2019 (P)
 Piezometer Installation Date : 07/07/2016
 Casing/Riser/Screen Type : PVC
 Borehole Diameter : 2.25"
 Riser/Screen Diameter : 1"
 0-Hr DTW (ft TOC) : Dry (P) / 11.8
 48-Hr DTW (ft TOC) : 9.5 (P) / 8.8
 No LNAPL or DNAPL detected at 0 or 48 hours

Boring ID: A10-024-SB/PZ

(page 1 of 1)

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample ID/Interval	DESCRIPTION	USCS	A10-024(P)-PZ	A10-024-PZ	REMARKS
0	-	-		(0-1.9') ORGANIC SILT, soft, dark brown, moist, non plastic, non cohesive	OL			Small roots, some small wood fragments
2.6			A10-024-SB-1					
70	1.3			(1.9-2.5') SILTY SAND with small GRAVEL, loose, brown to dark brown and gray, dry, non plastic, non cohesive	SM			Large wood fragments throughout
	1.3				ML			
5	0.3		A10-024-SB-5	(2.5-5') SILT, soft, black, moist, non plastic, non cohesive				
	-			(5-7') WOOD fragments with CLAY, loose, dark brown, very moist, non plastic, non cohesive	CL			
	0.3							
90	0.1			(7-8') SANDY CLAY, very soft, yellowish brown, very moist to wet, high plasticity, cohesive	CL			
	0.0			(8-10') CLAY, soft, yellowish brown, wet, high plasticity, cohesive	CL			
10	0.0							
	-			(10-15') SAND, fine to medium, dense, reddish yellow, wet, non plastic, non cohesive				Wet at 11' bgs
80	-				SW			
	-							
15	-			(15-18') SANDY CLAY, soft, light gray, moist, low plasticity, cohesive				
	-				CL			
	-							
50	-			(18-20') SAND, fine, dense, reddish yellow and pale brown, wet, non plastic, non cohesive				
	-				SP			
20	-			End of Boring				



Boring terminated at 20' bgs due to water and piezometer installation.
 TOC: Top of PVC casing
 DTW: Depth to water
 bgs: Below ground surface
 AMSL: Above mean sea level

Riser Stickup: 2.25' (P) / 2.90'
 Riser: 0 - 3' bgs (P) / 0 - 10' bgs
 Screen: 3 - 9' bgs (P) / 10 - 20' bgs [Slot Size: 0.010"]
 Sand Pack: 2 - 9' bgs (P) / 8 - 20' bgs [Grain Size: WG #2]
 Bentonite Seal: 0 - 3' bgs (P) / 0 - 8' bgs [chips/granular]

N / E (US ft)
 571653.78 /
 1464643.92
 (P)
 571659.56 /
 1464636.91



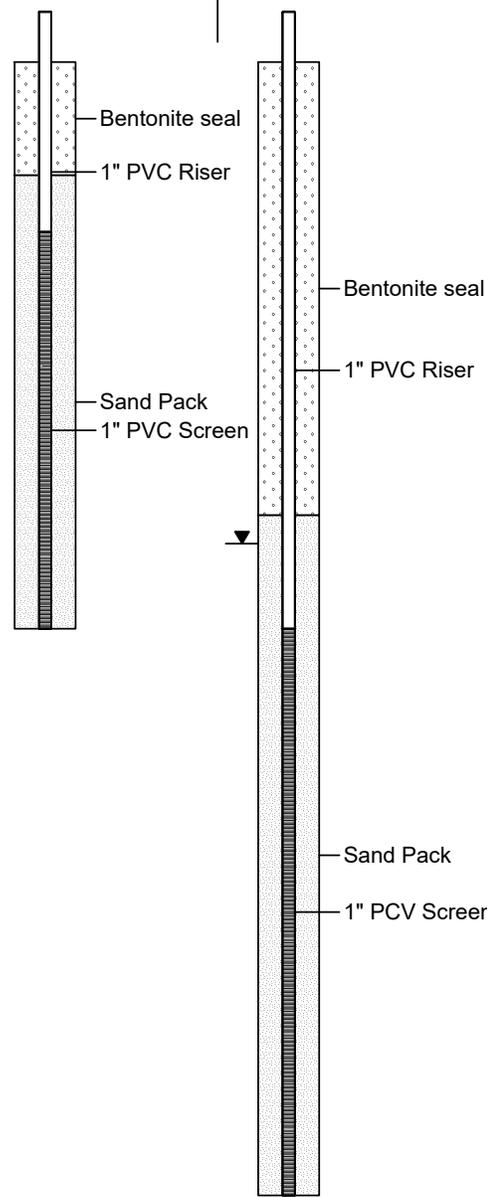
Client : EnviroAnalytics Group
 ARM Project No. : 180716M
 Project Description : Sparrows Point - Parcel A10
 Site Location : Sparrows Point, MD
 ARM Representative : L. Glumac (P) / L. Perrin
 Checked by : M. Replogle, E.I.T.
 Drilling Company : GSI
 Driller : Don Marchese
 Drilling Equipment : Geoprobe 7822DT

Piezometer Installation Date : 09/13/2019 (P)
 Piezometer Installation Date : 07/07/2016
 Casing/Riser/Screen Type : PVC
 Borehole Diameter : 2.25"
 Riser/Screen Diameter : 1"
 0-Hr DTW (ft TOC) : Dry (P) / 10.7
 48-Hr DTW (ft TOC) : Dry (P) / 11.3
 No LNAPL or DNAPL detected at 0 or 48 hours

Boring ID: A10-025-SB/PZ

(page 1 of 1)

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample ID/Interval	DESCRIPTION	USCS	A10-025(P)-PZ	A10-025-PZ	REMARKS
0	63.6		A10-025-SB-1	(0-0.7') ORGANIC SILT, soft, very dark, non plastic, non cohesive	OL			Tufts of grass and roots
	56.7			(0.7-1.5') SLAG GRAVEL, loose, gray, dry, non plastic, non cohesive	GP/SP			
				(1.5-2.5') SILT, very firm, reddish yellow with pale brown mottling, dry, low plasticity, cohesive	ML			
94	38.8							
	13.9		A10-025-SB-4	(2.5-5') SAND grading to SANDY CLAY, fine, very firm, reddish yellow, dry to moist, non plastic grading to low plasticity, non cohesive grading to cohesive	SP-CL			
	5.6							
5	0.2			(5-10') SILTY CLAY, very firm to soft, reddish yellow with pale brown mottling, dry to wet, cohesive, medium plasticity				
	0.2							
100	0.3				CL			
	0.0		A10-025-SB-10					
10	0.0			(10-15') CLAY, very soft, pale brown, very moist to wet, cohesive, high plasticity				
	0.0							
100	0.0				CL			
	0.0							
15	0.0			(15-20') SAND, fine to medium, medium dense, reddish yellow, wet, non plastic, non cohesive				
	-							
100	-							
	-							
20	-							
				End of Boring				Wet at 15' bgs N / E (US ft) 571908.55/ 1464908.75 (P) 571918.14 / 1464914.72



Boring terminated at 20' bgs due to water and piezometer installation.
 TOC: Top of PVC casing
 DTW: Depth to water
 bgs: Below ground surface
 AMSL: Above mean sea level

Riser Stickup: 2.60' (P) / 2.8'
 Riser: 0 - 3' bgs (P) / 0 - 10' bgs
 Screen: 3 - 10' bgs (P) / 10 - 20' bgs [Slot Size: 0.010"]
 Sand Pack: 2 - 10' bgs (P) / 8 - 20' bgs [Grain Size: WG #2]
 Bentonite Seal: 0 - 2' bgs (P) / 0 - 8' bgs [chips/granular]



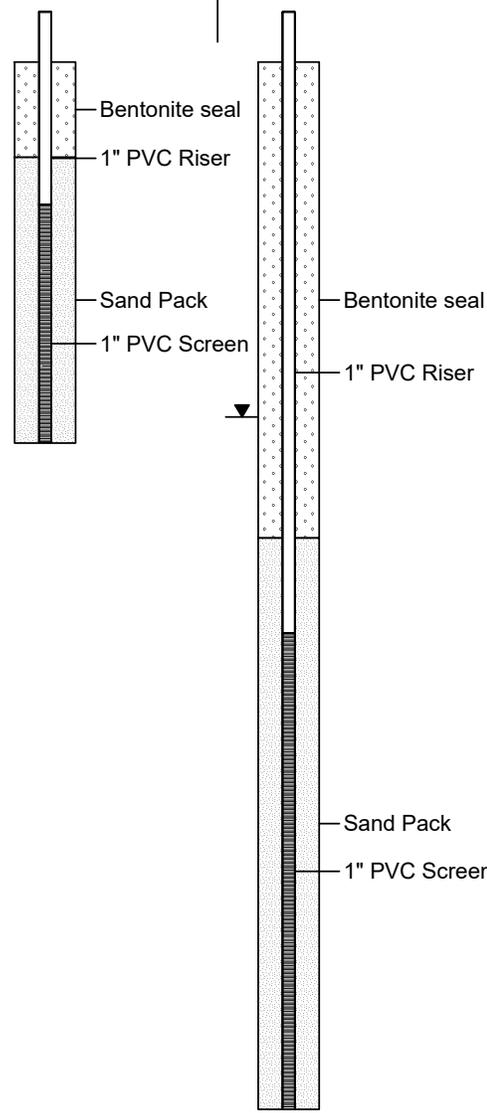
Client : EnviroAnalytics Group
 ARM Project No. : 180716M
 Project Description : Sparrows Point - Parcel A10
 Site Location : Sparrows Point, MD
 ARM Representative : L. Glumac (P) / L. Perrin
 Checked by : M. Replogle, E.I.T.
 Drilling Company : GSI
 Driller : Don Marchese
 Drilling Equipment : Geoprobe 7822DT

Piezometer Installation Date : 09/13/2019 (P)
 Piezometer Installation Date : 07/08/2016
 Casing/Riser/Screen Type : PVC
 Borehole Diameter : 2.25"
 Riser/Screen Diameter : 1"
 0-Hr DTW (ft TOC) : Dry (P) / 11.40
 48-Hr DTW (ft TOC) : Dry (P) / 11.26
 No LNAPL or DNAPL detected at 0 or 48 hours

Boring ID: A10-027-SB/PZ

(page 1 of 1)

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample ID/Interval	DESCRIPTION	USCS	A10-027(P)-PZ	A10-027-PZ	REMARKS
0	-	-	A10-027-SB-1	(0-0.5') ORGANIC SILT, soft, brown, dry, non plastic, non cohesive	OL			Abundant very small roots
60	2.1	-		(0.5-4') SILT with trace SAND, soft, brown grading to dark brown, dry, non plastic, non cohesive	ML			
		97.0	A10-027-SB-4	(4-5') CLAY, soft, yellowish brown, moist, medium plasticity, cohesive	CL			
5	0.1			(5-6') SAND with CLAY, fine to medium, medium dense, brownish yellow, moist, non plastic, non cohesive	SC			
	0.3			(6-10') CLAY, very firm to firm, brownish yellow with reddish yellow mottling, moist, high plasticity, cohesive	CL			
100	6.2			(10-15') CLAY with trace SAND, soft to very soft, brownish yellow (10-14.8' bgs), then light gray (14.8-15' bgs), moist, to very moist at 12.5' bgs, high plasticity, cohesive	CL			
	0.5			(15-16.2') SAND, fine, loose, brown, wet, non plastic, non cohesive	SP			Wet at 15' bgs
15	-			(16.2-16.9') SANDY CLAY, soft, light gray, wet, medium plasticity, cohesive	CL			
	0.2			(16.9-20') SAND, fine to medium, medium dense, yellowish red to reddish yellow, wet, non plastic, non cohesive	SW			N / E (US ft) 572283.09 / 1464917.23 (P)
80	-			(20-22') Apparent heaving sand, no sleeve collected, drillers advanced to 22' and set piezometer				572288.37 / 1464921.09
20	-			End of Boring				
25	-							



Boring terminated at 22' bgs due to water and piezometer installation.
 TOC: Top of PVC casing
 DTW: Depth to water
 bgs: Below ground surface
 AMSL: Above mean sea level

Riser Stickup: 1.97' (P) / 3.80'
 Riser: 0 - 3' bgs (P) / 0 - 12' bgs
 Screen: 3 - 8' bgs (P) / 12 - 22' bgs [Slot Size: 0.010"]
 Sand Pack: 2 - 8' bgs (P) / 10 - 22' bgs [Grain Size: WG #2]
 Bentonite Seal: 0-2' bgs (P) [chips] / 0-10' bgs [chips/granular]



Client : EnviroAnalytics Group
 ARM Project No. : 180716M
 Project Description : Sparrows Point - Parcel A10
 Site Location : Sparrows Point, MD
 ARM Representative : L. Perrin / T. Van Ness (S)
 Checked by : M. Replogle, E.I.T.
 Drilling Company : GSI
 Driller : Don Marchese
 Drilling Equipment : Geoprobe 7822DT

Piezometer Installation Date : 07/12/2016
 Piezometer Installation Date : 09/25/2019 (S)
 Casing/Riser/Screen Type : PVC
 Borehole Diameter : 2.25"
 Riser/Screen Diameter : 1"
 0-Hr DTW (ft TOC) : 7.27 / 18.95 (S)
 48-Hr DTW (ft TOC) : 6.82 / 18.90 (S)
 No LNAPL or DNAPL detected at 0 or 48 hours

Boring ID: A10-029-SB/PZ

(page 1 of 1)

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample ID/Interval	DESCRIPTION	USCS	A10-029-PZ	A10-029(S)-PZ	REMARKS
0	-	-	A10-029-SB-1	(0-0.5') ASPHALT	NA			N / E (US ft) 570739.81 / 1464684.22 (P) 570731.74 / 1464689.15 Wet at 24.8' bgs
5.5	70	0.1		(0.5-2.8') SAND, fine, medium, yellowish red, dry, no plasticity, no cohesion	SP	Bentonite seal		
0.0	0.0	0.0	A10-029-SB-4	(2.8-3.1') SANDY CLAY, hard, dark gray to brown, dry, medium plasticity, cohesive, with brown CLAY from 3.1-3.5' bgs	SC	1" PVC Riser		
5	0.0	0.0		(5.5-7.2') CLAYEY SAND, medium, brownish gray, moist, no plasticity, no cohesion	SC	Sand Pack		
7.2	0.0	0.0		(7.2-10.3') SAND, dense, grayish brown grading to yellowish red, wet, no plasticity, no cohesion	SC	1" PVC Screen		
10	0.0	0.0		(10.3-11.5') SANDY CLAY, hard, yellowish red, dry, high plasticity, cohesive	CH		Bentonite seal	
15	0.0	0.0		(11.5-12.8') CLAY, medium to soft, yellowish red grading to gray, dry, high plasticity, cohesive	SC		1" PVC Riser	
20	0.0	0.0		(12.8-15.5') SANDY CLAY, hard, gray with yellowish red mottling, dry, high plasticity, cohesive	CH			
25	0.0	0.0		(15.5-22.5') CLAY, medium, gray grading to dark gray, moist, high plasticity, cohesive	CH			
30	0.0	0.0		(22.5-24.8') SANDY CLAY, medium to hard, dark gray, moist, medium plasticity, cohesive	SC			
32	0	-		(24.8-32') SAND with GRAVEL, dense, pale brown, wet, no plasticity, no cohesion	SW		Sand Pack	
35	0	-		End of Boring			1" PVC Screen	

Boring terminated at 32' bgs due to water and piezometer installation.
 TOC: Top of PVC casing
 DTW: Depth to water
 bgs: Below ground surface
 AMSL: Above mean sea level

Riser Stickup: 3.50' / 3.31' (S)
 Riser: 0 - 4' bgs / 0 - 22' bgs (S)
 Screen: 4 - 14' bgs / 22 - 32' bgs (S) [Slot Size: 0.010"]
 Sand Pack: 2 - 14' bgs / 20 - 32' bgs (S) [Grain Size: WG #2]
 Bentonite Seal: 0 - 2' bgs / 0 - 20' bgs (S) [granular]



Client : EnviroAnalytics Group
 ARM Project No. : 180716M
 Project Description : Sparrows Point - Parcel A10
 Site Location : Sparrows Point, MD
 ARM Representative : L. Glumac (P) / L. Perrin
 Checked by : M. Replogle, E.I.T.
 Drilling Company : GSI
 Driller : Don Marchese
 Drilling Equipment : Geoprobe 7822DT

Piezometer Installation Date : 09/13/2019 (P)
 Piezometer Installation Date : 07/07/2016
 Casing/Riser/Screen Type : PVC
 Borehole Diameter : 2.25"
 Riser/Screen Diameter : 1"
 0-Hr DTW (ft TOC) : Dry (P) / 13.42
 48-Hr DTW (ft TOC) : Dry (P) / 13.65
 No LNAPL or DNAPL detected at 0 or 48 hours

Boring ID: A10-034-SB/PZ

(page 1 of 1)

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample ID/Interval	DESCRIPTION	USCS	A10-034(P)-PZ	A10-034-PZ	REMARKS
0	-	-	No Samples Collected	(0-3.1') ASPHALT, loose, gray, dry, non plastic, non cohesive	-			<p>N / E (US ft) 571282.94 / 1464800.33 (P) 571289.59 / 1464806.40</p> <p>Very saturated</p> <p>Wet at 19' bgs</p>
40	-	-						
3.5	-	-		(3.1-4') SLAG GRAVEL and SAND, loose, light gray and brown, dry, non plastic, non cohesive	GW			
3.7	-	-		(4-7.1') SANDY SILT, soft, dark brown, moist, non plastic, non cohesive	ML			
60	-	-		(7.1-8') CLAY, very soft, brown, very moist to wet, medium plasticity, cohesive	CL			
0.3	-	-		(8-12') CLAY, very firm, yellowish brown and light gray mottling, dry, medium plasticity, cohesive	CL			
100	-	-		(12-13') CLAY, very soft, yellowish brown with trace reddish yellow, very moist to wet, medium plasticity, cohesive	CL			
0.3	-	-		(13-15') CLAY, very firm, yellowish brown and light gray mottling, dry, medium plasticity, cohesive	CL			
15	-	-		(15-17') CLAY, soft, yellowish brown, moist, medium plasticity, cohesive	CL			
100	-	-		(17-19') CLAY, very soft, yellowish brown, very moist to wet, high plasticity, cohesive	CL			
20	-	-		(19-20') SANDY CLAY, very soft, very moist to wet, high plasticity, cohesive	CL			
0	-	-		(20-25') No recovery due to apparent heaving sand; drillers advanced to 25' and installed piezometer.				
25	-	-		End of Boring				

Boring terminated at 25' bgs due to due to water and piezometer installation.
 TOC: Top of PVC casing
 DTW: Depth to water
 bgs: Below ground surface
 AMSL: Above mean sea level

Riser Stickup: 2.74' (P) / 3.0'
 Riser: 0 - 3' bgs (P) / 0 - 20' bgs
 Screen: 3 - 10' bgs (P) / 20 - 25' bgs [Slot Size: 0.010"]
 Sand Pack: 2 - 10' bgs (P) / 20 - 25' bgs [Grain Size: prepack]
 Bentonite Seal: 0-2' bgs (P) [chips] / 0-20' bgs [chips (0-15' bgs), sleeve (15-20' bgs)]



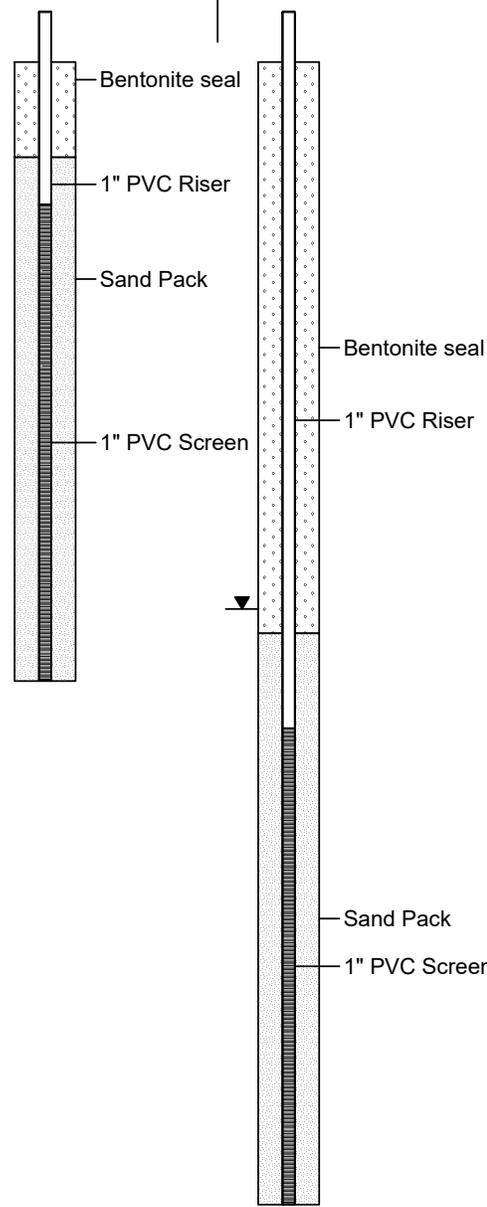
Client : EnviroAnalytics Group
 ARM Project No. : 180716M
 Project Description : Sparrows Point - Parcel A10
 Site Location : Sparrows Point, MD
 ARM Representative : T. Van Ness
 Checked by : M. Replogle, E.I.T.
 Drilling Company : GSI
 Driller : Don Marchese
 Drilling Equipment : Geoprobe 7822DT

Piezometer Installation Date : 09/25/2019 (P)
 Piezometer Installation Date : 09/25/2019 (S)
 Casing/Riser/Screen Type : PVC
 Borehole Diameter : 2.25"
 Riser/Screen Diameter : 1"
 0-Hr DTW (ft TOC) : Dry (P) / 14.37 (S)
 48-Hr DTW (ft TOC) : Dry (P) / 14.36 (S)
 No LNAPL or DNAPL detected at 0 or 48 hours

Boring ID: A10-035-SB/PZ

(page 1 of 1)

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample ID/Interval	DESCRIPTION	USCS	A10-035(P)-PZ		A10-035(S)-PZ		REMARKS
0	-	-	No Samples Collected	(0-3.8') CLAYEY SILT, hard, brown to light brown, dry, no plasticity, no cohesion	SM					N / E (US ft) 572139.03 / 1464952.83 (P) 572136.01 / 1464951.49 (S) Wet at 17.3' bgs
60	0.1									
	0.0									
5	0.0			(3.8-5.1') SAND, dense, tan, dry then moist at 4.2' bgs, no plasticity, no cohesion	SP					
	0.1			(5.1-6.3') CLAY, hard, light gray, dry, low plasticity, cohesive	CL					
	0.0			(6.3-15') SANDY CLAY, medium to soft grading to soft, gray, dry then moist at 14.5' bgs, high plasticity, cohesive						
100	0.0									
	0.1									
10	0.1				SC					
	0.1									
	0.1									
15	0.1			(15-17.3') SANDY SILT, soft, gray, moist, no plasticity, no cohesion	SM					
	0.1									
	0.1									
96	0.2			(17.3-24') SAND, medium, yellowish red to light brown, wet, no plasticity, no cohesion						
	0.1									
20	0.2				SP					
	-									
	-									
	-									
25				End of Boring						



Boring terminated at 24' bgs due to water and piezometer installation.
 TOC: Top of PVC casing
 DTW: Depth to water
 bgs: Below ground surface
 AMSL: Above mean sea level

Riser Stickup: 2.48' (P) / 2.87' (S)
 Riser: 0 - 3' bgs (P) / 0 - 14' bgs (S)
 Screen: 3 - 13' bgs (P) / 14 - 24' bgs (S) [Slot Size: 0.010"]
 Sand Pack: 2 - 13' bgs (P) / 12 - 24' bgs (S) [Grain Size: WG #2]
 Bentonite Seal: 0 - 2' bgs (P) / 0 - 12' bgs (S) [Grain Size: 3/8" chips]



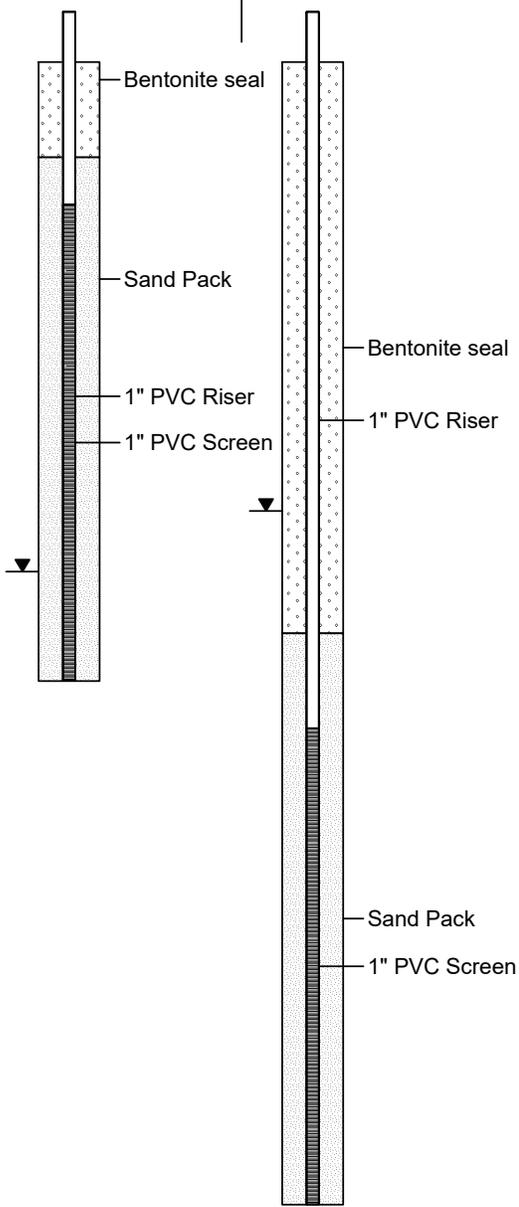
Client : EnviroAnalytics Group
 ARM Project No. : 180716M
 Project Description : Sparrows Point - Parcel A10
 Site Location : Sparrows Point, MD
 ARM Representative : L. Glumac
 Checked by : M. Replogle, E.I.T.
 Drilling Company : GSI
 Driller : Don Marchese
 Drilling Equipment : Geoprobe 7822DT

Piezometer Installation Date : 09/13/2019 (P)
 Piezometer Installation Date : 09/13/2019 (S)
 Casing/Riser/Screen Type : PVC
 Borehole Diameter : 2.25"
 Riser/Screen Diameter : 1"
 0-Hr DTW (ft TOC) : Dry (P) / 12.81 (S)
 48-Hr DTW (ft TOC) : 12.83 (P) / 12.47 (S)
 No LNAPL or DNAPL detected at 0 or 48 hours

Boring ID: A10-036-SB/PZ

(page 1 of 1)

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample ID/Interval	DESCRIPTION	USCS	A10-036(P)-PZ	A10-036(S)-PZ	REMARKS
0	-	-	No Samples Collected	(0-1') SILT and SAND, soft, brown, dry, no plasticity, cohesion	ML			N / E (US ft) 572107.59 / 1464661.93 (P) 572102.96 / 1464655.83 (S) Wet at 17' bgs
48	0.5	-		(1-6.7') GRAVEL and SAND, loose, light brown and light gray, dry, no plasticity, no cohesion	GW			
5	4.1	-						
	3.8	-						
80	0.6	-		(6.7-7.2') SILT and SAND, soft, brown, dry, no plasticity, cohesion	ML			
	0.7	-		(7.2-11') SANDY CLAY, medium to soft, light brown to pale brown, moist, low plasticity, cohesive	SC			
10	0.0	-						
	0.0	-		(11-15.5') CLAY, hard, yellowish red and light brown, dry, high plasticity, cohesive	CH			
15	0.0	-						
	0.0	-		(15.5-17.3') SANDY CLAY, medium to soft, light brown to pale brown, moist, low plasticity, cohesive	SC			
20	0.0	-						
	0.0	-		(17.3-24') SAND, very fine, very dense, reddish yellow, wet, no plasticity, no cohesion	SP			
25	-	-		End of Boring				



Boring terminated at 24' bgs due to water and piezometer installation.
 TOC: Top of PVC casing
 DTW: Depth to water
 bgs: Below ground surface
 AMSL: Above mean sea level

Riser Stickup: 2.12' bgs (P) / 3.04' (S)
 Riser: 0 - 3' bgs (P) / 0 - 14' bgs (S)
 Screen: 3 - 13' bgs (P) / 14 - 24' bgs (S) [Slot Size: 0.010"]
 Sand Pack: 2 - 13' bgs (P) / 12 - 24' bgs (S) [Grain Size: WG #2]
 Bentonite Seal: 0 - 2' bgs (P) / 0 - 12' bgs (S) [Grain Size: 3/8" chips]



Client : EnviroAnalytics Group
 ARM Project No. : 180716M
 Project Description : Sparrows Point - Parcel A10
 Site Location : Sparrows Point, MD
 ARM Representative : L. Glumac
 Checked by : M. Replogle, E.I.T.
 Drilling Company : GSI
 Driller : Tim Niblett
 Drilling Equipment : Geoprobe 7822DT

Piezometer Installation Date : 09/19/2019 (P)
 Piezometer Installation Date : 09/19/2019 (S)
 Casing/Riser/Screen Type : PVC
 Borehole Diameter : 2.25"
 Riser/Screen Diameter : 1"
 0-Hr DTW (ft TOC) : Dry (P) / 13.38 (S)
 48-Hr DTW (ft TOC) : 11.12 (P) / 12.34 (S)
 No LNAPL or DNAPL detected at 0 or 48 hours

Boring ID: A10-037-SB/PZ

(page 1 of 1)

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample ID/Interval	DESCRIPTION	USCS	A10-037(P)-PZ	A10-037(S)-PZ	REMARKS
0	-	-	No Samples Collected	(0-0.25') SILT, soft, brownish gray, dry, no plasticity, no cohesion	Mt	Bentonite seal	Bentonite seal	N / E (US ft) 571671.56 / 1464951.36 (P) 571664.93 / 1464951.87 (S)
40	-	-		(0.25-6.25') SLAG, SAND and GRAVEL-sized, medium, black, dry, then moist at 6' bgs, no plasticity, no cohesion	GW	1" PVC Riser	1" PVC Riser	
5	-	0.0		(6.25-7.4') SANDY CLAY, medium, black and dark gray, moist, low plasticity, cohesive	CL	Sand Pack	Bentonite seal	
80	-	0.0		(7.4-7.7') SANDY CLAY, very soft, black and dark gray with yellowish red mottling, dry, low plasticity, cohesive	CL	1" PVC Screen	1" PVC Riser	
10	-	0.0		(7.7-12.3) SANDY CLAY, hard to medium, then soft to medium (11.2-12.3' bgs), brown to tan, moist, low plasticity, cohesive	CL			
100	-	0.0		(12.3-16') SANDY CLAY, medium to hard, reddish brown, then gray (15.5-16' bgs), moist, low plasticity, cohesive	CL			
15	-	0.0		(16-23') SAND, fine, dense, pinkish white (16-18.5' bgs), then pinkish white to reddish yellow (18.5-19' bgs), then reddish yellow and brown, wet, no plasticity, no cohesion	SP			
90	-	0.0					Sand Pack	Wet at 16' bgs
20	-	0.0					1" PVC Screen	
25	-	0.0		End of Boring				

Boring terminated at 23' bgs due to water and piezometer installation.
 TOC: Top of PVC casing
 DTW: Depth to water
 bgs: Below ground surface
 AMSL: Above mean sea level

Riser Stickup: 1.60' (P) / 2.20' (S)
 Riser: 0 - 3' bgs (P) / 0 - 13' bgs (S)
 Screen: 3 - 13' bgs (P) / 13 - 23' bgs (S) [Slot Size: 0.010"]
 Sand Pack: 2 - 13' bgs (P) / 11 - 23' bgs (S) [Grain Size: WG #2]
 Bentonite Seal: 0 - 2' bgs (P) / 0 - 11' bgs (S) [chips/granular]



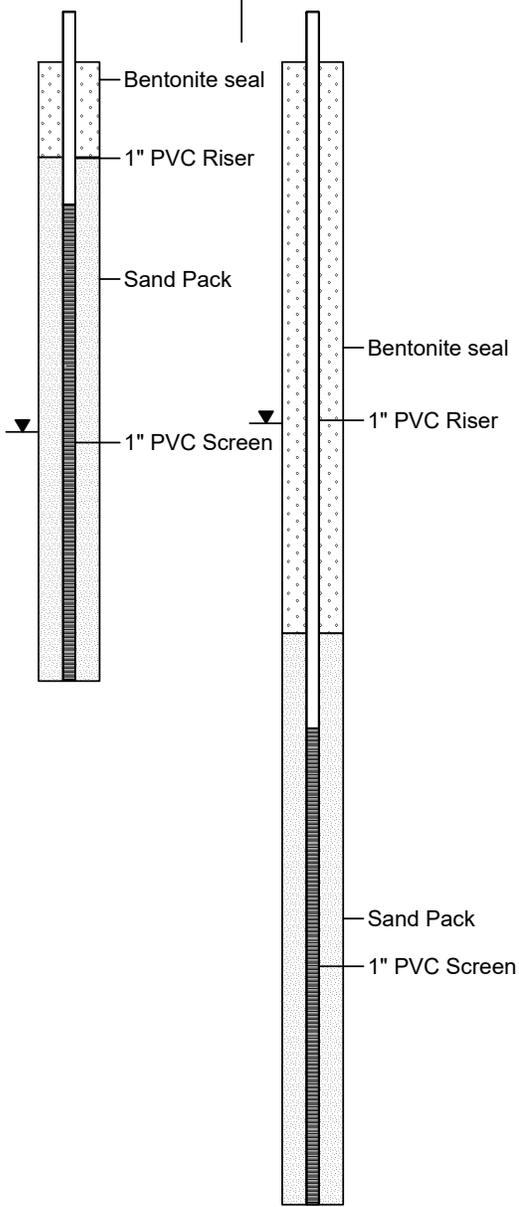
Client : EnviroAnalytics Group
 ARM Project No. : 180716M
 Project Description : Sparrows Point - Parcel A10
 Site Location : Sparrows Point, MD
 ARM Representative : L. Glumac
 Checked by : M. Replogle, E.I.T.
 Drilling Company : GSI
 Driller : Don Marchese
 Drilling Equipment : Geoprobe 7822DT

Piezometer Installation Date : 09/13/2019 (P)
 Piezometer Installation Date : 09/13/2019 (S)
 Casing/Riser/Screen Type : PVC
 Borehole Diameter : 2.25"
 Riser/Screen Diameter : 1"
 0-Hr DTW (ft TOC) : Dry (P) / 10.63 (S)
 48-Hr DTW (ft TOC) : 10.13 (P) / 10.35 (S)
 No LNAPL or DNAPL detected at 0 or 48 hours

Boring ID: A10-038-SB/PZ

(page 1 of 1)

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample ID/Interval	DESCRIPTION	USCS	A10-038(P)-PZ		A10-038(S)-PZ		REMARKS
0	-	-	No Samples Collected	(0-0.5') Non-native fill material						N / E (US ft) 571519.33 / 1464451.52 (P)
52	0.0	0.0		(0.5-5') SILT and SAND, loose, black and dark brown, dry, no plasticity, no cohesion	SM					
5	-	0.0		(5-10') SANDY CLAY, soft, light brown to light gray, moist, low plasticity, cohesive	SC					
10	-	0.0		(10-11.3') GRAVEL and SAND, medium, black, wet, no plasticity, no cohesion	GW					
15	-	0.0		(11.3-12') SANDY CLAY, soft, light gray, moist, low plasticity, cohesive	SC					
20	-	0.0		(12-17') CLAY, hard, gray, dry, low plasticity, cohesive	CL					
25	-	0.0		(17-24') SAND, very fine, very dense, reddish yellow and very pale brown, wet, no plasticity, no cohesion	SP					Wet at 17' bgs
End of Boring										



Boring terminated at 24' bgs due to water and piezometer installation.
 TOC: Top of PVC casing
 DTW: Depth to water
 bgs: Below ground surface
 AMSL: Above mean sea level

Riser Stickup: 2.36' (P) / 2.76' (S)
 Riser: 0 - 3' bgs (P) / 0 - 14' bgs (S)
 Screen: 3 - 13' bgs (P) / 14 - 24' bgs (S) [Slot Size: 0.010"]
 Sand Pack: 2 - 13' bgs (P) / 12 - 24' bgs (S) [Grain Size: WG #2]
 Bentonite Seal: 0 - 2' bgs (P) / 0 - 12' bgs (S) [chips]



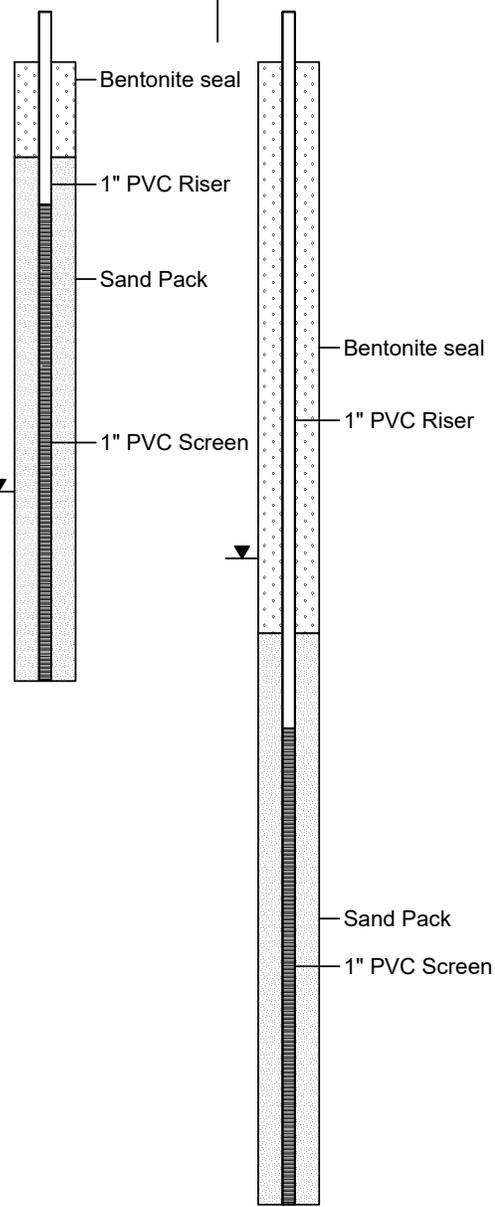
Client : EnviroAnalytics Group
 ARM Project No. : 180716M
 Project Description : Sparrows Point - Parcel A10
 Site Location : Sparrows Point, MD
 ARM Representative : T. Van Ness
 Checked by : M. Replogle, E.I.T.
 Drilling Company : GSI
 Driller : Don Marchese
 Drilling Equipment : Geoprobe 7822DT

Piezometer Installation Date : 09/25/2019 (P)
 Piezometer Installation Date : 09/25/2019 (S)
 Casing/Riser/Screen Type : PVC
 Borehole Diameter : 2.25"
 Riser/Screen Diameter : 1"
 0-Hr DTW (ft TOC) : Dry (P) / 13.48 (S)
 48-Hr DTW (ft TOC) : 11.18 (P) / 13.45 (S)
 No LNAPL or DNAPL detected at 0 or 48 hours

Boring ID: A10-039-SB/PZ

(page 1 of 1)

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample ID/Interval	DESCRIPTION	USCS	A10-039(P)-PZ	A10-039(S)-PZ	REMARKS
0	-		No Samples Collected	(0-1') CONCRETE	NA			
0.2				(1-2.9') SANDY CLAY, hard, gray to light brown, dry, low plasticity, cohesive	SC			N / E (US ft) 571395.21 / 1464973.61 (P)
82	0.1			(2.9-4.5') CLAY, hard, dry, reddish brown, dry, high plasticity, cohesive	CH			571389.28 / 1464971.72 (S)
4.3				(4.5-6') CLAYEY SILT, medium, gray to light brown, moist, no plasticity, no cohesion	SM			
5	0.0			(6-7.5') SILTY CLAY, soft, gray to light brown, moist, medium plasticity, cohesive				
56	0.0			(7.5-10.5') SANDY CLAY, hard to very hard, yellowish red, dry, high plasticity, cohesive	SC			
10	0.0			(10.5-15') SANDY CLAY, medium to hard grading to very hard, brown grading to reddish brown, dry but moist from 11.8-12.2' bgs, high plasticity, cohesive	SC			
76	0.0			(15-17.5') SANDY CLAY, medium to soft, light brown to gray, moist, low plasticity, cohesive	SC			
15	-			(17.5-24') SAND, fine, dense, gray to light brown (17.5-18' bgs), then brownish red (18-18.7' bgs), then tan to light brown (18.7-20' bgs), wet, no plasticity, no cohesion	SP			Wet at 17.5' bgs
84	-							
20	-							
0	-							
25	-			End of Boring				



Boring terminated at 24' bgs due to water and piezometer installation.
 TOC: Top of PVC casing
 DTW: Depth to water
 bgs: Below ground surface
 AMSL: Above mean sea level

Riser Stickup: 2.15' (P) / 3.02' (S)
 Riser: 0 - 3' bgs (P) / 0 - 14' bgs (S)
 Screen: 3 - 13' bgs (P) / 14 - 24' bgs (S) [Slot Size: 0.010"]
 Sand Pack: 2 - 13' bgs (P) / 12 - 24' bgs (S) [Grain Size: WG #2]
 Bentonite Seal: 0 - 2' bgs (P) / 0 - 12' bgs (S) [granular]



Client : EnviroAnalytics Group
 ARM Project No. : 180716M
 Project Description : Sparrows Point - Parcel A10
 Site Location : Sparrows Point, MD
 ARM Representative : L. Glumac
 Checked by : M. Replogle, E.I.T.
 Drilling Company : GSI
 Driller : Tim Niblett
 Drilling Equipment : Geoprobe 7822DT

Piezometer Installation Date : 09/19/2019 (P)
 Piezometer Installation Date : 09/19/2019 (S)
 Casing/Riser/Screen Type : PVC
 Borehole Diameter : 2.25"
 Riser/Screen Diameter : 1"
 0-Hr DTW (ft TOC) : 10.84 (P) / 16.71 (S)
 48-Hr DTW (ft TOC) : 9.13 (P) / 16.75 (S)
 No LNAPL or DNAPL detected at 0 or 48 hours

Boring ID: A10-040-SB/PZ

(page 1 of 1)

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample ID/Interval	DESCRIPTION	USCS	A10-040(P)-PZ		A10-040(S)-PZ		REMARKS
0	0.1		No Samples Collected	(0-0.5') ASPHALT						
0.6				(0.5-7.3') SANDY CLAY, hard, yellowish red with light gray mottling, dry, low plasticity, cohesive	SC					N / E (US ft) 571003.61 / 1464688.35 (P)
84	0.1									
1.4										
5	1.4									571003.46 / 1464672.02 (S)
	0.0									
	0.0									
100	0.0			(7.3-9') SAND, very fine, dense, light gray, wet, no plasticity, no cohesion	SP					Perched water bearing zone at 7.3' bgs
	0.0									
10	0.0			(9-21') CLAY, soft, then medium at 18.5' bgs, then soft at 20' bgs, light gray and pale brown grading to dark gray, dry, medium plasticity, cohesive	CH					
	0.0									
	0.0									
15	0.0									
	0.0									
	0.0									
20	0.0									
	0.0									
	0.0									
25	0.0			(21-21.5') SILTY SAND, dense, dark gray, wet, no plasticity, no cohesion	SM					Wet at 21' bgs
	0.0			(21.5-28') SAND, fine, very dense, dark gray, wet, no plasticity, no cohesion	SP					
	-									
	-									
	-									
30				End of Boring						

Boring terminated at 28' bgs due to water and piezometer installation.
 TOC: Top of PVC casing
 DTW: Depth to water
 bgs: Below ground surface
 AMSL: Above mean sea level

Riser Stickup: 0.91' (P) / 2.35' (S)
 Riser: 0 - 4' bgs (P) / 0 - 18' bgs (S)
 Screen: 4 - 14' bgs (P) / 18 - 28' bgs (S) [Slot Size: 0.010"]
 Sand Pack: 2 - 14' bgs (P) / 16 - 28' bgs (S) [Grain Size: WG #2]
 Bentonite Seal: 0 - 2' bgs (P) / 0 - 16' bgs (S) [chips/granular]



Client : EnviroAnalytics Group
 ARM Project No. : 180716M
 Project Description : Sparrows Point - Parcel A10
 Site Location : Sparrows Point, MD
 ARM Representative : L. Glumac
 Checked by : M. Replogle, E.I.T.
 Drilling Company : GSI
 Driller : Tim Niblett
 Drilling Equipment : Geoprobe 7822DT

Piezometer Installation Date : 09/19/2019 (P)
 Piezometer Installation Date : 09/19/2019 (S)
 Casing/Riser/Screen Type : PVC
 Borehole Diameter : 2.25"
 Riser/Screen Diameter : 1"
 0-Hr DTW (ft TOC) : 6.09 (P) / 14.02 (S)
 48-Hr DTW (ft TOC) : 6.30 (P) / 13.94 (S)
 No LNAPL or DNAPL detected at 0 or 48 hours

Boring ID: A10-041-SB/PZ

(page 1 of 1)

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample ID/Interval	DESCRIPTION	USCS	A10-041(P)-PZ		A10-041(S)-PZ		REMARKS
0	-	-	No Samples Collected	(0-0.5') ASPHALT (0.5-0.7') RED BRICK						N / E (US ft) 570913.56 / 1464960.73 (P) 570907.42 / 1464960.10 (S) Perched water bearing zone at 4' bgs Wet at 19' bgs
54	0.0	0.0		(0.7-8') SAND, fine, dense, light brown and tan, then light brown to reddish yellow (3.9-6' bgs), then light gray (6-8' bgs), wet, no plasticity, no cohesion	SP					
5	0.0	0.0								
78	0.0	0.0								
10	0.0	0.0		(8-18.8') CLAY, medium, then soft (15-17.8' bgs) then medium (17.8-18.8' bgs), light brownish gray, then dark gray at 15' bgs, dry, medium plasticity, cohesive	CH					
100	0.0	0.0								
15	0.0	0.0								
100	0.0	0.0								
20	0.0	0.0		(18.8-19') CLAYEY SAND, medium, dark gray, moist, no plasticity, no cohesion	SC					
20	-	-		(19-26') SAND, fine, dense, yellowish red, wet, no plasticity, no cohesion	SP					
25	0	-								
30	0	-		End of Boring						

Boring terminated at 26' bgs due to water and piezometer installation.
 TOC: Top of PVC casing
 DTW: Depth to water
 bgs: Below ground surface
 AMSL: Above mean sea level

Riser Stickup: 1.70' (P) / 2.82' (S)
 Riser: 0 - 3' bgs (P) / 0 - 16' bgs (S)
 Screen: 3 - 13' bgs (P) / 16 - 26' bgs (S) [Slot Size: 0.010"]
 Sand Pack: 2 - 13' bgs (P) / 14 - 26' bgs (S) [Grain Size: WG #2]
 Bentonite Seal: 0 - 2' bgs (P) / 0 - 14' bgs (S) [chips/granular]

Attachment 2

Permanent Wells



Project Name: A10 CVOC	Project Number: 180716M
Well Number: A10-002(S)-P2	Date: 10/15/19
Well Diameter (in): 1	One Well Volume (gal):
Depth to Product (ft): -	QED Controller Settings:
Depth to Water (ft): 17.64	Flow Rate (mL/min): 230
Product Thickness (ft): -	Length of time Purged (min):
Depth to Bottom (ft): 27.89	Condition of Pad/Cover: 1

PURGING RECORD

Time	Volume Purged (gallons)	DTW (feet)	Temp (°C)	pH (s.u.) ± 0.1	Specific Conductance (ms/cm) ± 3%	Dissolved Oxygen (mg/L) ± 0.3	OPF (mV) ± 10	Turbidity (NTU) ± 10% or < 5	Comments
1122	0	17.64	20.6	5.69	0.978	8.13	30.9		turbid
1127	0.3	17.69	20.2	5.59	0.965	5.56	15.6		
1132	0.6	17.74	20.3	5.48	0.975	4.65	16.3		
1137	0.9	17.79	19.6	5.44	0.969	4.23	15.5		clear
1142	1.2	17.84	19.6	5.39	0.971	3.98	16.2		
1147			19.3	5.38	0.968	3.90	16.1		

MONITORING SAMPLE RECORD

Sample ID	Time Collected	Parameter/Order	Container	Perservative	Collected?
A10-002(S)-P2	1152	TCL-VOCs	3 - 40 mL VOA	HCl	
		TPH-GRO	3 - 40 mL VOA	HCl	
		TPH-DRO	2 - 1 L Amber	none	
		TCL-SVOCs	2 - 1 L Amber	none	
		Oil & Grease	2 - 1 L Amber	HCl	
		TAL-Metals & Mercury (total)	1 - 250 mL Plastic	HNO3	
		Hexavalent Chromium (total)	1 - 250 mL Plastic	none	
		Total Cyanide	1 - 250 mL Plastic	NaOH	
		TAL-Metals & Mercury (Dissolved) Field Filtered	1 - 250 mL Plastic	HNO3	
		Hexavalent Chromium (Dissolved) Field Filtered	1 - 250 mL Plastic	none	
PCB	2 - 1 L Amber	None			
Matrix Spike					
Duplicate					

Sampled By: LMG

Comments: CVOC

casing Volume: 1" I.D. = 0.041 gal/ft - 2" I.D. = 0.163 gal/ft - 4" I.D. = 0.653 gal/ft - 6" I.D. = 1.47 gal/ft
 ft x gal/ft = (gal)

Low Flow Sampling Permanent Wells



ARM Group Inc.
Earth Resource Engineers and Consultants

Project Name: A10 CROC GW

Project Number: 190716M

Well Number: A10-024(S) - PZ

Date: 10-11-19

Well Diameter (in):

One Well Volume (gal):

Depth to Product (ft):

QED Controller Settings:

Depth to Water (ft): 10.10

Flow Rate (mL/min)

Product Thickness (ft):

Length of time Purged (min)

Depth to Bottom (ft): 22.40

Condition of Pad/Cover: /

PURGING RECORD

Time	Volume Purged (gallons)	DTW (feet)	Temp (°C)	pH (s.u.) ± 0.1	Specific Conductance (ms/cm) ± 3%	Dissolved Oxygen (mg/L) ± 0.3	ORP (mV) ± 10	Turbidity (NTU) ± 10% or < 5	Comments
1326		12.11	17.62	5.97	0.544	1.77	44.1		
1333		13.09	17.37	6.16	0.532	0.90	24.8		
1336		13.22	17.23	6.20	0.532	0.78	26.4		
1343		13.41	17.09	6.20	0.532	0.49	24.7		

MONITORING SAMPLE RECORD

Sample ID	Time Collected	Parameter/Order	Container	Perservative	Collected?
A10-024(S)-19	1346	TCL-VOCs	3 - 40 mL VOA	HCl	
		TPH-GRO	3 - 40 mL VOA	HCl	
		TPH-DRO	2 - 1 L Amber	none	
		TCL-SVOCs	2 - 1 L Amber	none	
		Oil & Grease	2 - 1 L Amber	HCl	
		TAL-Metals & Mercury (total)	1 - 250 mL Plastic	HNO3	
		Hexavalent Chromium (total)	1 - 250 mL Plastic	none	
		Total Cyanide	1 - 250 mL Plastic	NaOH	
		TAL-Metals & Mercury (Dissolved) Field Filtered	1 - 250 mL Plastic	HNO3	
		Hexavalent Chromium (Dissolved) Field Filtered	1 - 250 mL Plastic	none	
PCB	2 - 1 L Amber	None			

Matrix Spike
Duplicate

Sampled By: TCV

Comments:

Casing Volume: 1" I.D. = 0.041 gal/ft - 2" I.D. = 0.163 gal/ft - 4" I.D. = 0.653 gal/ft - 6" I.D. = 1.47 gal/ft
_____ ft x _____ gal/ft = _____ (gal)

Low Flow Sampling Permanent Wells



ARM Group Inc.
Earth Resource Engineers and Consultants

Project Name: A 10 CVOC
 Well Number: A10-025(S)-P2
 Well Diameter (in): 1
 Depth to Product (ft): none
 Depth to Water (ft): 13.51
 Product Thickness (ft): -
 Depth to Bottom (ft): 20.23

Project Number: 180716
 Date: 10/15/19
 One Well Volume (gal):
 QED Controller Settings:
 Flow Rate (mL/min) 240
 Length of time Purged (min)
 Condition of Pad/Cover: T

PURGING RECORD

Time	Volume Purged (gallons)	DTW (feet)	Temp (°C)	pH (s.u.) ± 0.1	Specific Conductance (ms/cm) ± 3%	Dissolved Oxygen (mg/L) ± 0.3	ORP (mV) ± 10	Turbidity (NTU) ± 10% or < 5	Comments
0915	0	13.51	15.8	6.48	1.125	11.22	-112.9		V turbid
0920	0.3		15.9	6.01	0.948	8.54	-76.8		mod turbid
0925	0.5		15.9	5.60	0.888	6.76	-18.3		Δ flow vis0
0930	0.6		15.8	5.50	0.868	6.22	-0.6		1. turb
0935	0.75		15.8	5.54	0.865	5.98	1.9		purged dry
0940									

MONITORING SAMPLE RECORD

Sample ID	Time Collected	Parameter/Order	Container	Perservative	Collected?
A10-025(S)-P2	0950	TCL-VOCs	3 - 40 mL VOA	HCl	
		TPH-GRO	3 - 40 mL VOA	HCl	
		TPH-DRO	2 - 1 L Amber	none	
		TCL-SVOCs	2 - 1 L Amber	none	
		Oil & Grease	2 - 1 L Amber	HCl	
		TAL-Metals & Mercury (total)	1 - 250 mL Plastic	HNO3	
		Hexavalent Chromium (total)	1 - 250 mL Plastic	none	
		Total Cyanide	1 - 250 mL Plastic	NaOH	
		TAL-Metals & Mercury (Dissolved) Field Filtered	1 - 250 mL Plastic	HNO3	
		Hexavalent Chromium (Dissolved) Field Filtered	1 - 250 mL Plastic	none	
PCB	2 - 1 L Amber	None			

Matrix Spike

Duplicate

Sampled By: LMG

Comments:

CVOC

air bubbles in tubing after 1 well volume but recharging v. fast

Casing Volume: 1" I.D. = 0.041 gal/ft - 2" I.D. = 0.163 gal/ft - 4" I.D. = 0.653 gal/ft - 6" I.D. = 1.47 gal/ft
 _____ ft x _____ gal/ft = _____ (gal)

ENVIRONMENTAL SERVICES
Permanent Wells



Project Name: A10 CVOC
Well Number: A10-029(S)-PZ
Well Diameter (in): 1
Depth to Product (ft): —
Depth to Water (ft): 18.98
Product Thickness (ft): —
Depth to Bottom (ft): 35.34

Project Number: 180716m
Date: 10/15/19
One Well Volume (gal):
GED Controller Settings:
Flow Rate (mL/min): 210
Length of time Purged (min):
Condition of Pad/Cover: 1

FLUSHING RECORD

Time	Volume Purged (gallons)	DTW (feet)	Temp (°C)	pH (s.u.) ± 0.1	Specific Conductance (ms/cm) ± 3%	Dissolved Oxygen (mg/L) ± 0.3	ORP (mV) ± 10	Turbidity (NTU) ± 10% or < 5	Comments
1350	0	18.98	22.5	6.08	1.208	8.22	-32.9		m turbid
1355	.3	18.98	21.1	5.59	0.978	5.59	-26.3		l. turbid
1400	.6	18.98	20.7	5.77	0.942	4.53	-20.8		clear
1405	.9		20.2	5.45	0.931	4.01	-19.5		
1410	1.2		20.3	5.44	0.935	3.83	-19.1		
1415			20.1	5.43	0.931	3.72	-18.4		

MONITORING SAMPLE RECORD

Sample ID	Time Collected	Parameter/Order	Container	Perservative	Collected?
A10-029(S)-PZ	1420	TCL-VOCs	3 - 40 mL VOA	HCl	
		TPH-GRO	3 - 40 mL VOA	HCl	
		TPH-DRO	2 - 1 L Amber	none	
		TCL-SVOCs	2 - 1 L Amber	none	
		Oil & Grease	2 - 1 L Amber	HCl	
		TAL-Metals & Mercury (total)	1 - 250 mL Plastic	HNO3	
		Hexavalent Chromium (total)	1 - 250 mL Plastic	none	
		Total Cyanide	1 - 250 mL Plastic	NaOH	
		TAL-Metals & Mercury (Dissolved) Field Filtered	1 - 250 mL Plastic	HNO3	
		Hexavalent Chromium (Dissolved) Field Filtered	1 - 250 mL Plastic	none	
PCE		2 - 1 L Amber	None		

Matrix Spike
Duplicate

Sampled By: LMG

Comments:
AVOC

Capine Volume: 1" I.D. = 0.04 gal/ft - 2" I.D. = 0.163 gal/ft - 4" I.D. = 0.653 gal/ft - 6" I.D. = 1.47 gal/ft
ft x gal/ft = (gal)

ENVIRONMENTAL SCIENTISTS
Permanent Wells



Project Name: A10 CVOC
 Well Number: A10-034(S)-PZ
 Well Diameter (in): 1
 Depth to Product (ft): —
 Depth to Water (ft): 15.72
 Product Thickness (ft): —
 Depth to Bottom (ft): 27.76

Project Number: 1807/6m
 Date: 10/15/17
 One Well Volume (gal): —
 OED Controller Settings: —
 Flow Rate (mL/min): 260
 Length of time Purged (min): —
 Condition of Pad/Cover: 1

PURGING RECORD

Time	Volume Purged (gallons)	DTW (feet)	Temp (°C)	pH (s.u.) ± 0.1	Specific Conductance (ms/cm) ± 3%	Dissolved Oxygen (mg/L) ± 0.3	ORP (mV) ± 10	Turbidity (NTU) ± 10% or < 5	Comments
1210	0	15.72	19.5	4.68	1.142	8.75	134.0		
1215	0.3	15.73	20.0	4.11	1.085	5.81	175.8		clear
1220	0.6	15.74	19.8	4.16	1.070	4.76	177.2		
1225	0.9	15.76	19.7	4.15	1.064	4.37	180.5		
1230	1.2	15.77	19.6	4.12	1.061	4.14	182.9		
1235			19.4	4.11	1.066	4.02	183.8		

MONITORING SAMPLE RECORD

Sample ID	Time Collected	Parameter/Order	Container	Perservative	Collected
A10-034(S)-PZ	1240	TCL-VOCs	3 - 40 mL VOA	HCl	
		TPH-GRO	3 - 40 mL VOA	HCl	
		TPH-DRO	2 - 1 L Amber	none	
		TCL-SVOCs	2 - 1 L Amber	none	
		Oil & Grease	2 - 1 L Amber	HCl	
		TAL-Metals & Mercury (total)	1 - 250 mL Plastic	HNO3	
		Hexavalent Chromium (total)	1 - 250 mL Plastic	none	
		Total Cyanide	1 - 250 mL Plastic	NaOH	
		TAL-Metals & Mercury (Dissolved) Field Filtered	1 - 250 mL Plastic	HNO3	
		Hexavalent Chromium (Dissolved) Field Filtered	1 - 250 mL Plastic	none	
PCE		2 - 1 L Amber	None		

Matrix Spike
Duplicate

Sampled By: LMG

Comments:
CVOC

Coarse Volume: 1" I.D. = 0.041 gal/ft - 2" I.D. = 0.163 gal/ft - 4" I.D. = 0.653 gal/ft - 6" I.D. = 1.47 gal/ft
 ft x _____ gal/ft = _____ (gal)

Low Flow Sampling Permanent Wells



ARM Group Inc.
Earth Resource Engineers and Consultants

Project Name: A10 CVOG

Project Number: 180716

Well Number: A10-039(S)-P2

Date: 10/15/19

Well Diameter (in): 1

One Well Volume (gal):

Depth to Product (ft): -

QED Controller Settings:

Depth to Water (ft): 13.56

Flow Rate (mL/min) 250

Product Thickness (ft): -

Length of time Purged (min)

Depth to Bottom (ft): 26.29

Condition of Pad/Cover: 1

PURGING RECORD

Time	Volume Purged (gallons)	DTW (feet)	Temp (°C)	pH (s.u.) ± 0.1	Specific Conductance (ms/cm) ± 3%	Dissolved Oxygen (mg/L) ± 0.3	ORP (mV) ± 10	Turbidity (NTU) ± 10% or < 5	Comments
1000	0	13.56	17.8	5.78	0.915	7.98	-21.5		M. turbid
1005	0.3	13.62	17.9	5.58	0.911	6.12	-35.4		
1010	0.6	13.69	17.7	5.56	0.916	5.08	-44.0		
1015	0.9	13.77	17.7	5.55	0.915	4.64	-47.3		
1020	1.2	13.85	17.6	5.54	0.916	4.35	-49.5		
1025	1.5		17.48	5.53	0.914	4.08	-50.7		

MONITORING SAMPLE RECORD

Sample ID	Time Collected	Parameter/Order	Container	Perservative	Collected?
A10-039(S)-P2	1030	TCL-VOCs	3 - 40 mL VOA	HCl	
		TPH-GRO	3 - 40 mL VOA	HCl	
		TPH-DRO	2 - 1 L Amber	none	
		TCL-SVOCs	2 - 1 L Amber	none	
		Oil & Grease	2 - 1 L Amber	HCl	
		TAL-Metals & Mercury (total)	1 - 250 mL Plastic	HNO3	
		Hexavalent Chromium (total)	1 - 250 mL Plastic	none	
		Total Cyanide	1 - 250 mL Plastic	NaOH	
		TAL-Metals & Mercury (Dissolved) Field Filtered	1 - 250 mL Plastic	HNO3	
		Hexavalent Chromium (Dissolved) Field Filtered	1 - 250 mL Plastic	none	
PCB	2 - 1 L Amber	None			
Matrix Spike					
Duplicate					

Sampled By: LMG

Comments:

CVOG

Casing Volume: 1" I.D. = 0.041 gal/ft - 2" I.D. = 0.163 gal/ft - 4" I.D. = 0.653 gal/ft - 6" I.D. = 1.47 gal/ft
_____ ft x _____ gal/ft = _____ (gal)

Permanent Wells



Project Name A10 CVOC	Project Number 180716m
Well Number A10-040(S)-P2	Date 10/5/19
Well Diameter (in) 1	One Well Volume (gal):
Depth to Product (ft) -	GED Controller Settings:
Depth to Water (ft) 16.98	Flow Rate (mL/min) 250
Product Thickness (ft) -	Length of time Purged (min)
Depth to Bottom (ft) 28.49	Condition of Pad/Cover 1

PIERCING RECORD

Time	Volume Purged (gallons)	DTW (feet)	Temp (°C)	pH (s.u.) ± 0.1	Specific Conductance (ms/cm) ± 3%	Dissolved Oxygen (mg/L) ± 0.3	GED (mV) ± 10	Turbidity (NTU) ± 10% or < 5	Comments
1300	0	16.98	20.3	6.26	1.485	7.87	-40.6		turbid
1305	0.3	17.01	21.3	6.31	1.949	5.39	-99.8		clear
1310	0.6	17.04	21.1	6.26	1.376	4.53	-106.5		
1315	0.9	17.07	21.2	6.20	1.316	4.02	-104.0		
1320	1.2	17.1	20.8	6.16	1.272	3.78	-101.2		
1325	1.5		20.5	6.14	1.254	3.69	-99.6		

MONITORING SAMPLE RECORD

Sample ID	Time Collected	Parameter/Order	Container	Perservative	Collected
A10-040(S)-P2	1330	TCL-VOCs	3 - 40 mL VOA	HCl	
		TPH-GRO	3 - 40 mL VOA	HCl	
		TPH-DRO	2 - 1 L Amber	none	
		TCL-SVOCs	2 - 1 L Amber	none	
		Oil & Grease	2 - 1 L Amber	HCl	
		TAL-Metals & Mercury (total)	1 - 250 mL Plastic	HNO3	
		Hexavalent Chromium (total)	1 - 250 mL Plastic	none	
		Total Cyanide	1 - 250 mL Plastic	NaOH	
		TAL-Metals & Mercury (Dissolved) Field Filtered	1 - 250 mL Plastic	HNO3	
		Hexavalent Chromium (Dissolved) Field Filtered	1 - 250 mL Plastic	none	
PCB	2 - 1 L Amber	None			

Matrix Spike

Duplicate

Sampled By: LMG

Comments:

CVOC

Casing Volume: 1" I.D. = 0.041 gal/ft - 2" I.D. = 0.163 gal/ft - 4" I.D. = 0.653 gal/ft - 6" I.D. = 1.47 gal/ft
 ft x _____ gal/ft = _____ (gal)

Permanent Wells



Project Name: A10 CVOC	Project Number: 180716 m
Well Number: A10-041(S)-PZ	Date: 10/15/19
Well Diameter (in): 1	One Well Volume (gal):
Depth to Product (ft): -	QED Controller Settings:
Depth to Water (ft): 14.22	Flow Rate (mL/min): 250
Product Thickness (ft): -	Length of time Purged (min):
Depth to Bottom (ft): 28.43	Condition of Pad/Cover: 1

PURGING RECORD

Time	Volume Purged (gallons)	DTW (feet)	Temp (°C)	pH (s.u.) ± 0.1	Specific Conductance (ms/cm) ± 3%	Dissolved Oxygen (mg/L) ± 0.3	ORP (mV) ± 10	Turbidity (NTU) ± 10% or < 5	Comments
1040	0	14.22	20.6	5.56	0.810	8.24	32.0		turbid
1045	0.3	15.22	19.7	4.88	0.768	5.56	81.9		clear
1050	0.6	16.22	18.8	4.66	0.763	4.96	107.0		clear
1055	0.9		18.4	4.31	0.789	4.31	116.9		
1100	1.2		18.5	4.41	0.809	4.04	120.5		
1105			18.4	4.50	0.825	3.85	122.0		

MONITORING SAMPLE RECORD

Sample ID	Time Collected	Parameter/Order	Container	Perservative	Collected
A10-041(S)-PZ	1110	TCL-VOCs	3 - 40 mL VOA	HCl	
		TPH-GRO	3 - 40 mL VOA	HCl	
		TPH-DRO	2 - 1 L Amber	none	
		TCL-SVOCs	2 - 1 L Amber	none	
		Oil & Grease	2 - 1 L Amber	HCl	
		TAL-Metals & Mercury (total)	1 - 250 mL Plastic	HNO3	
		Hexavalent Chromium (total)	1 - 250 mL Plastic	none	
		Total Cyanide	1 - 250 mL Plastic	NaOH	
		TAL-Metals & Mercury (Dissolved) Field Filtered	1 - 250 mL Plastic	HNO3	
		Hexavalent Chromium (Dissolved) Field Filtered	1 - 250 mL Plastic	none	
PCB	2 - 1 L Amber	None			

Matrix Spike

Duplicate

Sampled By: LMG

Comments:

CVOC

Casing Volume: 1" I.D. = 0.041 gal/ft - 2" I.D. = 0.163 gal/ft - 4" I.D. = 0.653 gal/ft - 6" I.D. = 1.47 gal/ft
ft x _____ gal/ft = _____ (gal)