PHASE II
INVESTIGATION REPORT

AREA A: PARCEL A17
TRADEPOINT ATLANTIC
SPARROWS POINT, MARYLAND

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1.0 INTRODUCTION

ARM Group LLC (ARM), on behalf of Tradepoint Atlantic, has completed a Phase II Investigation of a portion of the Tradepoint Atlantic property (formerly Sparrows Point Terminal, LLC) that has been designated as Area A: Parcel A17 (the Site). Parcel A17 is comprised of 6.3 acres of the approximately 3,100-acre former steel making facility (**Figure 1**). The Site includes the western portion of the former Central Receiving Warehouse (CRW), now occupied by Caprock Grain, which covers about 120,400 square feet or 44% of the parcel.

The Site is bounded to the southwest by a stormwater management pond in Parcel A16, to the southeast by another stormwater management pond and wooded areas in Parcel A18, to the northwest by Maryland Route 158 (Bethlehem Boulevard), and to the northeast by the eastern portion of the CRW (occupied by Universal Trade Solutions, Inc.).

The Phase II Investigation was performed in accordance with procedures outlined in the approved Phase II Investigation Work Plan for Area A: Parcel A17. This Work Plan (Revision 0 dated June 28, 2019) was approved by the Maryland Department of the Environment (MDE) and the United States Environmental Protection Agency (USEPA) via email on September 9, 2019. The Work Plan was implemented in compliance with requirements pursuant to the following:

- Administrative Consent Order (ACO) between Tradepoint Atlantic (formerly Sparrows Point Terminal, LLC) and the MDE effective September 12, 2014; and

- Settlement Agreement and Covenant Not to Sue (SA) between Tradepoint Atlantic (formerly Sparrows Point Terminal, LLC) and the USEPA effective November 25, 2014.

Parcel A17 is part of the acreage that was removed (Carveout Area) from inclusion in the Multimedia Consent Decree between Bethlehem Steel Corporation, the USEPA, and the MDE (effective October 8, 1997) as documented in correspondence received from the USEPA on September 12, 2014. Based on this agreement, the USEPA determined that no further investigation or corrective measures will be required under the terms of the Consent Decree for the Carveout Area. However, the SA reflects that the property within the Carveout Area will remain subject to the USEPA's Resource Conservation and Recovery Act (RCRA) Corrective Action authorities.

An application to enter the full Tradepoint Atlantic property (3,100 acres) into the MDE's Voluntary Cleanup Program (MDE-VCP) was submitted to the MDE and delivered on June 27, 2014. The property's current and anticipated future use is Tier 3 (Industrial), and plans for the property include demolition and redevelopment over the next several years.

1.1. SITE HISTORY

From the late 1800s until 2012, the production and manufacturing of steel was conducted at Sparrows Point. Iron and steel production operations and processes at Sparrows Point included raw material handling, coke production, sinter production, iron production, steel production, and semi-finished and finished product preparation. In 1970, Sparrows Point was the largest steel facility in the United States, producing hot and cold rolled sheets, coated materials, pipes, plates, and rod and wire. The steel making operations at Sparrows Point ceased in fall 2012.

The CRW is located southeast of Bethlehem Boulevard on the northeastern portion of the Tradepoint Atlantic property. During plant operation, all receivable goods and maintenance items (tools, bolts, etc.) were delivered to the CRW and stored before being distributed to other portions of the property.

Parcel A17 includes the southwestern portion of the CRW, along with associated parking to the southwest, and additional parking and an access road from Bethlehem Boulevard to the northwest. The on-site structure is currently occupied by Caprock Grain, which is an import supplier of organic animal grain. According to their website, Caprock specializes in an array of grains, meals, and oils which are certified organic. Specific product examples include soybeans, soybean meal, and soybean oil; corn and corn meal; sunflower and flax meal; wheat; and dry distiller grains. The northeastern portion of the CRW (contiguous with the Site) was formerly owned and occupied by Dietrich Industries, Inc. This section of the CRW is currently occupied by Universal Trade Solutions, Inc., a warehousing and transportation company.

1.2. OBJECTIVES

The objective of this Phase II Investigation was to identify the nature and extent of contamination at the Site. A summary table of the site investigation locations, including the sample identification numbers and the analyses performed, is provided as **Appendix A**. This report includes a summary of the work performed, including the environmental setting, site investigation methods, analytical results and data usability assessment, and findings and recommendations.

At the request of the MDE, this Phase II Investigation Report also includes soil/ballast and sub-slab soil gas data previously collected (in 2015) during the preceding Building Occupancy Assessment (BOA) for the CRW.

2.0 ENVIRONMENTAL SETTING

2.1. LAND USE AND SURFACE FEATURES

The Tradepoint Atlantic property consists of the former Sparrows Point steel mill. According to the Phase I Environmental Site Assessment (ESA) prepared by Weaver Boos dated May 19, 2014, the property is zoned Manufacturing Heavy-Industrial Major (MH-IM). Surrounding property zoning classifications (beyond Tradepoint Atlantic) include the following: Manufacturing Light (ML); Resource Conservation (RC); Density Residential (DR); Business Roadside (BR); Business Major (BM); Business Local (BL); and Residential Office (RO). Light industrial and commercial properties are located northeast of the property and northwest of the property across Bear Creek. Residential areas of Edgemere and Fort Howard are located northeast of the property across Jones Creek and to the southeast across Old Road Bay, respectively. Residential and commercial areas of Dundalk are located northwest of the property across Bear Creek.

The Site is relatively flat across the majority of the parcel area, with slightly elevated topography in the northeastern portion of the Site and a gradual slope toward the stormwater management pond in Parcel A16 to the southwest. Steeper grades are present along the southeastern edge of the Site, where the ground surface slopes downward toward another stormwater management pond in Parcel A18; and the northwestern edge, where the ground surface slopes upward to meet Bethlehem Boulevard. Elevations in the central portion of the Site range between approximately 8 and 12 feet above mean sea level (amsl), with higher elevations along Bethlehem Boulevard and lower elevations approaching the adjoining stormwater ponds. According to Figure B-2 of the Stormwater Pollution Prevention Plan (SWPPP) Revision 8 dated April 30, 2020, surface water runoff from the Site flows to the two stormwater ponds to the southeast and southwest, is then conveyed by the Tin Mill Canal (TMC), and is ultimately discharged through National Pollutant Discharge Elimination System (NPDES) permitted Outfall 014 beyond the Humphrey Creek Wastewater Treatment Plant (HCWWTP), which discharges to Bear Creek.

2.2. REGIONAL GEOLOGY

The Site is located within the Atlantic Coastal Plain Physiographic Province (Coastal Plain). The western boundary of the Coastal Plain is the “Fall Line”, which separates the Coastal Plain from the Piedmont Plateau Province. The Fall Line runs from northeast to southwest along the western boundary of the Chesapeake Bay, passing through Elkton (MD), Havre de Grace (MD), Baltimore City (MD), and Laurel (MD). The eastern boundary of the Coastal Plain is the off-shore Continental Shelf.

The unconsolidated sediments beneath the Site belong to the Talbot Formation (Pleistocene), which is then underlain by the Cretaceous formations which comprise the Potomac Group (Patapsco Formation, Arundel Formation, and the Patuxent Formation). The Potomac Group

formations are comprised of unconsolidated sediments of varying thicknesses and types, which may be several hundred feet to several thousand feet thick. These unconsolidated formations may overlie deeper Mesozoic and/or Precambrian bedrock. Depth to bedrock is approximately 700 feet within the Site.

2.3. SITE GEOLOGY/HYDROGEOLOGY

The approximate shoreline of the Sparrows Point Peninsula in 1916, as shown on **Figure 2** (adapted from Figure 2-20 in the Description of Current Conditions (DCC) Report prepared by Rust Environment and Infrastructure dated January 1998), suggests that the Site is comprised of 100% natural soils. However, 1952 historical aerial imagery (available through Johns Hopkins University online databases) shows that groundcover at the Site is comprised of roughly 67% natural soils and 33% non-native fill material (i.e., slag). The 1952 aerial imagery and shoreline are shown on **Figure 3**.

In general, the encountered subsurface geology included natural soils, which included fine-grained sediments (clays and silts) and coarse-grained sediments (sands), as well as some non-native sand and slag gravel fill materials. Shallow groundwater was observed in soil cores at depths of 7 to 14.3 feet below ground surface (bgs) across the Site. Soil boring observation logs are provided in **Appendix B**. Note that unless otherwise indicated, all Unified Soil Classification System (USCS) group symbols provided on the attached boring logs are from visual observations, and not from laboratory testing.

Groundwater was investigated at the Site via the installation of four temporary groundwater sample collection points (commonly referred to as piezometers). Sample locations where piezometers were installed within Parcel A17 included A17-001-PZ, A17-002-PZ, A17-004-PZ, and A17-005-PZ. **Figure 4** shows an aerial view of the piezometers which were installed and sampled to characterize groundwater conditions below Parcel A17.

The piezometers were surveyed by a Maryland-licensed surveyor, and the supporting documentation from the survey is included in **Appendix C**. A synoptic round of groundwater level measurements was collected from the piezometers on August 10, 2020. Surveyed top of casing (TOC) and ground surface elevations for all locations can be found in **Table 1**, along with the depth to water (DTW) measurements from this date. A groundwater potentiometric surface map was constructed for the shallow hydrogeologic zone based on the field gauging measurements. The localized potentiometric surface map for shallow groundwater has been included on **Figure 4**. The groundwater elevation contours indicate that groundwater flows from the north to the south at the Site. The adjoining stormwater ponds are the presumed discharge locations for groundwater.

3.0 SITE INVESTIGATION

A total of 12 soil samples (from five locations) and four groundwater samples were collected for analysis between May 11 and July 7, 2020 as part of the Parcel A17 Phase II Investigation. This Phase II Investigation utilized methods and protocols that followed the procedures included in the Quality Assurance Project Plan (QAPP) dated April 5, 2016 which was approved by the agencies to support the investigation and remediation of the Tradepoint Atlantic property. Information regarding the project organization, field activities and sampling methods, sampling equipment, sample handling and management procedures, the selected laboratory and analytical methods, quality control and quality assurance procedures, investigation-derived waste (IDW) management methods, and reporting requirements are described in detail in the approved Parcel A17 Work Plan (Revision 0 dated June 28, 2019) and the QAPP.

All site characterization activities were conducted under the property-wide Health and Safety Plan (HASP) provided as Appendix F of the approved Work Plan.

3.1. SAMPLE TARGET IDENTIFICATION

Previous activities within and around the buildings and facilities located on the Tradepoint Atlantic property may have been historical sources of environmental contamination. If present, source areas were identified as targets for sampling through a careful review of historical documents. When a sampling target was identified, a boring was placed at or next to its location using Geographic Information Systems (GIS) software (ArcMap Version 10.6).

Sampling targets included, as applicable, 1) Recognized Environmental Conditions (RECs) shown on the REC Location Map provided in Weaver Boos' Phase I ESA, 2) additional findings (non-RECs) from the Phase I ESA which were identified as potential environmental concerns, and 3) Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) identified from the DCC Report prepared by Rust Environment and Infrastructure. There were no RECs, SWMUs, or AOCs identified at the Site based on the Phase I ESA or DCC Report; however, one off-site REC (REC 28A; Finding 281) was identified immediately adjacent to the Site due to the presence of two Underground Storage Tanks (USTs) located northeast of the property. The identified REC is described in further detail within the Parcel A17 Work Plan. The off-site REC was investigated along the parcel boundary to characterize any potential migration of contamination.

Four sets of historical drawings were also reviewed to identify potential sampling targets for the Site. These drawings included the 5000 Set (Plant Arrangement), the 5100 Set (Plant Index), the 5500 Set (Plant Sewer Lines), and a set of drawings indicating coke oven gas distribution drip leg locations. Drip legs are points throughout the distribution system where coke oven gas condensate was removed from the gas pipelines. The condensate from the drip legs was typically discharged to drums, although it is possible some spilled out of the drums and onto the ground. The drip legs

drawings did not provide coverage of Parcel A17, but based on the positions of other drip legs and known paths of the coke gas lines, it is unlikely that any drip legs were present within the parcel boundary. Similarly, the historical 5000 Set, 5100 Set, and 5500 Set did not provide coverage of Parcel A17, suggesting that significant steel-production operations did not historically occur within the parcel boundary.

Based on the review of plant drawings, Phase I ESA, and a pre-investigation site visit conducted by ARM on April 24, 2019, the only identified sampling targets were the off-site REC 28A and an Ejector/Pump Station. A summary table of the investigation plan, with the applicable boring identification numbers and the analyses performed, has been provided as **Appendix A**. During the completion of fieldwork, it was necessary to slightly shift some borings from the approved locations given in the Work Plan due to access restrictions, presence of utilities, and/or equipment refusal. **Table 2** provides the identification numbers of the field adjusted samples, the coordinates of the proposed and final locations, and the distance/direction of the field shifts.

The density of soil borings met the requirements set forth in QAPP Worksheet 17 – Sampling Design and Rationale. Parcel A17 contains a total of 3.54 acres outside of the CRW. The CRW was previously investigated during a separate BOA in 2015, and therefore was not included for additional sampling during this Phase II Investigation. The exterior parcel areas were evaluated according to the sampling density requirements for areas without engineered barriers. A minimum of four soil borings were required to meet the density specification; soil samples were collected from five soil borings during this Phase II Investigation.

3.2. BUILDING OCCUPANCY ASSESSMENT (BOA)

Sub-slab soil gas data and soil/ballast data were previously collected from within the CRW during the preceding BOA conducted in 2015. The BOA was conducted prior to development of the property-wide QAPP. The investigation methods and findings were previously documented in a BOA letter report dated February 27, 2015. The complete BOA letter report (with associated attachments including laboratory reports) is provided as an electronic attachment to this Phase II Investigation Report.

A total of six sub-slab soil gas samples were collected from the locations shown on **Figure 5**. To facilitate the collection of each sub-slab soil gas sample, a core-drill was used to create a pilot-hole approximately three-inches in diameter that extended through the concrete floor. A hand auger was then used to create a borehole that extended through the subgrade and into the soil to a depth at least eight inches below the bottom of the concrete floor slab. A six-inch soil gas implant, constructed of double woven stainless steel wire screen, was then attached to an appropriate length of polyethylene tubing and lowered to the bottom of the borehole. Once the implant and tubing were installed, the tubing was capped with a three-way valve, and clean sand was added around the implant to create a permeable layer that extended at least two inches above the implant. Bentonite was then added and hydrated to create a seal above the sand pack that extended to the

surface. Once installed, each sub-slab soil gas monitoring probe was allowed to equilibrate for at least 24 hours. Prior to sampling, a syringe was attached to the three-way valve and three purge volumes of air were removed. After the probe had been purged of any ambient air, an evacuated stainless steel summa canister with a flow restrictor set for a 24-hour intake time was attached to the tubing. The soil gas sample was then collected over a period of 24 hours. The soil gas samples were submitted to Pace Analytical Services, Inc. (PACE) to be analyzed for volatile organic compounds (VOCs) via USEPA Method TO-15.

In addition to the sub-slab soil gas investigation, a total of four samples of soil/ballast material were collected from below the rail line along the interior eastern wall of the CRW. The four samples were collected from the two locations indicated on **Figure 5**. ARM attempted to utilize a hand-auger to collect the samples; however, a shovel had to be used instead due to refusal in the ballast material. From each location, one sample of ballast was collected from the 0 to 1 foot depth interval, and a deeper sample was collected from the 1 to 2 foot depth interval. The holes were then backfilled with the ballast that had been displaced. The ballast samples were submitted to PACE to be analyzed for polynuclear aromatic hydrocarbons (PAHs) via USEPA Method 8270 SIM and metals (including hexavalent chromium) via USEPA Methods 6010, 7471, and 7196.

3.3. SOIL INVESTIGATION

Continuous core soil borings were advanced at five locations across the Site to assess the presence or absence of soil contamination, and to assess the vertical distribution of any encountered contamination (**Figure 6**). Analytical soil samples were successfully collected from all of the proposed locations. The continuous core soil borings were advanced to a maximum depth of 21 feet bgs using the Geoprobe® MC-7 Macrocore soil sampler (surface to 10 feet bgs) and the Geoprobe® D-22 Dual-Tube Sampler (depths >10 feet bgs). At each of the five completed boring locations, the soil core was visually inspected and screened with a hand-held photoionization detector (PID) prior to logging soil types. Soil boring logs have been included as **Appendix B**, and the PID calibration log has been included as **Appendix D**. Unless otherwise indicated, all USCS group symbols provided on the attached boring logs are from visual observations.

In each boring, one shallow sample was collected from the 0 to 1 foot depth interval. If unsuitable surface cover materials (such as asphalt pavement) were present, the first 1 foot of soil beneath this layer was collected as the shallow sample. An underlying sample was collected from the 4 to 5 foot depth interval from each continuous core soil boring, but could be adjusted based on field observations. If the PID or other field observations indicated contamination to exist at a depth greater than 3 feet bgs but less than 9 feet bgs, and above the water table, the sample from the deeper 4 to 5 foot interval was shifted to the alternate depth interval. One additional set of samples was also collected from the 9 to 10 foot depth interval if groundwater had not been encountered. The 10-foot bgs samples were held by the laboratory prior to analysis in accordance with the requirements given in the Parcel A17 Work Plan. These project-specific requirements for the

analysis of 10-foot bgs samples are further described below. It should be noted that soil samples were not collected from a depth that was below the water table.

Soil sampling activities were conducted in accordance with the procedures and methods referenced in **Field Standard Operating Procedure (SOP) Numbers 008, 009, 012, and 013** provided in Appendix A of the QAPP. Down-hole soil sampling equipment was decontaminated after soil sampling had been concluded at each location, according to the procedures and methods referenced in **Field SOP Number 016** provided in Appendix A of the QAPP.

Each soil sample collected during this investigation was submitted to PACE for analysis. As stated above, the 10-foot bgs samples were held prior to analysis in accordance with the Parcel A17 Work Plan requirements. Excluding the deep samples, the remaining soil samples were analyzed for Target Compound List (TCL) semi-volatile organic compounds (SVOCs) via USEPA Method 8270, Oil & Grease via USEPA Method 9071, total petroleum hydrocarbon (TPH) diesel range organics (DRO) and gasoline range organics (GRO) via USEPA Method 8015, Target Analyte List (TAL) Metals via USEPA Methods 6010 and 7471, hexavalent chromium via USEPA Method 7196, and cyanide via USEPA Method 9012. Additionally, the shallow soil samples collected across the Site from the 0 to 1 foot bgs interval were analyzed for polychlorinated biphenyls (PCBs) via USEPA Method 8082. Samples from any depth interval with a sustained PID reading of greater than 10 ppm were also designated to be analyzed for TCL-VOCs via USEPA Method 8260; however, no PID readings above this threshold were recorded during this investigation. The soil samples were also submitted to Alpha Analytical, Inc. (Alpha) for analysis of PAHs via USEPA Method 8270 SIM. Sample containers, preservatives, and holding times for the sample analyses are listed in the QAPP Worksheet 19 & 30 – Sample Containers, Preservation, and Holding Times.

If the PID reading from the 9 to 10 foot bgs interval was less than 10 ppm (true for all 10-foot bgs samples collected in Parcel A17), all parameters were held by the laboratory pending the analysis of the overlying 0 to 1 and 4 to 5 foot bgs (or field adjusted interval) samples. If the preliminary laboratory results from the 4 to 5 foot bgs interval indicated exceedances of the PALs for any constituents, the held sample from the 9 to 10 foot bgs interval was then released to be analyzed for those constituents that exhibited PAL exceedances in the overlying sample.

3.4. GROUNDWATER INVESTIGATION

As noted in the Parcel A17 Work Plan, two historical groundwater monitoring wells (SG05-PDM004 and SG05-PPM006) were located in the western portion of the Site and were considered as potential sample locations for this Phase II Investigation. The locations of the historical wells are shown on **Figure 7**. Inspection logs from these two wells have been included in **Appendix E**. Both were observed to be in poor structural condition. The historical monitoring well SG05-PDM004 was proposed to be sampled during this Phase II Investigation; however, a replacement temporary groundwater piezometer was installed at location A17-005-SB in lieu of sampling

SG05-PDM004. This contingency had been provided in the Parcel A17 Work Plan. Both historical monitoring wells were abandoned per MDE direction (as outlined in the MDE's approval email dated September 9, 2019). SG05-PPM006 had previously been damaged, with only a short length of PVC and the steel casing able to be removed. Well abandonment forms for historical monitoring wells SG05-PDM004 and SG05-PPM006 are also included in **Appendix E**.

Four shallow temporary groundwater piezometers (A17-001-PZ, A17-002-PZ, A17-004-PZ, and A17-005-PZ) were included in the parcel-specific sampling plan to investigate groundwater below Parcel A17. The locations where shallow groundwater samples were collected are provided on **Figure 4**. Piezometer installation activities were conducted in accordance with the procedures and methods referenced in **Field SOP Number 028**. The piezometers were installed at each location using the Geoprobe® DT22 Dual Tube sampling system. During the installation of each piezometer, soil types were logged and screened with a hand-held PID. The piezometer construction logs have been included as part of **Appendix B**. Following the installation of each sample collection point, the 0-hour depth to water was documented and the collection point was checked for the presence of non-aqueous phase liquid (NAPL) using an oil-water interface probe in accordance with the methods referenced in **Field SOP Number 019** provided in Appendix A of the QAPP.

After the installation of each temporary groundwater sample collection point, down-hole equipment was decontaminated according to the procedures and methods referenced in **Field SOP Number 016** provided in Appendix A of the QAPP.

Groundwater samples were collected at each location in accordance with methods referenced in **Field SOP Number 006** provided in Appendix A of the QAPP; which employed the use of laboratory supplied sample containers and preservatives, a peristaltic pump, dedicated polyethylene tubing, and a water quality multiparameter meter with a flow-through cell. Groundwater samples submitted for analysis of dissolved metals were filtered in the field with an in-line 0.45 micron filter. The sampling and purge logs have been included in **Appendix F**. Calibration of the multiparameter meter was performed before the start of each day of the sampling event. Appropriate documentation of the multiparameter meter calibration has also been included in **Appendix F**.

Groundwater samples collected in Parcel A17 were submitted to PACE to be analyzed for TCL-VOCs via USEPA Method 8260, TCL-SVOCs via USEPA Methods 8270 and 8270 SIM, Oil & Grease via USEPA Method 1664, TPH-DRO/GRO via USEPA Methods 5030 and 8015, TAL-Dissolved Metals via USEPA Methods 6010 and 7470, dissolved hexavalent chromium via USEPA Method 7196, and total cyanide via USEPA Method 9012. Sample containers, preservatives, and holding times for the sample analyses are listed in the QAPP Worksheet 19 & 30 – Sample Containers, Preservation, and Holding Times.

3.5. MANAGEMENT OF INVESTIGATION-DERIVED WASTE (IDW)

In accordance with **Field SOP Number 005** provided in Appendix A of the QAPP, potentially impacted materials, or IDW, generated during this Phase II Investigation was containerized in 55-gallon (DOT-UN1A2) drums. The types of IDW that were generated during this Phase II Investigation included the following:

- soil cuttings generated from soil borings or the installation of groundwater sample points;
- purged groundwater; and
- decontamination fluids

Following the completion of field activities, a composite sample was gathered with aliquots from each of the Parcel A17 Phase II IDW soil drums for waste characterization. Based on this analysis, the waste soil was characterized as non-hazardous. A list of all results from the soil waste characterization procedure can be found in **Table 3**. IDW drums containing aqueous materials (including aqueous waste generated during the Parcel A17 Phase II Investigation) were characterized by preparing composite samples from randomly selected drums. The composite samples included aliquots from several individual drums that were chosen as a subset of the aqueous drums being staged on-site at the date of collection. Based on this analysis, the aqueous waste was characterized as non-hazardous. A list of all results from the aqueous waste characterization procedure can be found in **Table 4**.

The parcel-specific IDW drum log from this Phase II Investigation is included as **Appendix G**. All IDW procedures were carried out in accordance with methods referenced in the QAPP Worksheet 21 – Field SOPs and Appendix A of the QAPP.

4.0 ANALYTICAL RESULTS

4.1. SOIL CONDITIONS

Soil analytical results were screened against PALs established in the property-wide QAPP (or other direct guidance from the agencies; i.e., TPH/Oil & Grease) to determine PAL exceedances. PALs are generally based on the USEPA's Regional Screening Levels (RSLs) for the Composite Worker exposure to soil. The Composite Worker is defined by the USEPA as a long-term receptor exposed during the workday who is a full-time employee that spends most of the workday conducting maintenance activities (which typically involve on-site exposures to surface soils) outdoors.

The analytical results for the detected parameters among the Phase II Investigation soil borings are summarized and compared to the PALs in **Table 5** (Organics) and **Table 6** (Inorganics). The laboratory Certificates of Analysis (including Chains of Custody) and Data Validation Reports (DVRs) have been included as electronic attachments. The DVRs contain a glossary of qualifiers for the final flags assigned to individual results in the attached summary tables.

4.1.1. Soil Conditions: Organic Compounds

There were no samples which exhibited PID readings greater than 10 ppm; therefore, no samples were analyzed for VOCs.

Table 5 provides a summary of SVOCs detected above the laboratory's method detection limits (MDLs) in the soil samples collected from across the Site. The PALs for relevant PAHs have been adjusted upward based on revised toxicity data published in the USEPA RSL Composite Worker Soil Table. Therefore, any soil exceedances for PAHs would be based on the adjusted PALs rather than those presented in the QAPP. There were no SVOCs detected above their respective PALs.

Shallow soil samples collected across the Site from the 0 to 1 foot bgs interval were analyzed for PCBs. **Table 5** provides a summary of PCBs detected above the laboratory's MDLs in the soil samples collected from shallow soil across the Site. Only Aroclor 1260 was detected in one soil sample (A17-003-SB-1). There were no PAL exceedances of PCBs in any soil samples.

Table 5 provides a summary of the TPH/Oil & Grease detections above the laboratory's MDLs in the soil samples collected from across the Site. There were no detections of GRO in any soil samples, and no PAL exceedances of DRO, GRO, or Oil & Grease. Additionally, no physical evidence of NAPL was observed in any soil cores completed during this investigation.

4.1.2. Soil Conditions: Inorganic Constituents

Table 6 provides a summary of inorganic constituents detected above the laboratory's MDLs in the soil samples collected from across the Site. Arsenic, manganese, and thallium were the only constituents detected above their respective PALs. Arsenic was detected above its PAL of 3 mg/kg

in seven soil samples with a maximum detection of 6.8 mg/kg in sample A17-002-SB-10. Manganese was detected above its PAL of 26,000 mg/kg in three soil samples with a maximum detection of 32,300 mg/kg in A17-002-SB-5. Thallium was detected above its PAL of 12 mg/kg in eight soil samples with a maximum detection of 50.1 mg/kg (flagged with the "J" qualifier) in A17-002-SB-5. The inorganic PAL exceedance locations and results are shown on **Figure 8**.

4.1.3. CRW Soil/Ballast Conditions: Organic and Inorganic Constituents

Table 7 provides a summary of organic and inorganic constituents detected above the laboratory's MDLs in the soil/ballast samples collected during the CRW BOA completed in 2015. The laboratory reports are included in the BOA letter report dated February 27, 2015 (provided as an electronic attachment). The four soil/ballast samples targeted the interior rail line along the eastern wall of the CRW. The BOA sample locations are shown along with the Phase II Investigation soil borings on **Figure 8**. Several SVOCs and inorganics were detected above the laboratory's MDLs; however, there were no PAL exceedances in any of the BOA samples.

4.1.4. Soil Conditions: Results Summary

Table 5 through **Table 7** provide summaries of the detected organic compounds and inorganics in the soil samples submitted for laboratory analysis, including the BOA samples collected in 2015. **Figure 8** presents the soil sample results that exceeded the PALs. Organic compounds (SVOCs, PCBs, and TPH/Oil & Grease) were not detected above their respective PALs and are not considered to be significant soil contaminants in Parcel A17. PAL exceedances in soil were limited to arsenic, manganese, and thallium. The maximum detections of each of these constituents were 6.8 mg/kg (at A17-002-SB-10), 32,300 mg/kg (at A17-002-SB-5), and 50.1 mg/kg (at A17-002-SB-5), respectively. Soil boring A17-002-SB targeted the off-site REC 28A (Adjoining Property USTs), but the metals concentrations are not believed to be related to the USTs.

Lead, PCBs, and TPH/Oil & Grease are subject to special requirements as designated by the agencies: lead results above 10,000 mg/kg are subject to additional delineation (and possible excavation), PCB results above 50 mg/kg are subject to delineation and excavation, and TPH/Oil & Grease results above 6,200 mg/kg should be evaluated for the potential presence and mobility of NAPL in any future development planning. Concentrations of these parameters did not exceed the PALs or specified thresholds in any soil samples collected at the Site.

4.2. GROUNDWATER CONDITIONS

The analytical results for the detected parameters in groundwater are summarized and compared to the PALs in **Table 8** (Organics) and **Table 9** (Inorganics). The laboratory Certificates of Analysis (including Chains of Custody) and the associated DVR have been included as electronic attachments. The DVR contains a glossary of qualifiers for the final flags assigned to individual results in the attached summary tables.

4.2.1. Groundwater Conditions: Organic Compounds

As provided on **Table 8**, several VOCs were identified above the laboratory's MDLs in the groundwater samples collected from across the Site. No VOCs were detected above their respective PALs in groundwater.

Table 8 provides a summary of SVOCs identified in the groundwater samples above the laboratory's MDLs. Similar to the evaluation of soil data, the PALs for relevant PAHs have been adjusted upward based on revised toxicity data published in the USEPA RSL Resident Tapwater Table. Four SVOCs (1,1-biphenyl, 1,4-dioxane, naphthalene, and pentachlorophenol) were detected above the PALs in at least one sample. The maximum detections of these constituents were 1.3 µg/L (at A17-004-PZ), 11.8 µg/L (at A17-004-PZ), 7 µg/L (at A17-004-PZ), and 4.5 µg/L (at A17-005-PZ), respectively. The SVOC PAL exceedances are shown on **Figure 9**.

Table 8 provides a summary of the TPH/Oil & Grease detections in groundwater at the Site. There were no detections (or PAL exceedances) of GRO in any groundwater samples. DRO was detected above the PAL in all four groundwater samples with a maximum detection of 2,000 µg/L (flagged with the "J" qualifier) in A17-002-PZ. Oil & Grease was detected above the PAL in one groundwater sample (A17-004-PZ) with a detection of 3,600 µg/L (also flagged with the "J" qualifier). The TPH/Oil & Grease PAL exceedances are shown on **Figure 9**.

Each location was checked for the potential presence of NAPL using an oil-water interface probe prior to sampling. During these checks, NAPL was not detected in any of the groundwater sampling locations, although an unknown milky-white material (possibly bentonite) was observed in A17-001-PZ. Based on its color, lack of odors, lack of reactivity to the oil-water interface probe, and lack of significant PAL exceedances at A17-001-PZ, the unknown material appears to be relatively benign and is not a petroleum-based NAPL.

4.2.2. Groundwater Conditions: Inorganic Constituents

Table 9 provides a summary of inorganic constituents detected above the MDLs in the groundwater samples collected from across the Site. A total of four dissolved metals (hexavalent chromium, cobalt, manganese, and vanadium) were detected above their respective aqueous PALs. The maximum detections of these inorganic constituents in groundwater were 35.2 µg/L (at A17-002-PZ), 58.1 µg/L (at A17-001-PZ), 3,610 µg/L (at A17-001-PZ), and 148 µg/L (at A17-002-PZ), respectively. The inorganic PAL exceedances are shown on **Figure 9**.

4.2.3. Groundwater Conditions: Results Summary

Table 8 and **Table 9** provide summaries of the detected organic compounds and inorganics in the groundwater samples submitted for laboratory analysis, and **Figure 9** presents the locations and aqueous results that exceeded the PALs. Aqueous PAL exceedances among the groundwater

samples collected from the Site consisted of four SVOCs (1,1-biphenyl, 1,4-dioxane, naphthalene, and pentachlorophenol), DRO, Oil & Grease, and four dissolved metals (hexavalent chromium, cobalt, manganese, and vanadium).

The groundwater data were screened to determine whether individual sample results may exceed the USEPA Vapor Intrusion (VI) Screening Levels (Target Cancer Risk (TCR) of 1E-5 and Target Hazard Quotient (THQ) of 1 as determined by the Vapor Intrusion Screening Level (VISL) Calculator (https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-levels-visls). The PALs specified in the QAPP are based upon drinking water use, which is not a potential exposure pathway for groundwater at the Site.

None of the aqueous results exceeded the individual VI TCR or THQ criteria as specified by the VISL Calculator. Following the initial screening, a cumulative VI risk assessment was also performed for each individual sample location, with the results separated by cancer risk versus non-cancer hazard. All compounds with detections were included in the computation of the cumulative cancer risk, and all compounds with detections exceeding 10% of the THQ level were included in the evaluation of non-cancer hazard. None of the cumulative VI cancer risks were greater than 1E-5, and there were no compounds above the 10% THQ level. The cumulative VI comparisons are provided in **Table 10**.

The presence and absence of groundwater impacts within the Site boundaries have been adequately described. Groundwater is not used on the Tradepoint Atlantic property (and is not proposed to be utilized). There were no concerns related to potential VI risks/hazards at the Site. Based on the relatively low-level analytical results identified during this investigation, there do not appear to be significant ongoing sources of groundwater contamination present.

4.3. SUB-SLAB SOIL GAS CONDITIONS

Table 11 provides a summary of VOCs detected above the laboratory's MDLs in the sub-slab soil gas samples collected during the CRW BOA completed in 2015. The table shows the PALs established in the QAPP as well as the MDE's updated Commercial Tier 1 Target Soil Gas Screening Levels which were published in May 2019. The laboratory reports are included in the BOA letter report dated February 27, 2015 (provided as an electronic attachment). The locations of the sub-slab soil gas samples are shown on **Figure 5**. Several VOCs were detected above the laboratory's MDLs; however, there were no PAL exceedances (or exceedances of the updated MDE criteria) in any of the BOA sub-slab soil gas samples.

5.0 DATA USABILITY ASSESSMENT

The approved property-wide QAPP specified a process for evaluating data usability in the context of meeting project goals. Since the 2015 CRW BOA was completed prior to the development of the QAPP, discussion of data usability in this section is limited to the Phase II Investigation of soil and groundwater conditions conducted from May to July 2020.

The goal of the Phase II Investigation is to determine if potentially hazardous substances or petroleum products (VOCs, SVOCs, PCBs, metals, cyanide, or TPH/Oil & Grease) are present in Site media at concentrations that could pose an unacceptable risk to Site receptors. Individual results are compared to the PALs established in the QAPP (i.e., the USEPA RSLs) or based on other direct guidance from the agencies, to identify the presence of exceedances in each environmental medium.

Quality assurance and quality control (QA/QC) samples were collected during field studies to evaluate field/laboratory variability. A summary of QA/QC samples associated with this investigation has been included as **Appendix H**. The following QA/QC samples were required by the QAPP to support the data validation:

- Trip Blank – at a rate of one per cooler with VOC samples per day
  - Soil – VOCs only
  - Water – VOCs only
- Blind Field Duplicate – at a rate of one per twenty samples
  - Soil – VOCs, SVOCs, Metals, TPH-DRO, TPH-GRO, Oil & Grease, PCBs, hexavalent chromium, and cyanide
  - Water – VOCs, SVOCs, Metals, TPH-DRO, TPH-GRO, Oil & Grease, hexavalent chromium, and cyanide
- Matrix Spike/Matrix Spike Duplicate – at a rate of one per twenty samples
  - Soil – VOCs, SVOCs, Metals, TPH-DRO, TPH-GRO, Oil & Grease, PCBs, and hexavalent chromium
  - Water – VOCs, SVOCs, Metals, TPH-DRO, TPH-GRO, Oil & Grease, and hexavalent chromium
- Field Blank and Equipment Blank – at a rate of one per twenty samples
  - Soil – VOCs, SVOCs, Metals, TPH-DRO, TPH-GRO, Oil & Grease, hexavalent chromium, and cyanide
  - Water – VOCs, SVOCs, Metals, TPH-DRO, TPH-GRO, Oil & Grease, hexavalent chromium, and cyanide

The QA/QC samples were collected and analyzed in accordance with the QAPP Worksheet 12 – Measurement Performance Criteria, QAPP Worksheet 20 – Field Quality Control, and QAPP Worksheet 28 – Analytical Quality Control and Corrective Action.

5.1. DATA VERIFICATION

A verification review was performed on documentation generated during sample collection and analysis. The verification included a review of field log books, field data sheets, and Chains of Custody to ensure that all planned samples were collected, and to ensure consistency with the field methods and decontamination procedures specified in the QAPP Worksheet 21 – Field SOPs and Appendix A of the QAPP. In addition, calibration logs were reviewed to ensure that field equipment was calibrated at the beginning of each day and re-checked as needed. The logs have been provided in **Appendix D** (PID calibration log) and **Appendix F** (multiparameter meter calibration logs). Documentation of the multiparameter meter end of the day calibration check was not recorded for this parcel.

The laboratory deliverables were reviewed to ensure that all records specified in the QAPP as well as necessary signatures and dates are present. Sample receipt records were reviewed to ensure that the sample condition upon receipt was noted, and any missing/broken sample containers (if any) were noted and reported according to plan. The data packages were compared to the Chains of Custody to verify that results were provided for all collected samples. The data package case narratives were reviewed to ensure that all exceptions (if any) are described.

5.2. DATA VALIDATION

USEPA Stage 2B data validation was completed for a representative 30% (minimum) of the environmental sample analyses performed by PACE and Alpha and supporting Level IV Data Package information by Environmental Data Quality Inc. (EDQI). The DVRs provided by EDQI have been included as electronic attachments.

Sample analyses have undergone an analytical quality assurance review to ensure adherence to the required protocols. The Stage 2B review was performed as outlined in "Guide for Labeling Externally Validated Laboratory Analytical Data for Superfund Use", EPA-540-R-08-005. Results have been validated or qualified according to general guidance provided in "USEPA National Functional Guidelines for Inorganic Superfund Data Review (ISM02.1)", USEPA October 2013. Region III references this guidance for validation requirements. This document specifies procedures for validating data generated for Contract Laboratory Program (CLP) analyses. The approved property-wide QAPP dated April 5, 2016 and the quality control requirements specified in the methods and associated acceptance criteria were also used to evaluate the non-CLP data.

The PACE-Greensburg (PA) laboratory facility implements quality assurance and reporting requirements through the TNI certification program with the State of Pennsylvania; which is accepted by Maryland. Since late-January 2017, these requirements include the flagging of contaminants with a "B" qualifier when an analyte is detected in an associated laboratory method blank, regardless of the level of the contaminant detected in the sample. A method blank is

analyzed at a rate of one blank for each 20 sample analytical batch. The USEPA has previously specified that results flagged with the "B" qualifier do not represent legitimate detections. They have also specified that results flagged with a "JB" qualifier are invalid, and any such results should be revised to display the "B" qualifier only.

Although elevated sample results may be "B" qualified by the laboratory as non-detects due to low-level blank detections, EDQI corrects any erroneous "B" qualifiers during the data validation procedure to avoid under-reporting analytical detections. EDQI removes the "B" qualifiers for relevant samples according to the guidance given in the table below. Therefore, a result originally flagged with a "B" qualifier in the laboratory certificate may be reported as a legitimate detection without this qualifier. Likewise, a result originally flagged with a "JB" qualifier in the laboratory certificate may be reported as a "J" qualifier if the erroneous "B" qualifier can be eliminated, but would be reported as a "B" qualified non-detect result if the original "B" qualifier is legitimate.

Blank Result	Sample Result	Qualifying Action
Result less than RL	Result less than RL	Result is Qualified "B"
	Result greater than RL	Remove "B"
Result greater than RL	Result less than Blank Result	Result is Qualified "B"
	Result greater than Blank Result	Remove "B"

RL = Reporting Limit

As directed by EDQI, ARM has reviewed all non-validated laboratory reports (those which were not designated to be reviewed by EDQI), and applied the same validation corrections to any relevant "B" or "JB" qualified results. This review of the non-validated data ensures that any elevated detections of parameters, including those which may exceed the PALs, are not mistakenly reported as non-detect values simply because they did not undergo the formal validation procedure by EDQI. ARM has also revised the non-validated results to eliminate any laboratory-specific, non-standardized qualifiers (L2, 6c, ip, 4c, etc.), which are customarily removed by EDQI during the validation procedure.

5.3. DATA USABILITY

The data were evaluated with respect to the quality control elements of precision, bias, representativeness, comparability, completeness, and sensitivity relative to data quality indicators and performance measurement criteria outlined in QAPP Worksheet 12 – Measurement Performance Criteria. The following discussion details deviation from the performance measurement criteria, and the impact on data quality and usability.

The measurement performance criteria of precision and bias were evaluated in the data validation process as described in the DVRs provided as electronic attachments. Where appropriate, potential limitations in the results have been indicated through final data flags. These flags indicate whether particular data points were quantitative estimates, biased high/low, associated with blank contamination, etc. Individual data flags are provided with the results in the detection summary tables. A qualifier code glossary is included with each DVR provided by EDQI. Particular results may have been marked with the "R" flag if the result was deemed to be unreliable and was not included in any further data evaluation. The analytical soil and groundwater results that were rejected during data validation are provided in **Table 12**. A discussion of data completeness (the proportion of valid data) is included below.

Representativeness is a measure of how accurately and precisely the data describe the Site conditions. Representativeness of the samples submitted for analysis was ensured by adherence to standard sampling techniques and protocols, as well as appropriate sample preservation prior to analysis. Sampling was conducted in accordance with the QAPP Worksheet 21 – Field SOPs and Appendix A of the QAPP. Specific Field SOPs applicable to the assessment of representativeness include **Field SOP Numbers 006, 008, 009, 010, 011, 017, and 024**. Review of the field notes and laboratory sample receipt records indicated that sample collection at the Site was representative, with no significant deviations from the SOPs.

Comparability describes the degree of confidence in comparing two sets of data. Comparability is maintained across multiple datasets by the use of consistent sampling and analytical methods across multiple project phases. Comparability of sample results was ensured through the use of approved standard sampling and analysis methods outlined in the QAPP. QA/QC protocols help to maintain the comparability of datasets, and in this case were assessed via blind duplicates, blank samples, and spiked samples, where applicable. No significant deviations from the QAPP were noted in the dataset.

Sensitivity is a determination of whether the analytical methods and quantitation limits will satisfy the requirements of the project. The laboratory reports were reviewed to verify that reporting limits met the quantitation limits for specific analytes provided in QAPP Worksheet #15 – Project Action Limits and Laboratory-Specific Detection/Quantitation Limits. In general, the laboratory reporting limits met the detection and quantitation limits specified in the QAPP.

Completeness is expressed as a ratio of the number of valid data points to the total number of analytical data results. Non-usable ("R" flagged) data results were determined through the data validation process. The approved QAPP specifies that the completeness of data is assessed by professional judgement, but should be greater than or equal to 90%. Data completeness for each compound is provided in **Appendix I**. This evaluation of completeness includes only the representative 30% (minimum) of sample results which were randomly selected for validation.

All groundwater compounds had an overall completeness ratio of 100%; with the exception of 3,3'-dichlorobenzidine, which had one rejected result (out of a total of three validated results) and an overall completeness ratio of 67%. The only soil compounds with completeness ratios below 90% were 11 acid-extractable SVOCs (2,3,4,6-tetrachlorophenol, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, 2,4-dichlorophenol, 2,4-dimethylphenol, 2,4-dinitrophenol, 2-chlorophenol, 2-methylpenol, 3&4-methylphenol, pentachlorophenol, and phenol), but in each case the completeness ratio was at least 75% and close to the stated goal.

Overall, the soil and groundwater data can be used as intended, and no significant data gaps were identified. While a limited set of analytes did not meet the completeness goal of 90% for all media, these do not appear to be significant contaminants at the Site.

6.0 FINDINGS AND RECOMMENDATIONS

The objective of this Parcel A17 Phase II Investigation was to characterize the nature and extent of contamination at the Site. During the Phase II Investigation, a total of 12 soil samples (from five boring locations) and four groundwater samples were collected and analyzed. At the request of the MDE, this report also includes four soil/ballast samples and six sub-slab soil gas samples previously collected during the CRW BOA conducted in 2015. The sampling and analysis plan for the parcel was developed to target specific features that represented a potential release of hazardous substances and/or petroleum products to the environment, as well as providing general site coverage.

Soil samples were analyzed for SVOCs, TPH-DRO/GRO, Oil & Grease, TAL-Metals, hexavalent chromium, and cyanide. Shallow soil samples (0 to 1 foot bgs) were additionally analyzed for PCBs. Groundwater samples were analyzed for VOCs, SVOCs, TPH-DRO/GRO, Oil & Grease, TAL-Dissolved Metals, dissolved hexavalent chromium, and total cyanide. The soil/ballast samples collected during the CRW BOA were analyzed for PAHs and metals. The sub-slab soil gas samples collected during the CRW BOA were analyzed for VOCs.

6.1. SOIL

The concentrations of constituents in the soil have been characterized by the Phase II Investigation, as well as the CRW BOA completed in 2015 (which provided data for the rail line along the interior eastern wall), to provide estimates of exposure point concentrations to support risk assessment.

PCB concentrations are below levels that would warrant delineation and evaluation of a removal remedy (50 mg/kg). Additionally, lead concentrations were below the mandatory delineation threshold (10,000 mg/kg). No further action is required with respect to PCBs or lead at the Site. There were no soil PAL exceedances identified for organic compounds (SVOCs, PCBs, and TPH/Oil & Grease), indicating that these compounds are not significant contaminants in soil at the Site. There were no samples which exhibited PID readings greater than 10 ppm; therefore, no soil samples were analyzed for VOCs. No physical evidence of NAPL was observed in any soil cores completed during this investigation.

PAL exceedances in soil within Parcel A17 were limited to arsenic, manganese, and thallium. Arsenic exceeded its PAL in seven soil samples, with a maximum detection of 6.8 mg/kg in sample A17-002-SB-10. Manganese exceeded its PAL in three soil samples, with a maximum detection of 32,300 mg/kg in sample A17-002-SB-5. Thallium exceeded its PAL in eight soil samples, with a maximum ("J" flagged) detection of 50.1 mg/kg in sample A17-002-SB-5.

Four additional soil/ballast samples (from two locations) were collected from below the rail line along the interior eastern wall and analyzed as part of the CRW BOA completed in 2015. There were no organic compounds or inorganics that exceeded the soil PALs from these locations.

6.2. GROUNDWATER

The concentrations of constituents in the groundwater have also been characterized by the Phase II Investigation to provide estimates of exposure point concentrations to support risk assessment.

There were no aqueous PAL exceedances identified in groundwater for VOCs or GRO, indicating that these compounds are not significant contaminants in groundwater at the Site. Exceedances of the PALs in groundwater within Parcel A17 consisted of four dissolved metals (hexavalent chromium, cobalt, manganese, and vanadium), four SVOCs (1,1-biphenyl, 1,4-dioxane, naphthalene, and pentachlorophenol), DRO, and Oil & Grease. The maximum detections of hexavalent chromium, cobalt, manganese, and vanadium in groundwater were 35.2 µg/L (at A17-002-PZ), 58.1 µg/L (at A17-001-PZ), 3,610 µg/L (at A17-001-PZ), and 148 µg/L (at A17-002-PZ), respectively. The maximum detections of 1,1-biphenyl, 1,4-dioxane, naphthalene, and pentachlorophenol in groundwater were 1.3 µg/L (at A17-004-PZ), 11.8 µg/L (at A17-004-PZ), 7 µg/L (at A17-004-PZ), and 4.5 µg/L (at A17-005-PZ), respectively.

DRO was detected above the PAL in all four groundwater samples with a maximum ("J" flagged) detection of 2,000 µg/L (at A17-002-PZ), while Oil & Grease was only detected above the PAL at one location (A17-004-PZ) with a concentration of 3,600 µg/L (also flagged with the "J" qualifier). Each temporary groundwater sample collection point was checked for the potential presence of NAPL using an oil-water interface probe prior to sampling. During these checks, NAPL was not detected at any of the groundwater sampling locations, although an unknown milky-white material (possibly bentonite) was observed in A17-001-PZ. Based on its color, lack of odors, lack of reactivity to the oil-water interface probe, and lack of significant PAL exceedances at A17-001-PZ, the unknown material appears to be relatively benign and is not a petroleum-based NAPL.

All temporary groundwater sample collection points remaining at the Site will be properly abandoned in accordance with COMAR 26.04.04.34 through 36. Each location will be gauged a final time on the abandonment date using the oil-water interface probe in accordance with MDE guidance.

Groundwater is not used on the Tradepoint Atlantic property (and is not proposed to be utilized); therefore, there is no potential for direct human exposure for a Composite Worker. In the event that future construction/excavation leads to a potential Construction Worker exposure to groundwater, health and safety plans should be implemented to limit exposure risk. The groundwater data were screened to determine whether any cumulative (or individual) sample results exceeded the USEPA VI TCR (carcinogen) or THQ (non-carcinogen) Screening Levels. None of the individual sample results exceeded the VI TCR or THQ criteria. When the aqueous results were summed by sample location, none of the cumulative VI cancer risks exceeded 1E-5, and none of the cumulative VI non-cancer HI values exceeded 1. There are no concerns related to potential VI risks at the Site.

6.3. SUB-SLAB SOIL GAS

The concentrations of constituents in sub-slab soil gas have been adequately characterized by the CRW BOA completed in 2015. Several VOCs were detected among the samples; however, there were no sub-slab soil gas PAL exceedances (or exceedances of the MDE's updated Commercial Tier 1 Target Soil Gas Screening Levels published in May 2019) identified during this analysis. Further investigation is not recommended based on the documentation of minimal impacts below the building slab, and the apparent insignificant VI risk from VOCs.

6.4. RECOMMENDATIONS

Sufficient remedial investigation data has been collected to evaluate the nature and extent of possible constituents of concern in Parcel A17. The presence and absence of soil, groundwater, and sub-slab soil gas impacts within Parcel A17 have been adequately described and further investigation at the Site is not warranted to characterize overall conditions. No further action is recommended in Parcel A17 at this time. Any future proposed development will be presented in a project-specific Response and Development Work Plan.

7.0 REFERENCES

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ARM Group Inc. (2016). *Quality Assurance Project Plan: Sparrows Point Terminal Site*. Revision 3. April 5, 2016.

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FIGURES


Site Boundary
Parcel Boundaries
Private Property
Parcel A9
Parcel A5
Parcel A13
Parcel A7
Parcel A14
Parcel A11
Parcel A8
Parcel A12
Parcel A15
Parcel A2
Parcel A17
Parcel A18
Parcel A16
Parcel A6
Parcel A4
Parcel A3
Parcel A1
Parcel A10
Parcel B6
Parcel B8
Parcel B14
Parcel B22
Parcel B16
Parcel B21
Parcel B15
Parcel B24
Parcel B23
Parcel B25
Parcel B7
Parcel B1
Parcel B2
Parcel B3
Parcel B17
Parcel B19
Parcel B4
Parcel B5
Parcel B9
Parcel B18
Parcel B10
Parcel B13
Parcel B20
Parcel B11
Parcel B12
Tradepoint Atlantic
Area A and Area B Parcels
September 22, 2020
Figure
1
ARM Group LLC
Engineers and Scientists
0 500 1,000 2,000
Feet
Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
Area A: Project 200101
Area B: Project 200102

Site Boundary

Parcel Boundaries

1916 Shoreline:

Land

Marsh

Water

Parcel A9

Parcel A5

Parcel A13

Parcel A7

Parcel A14

Greys Creek

Bear Creek

Parcel A11

Parcel A8

Parcel A12

Parcel A2

Parcel A15

Parcel A17

Parcel A18

Parcel A16

Parcel A6

Parcel A3

Parcel A4

Parcel A10

Parcel A1

Parcel B6

Humphrey Creek

Parcel B8

Parcel B14

Parcel B21

Parcel B22

Parcel B16

Parcel B15

Parcel B24

Parcel B23

Parcel B25

Old Road Bay

Block House Cove

Parcel B7

Jones Creek

Parcel B1

Parcel B2

Parcel B3

Parcel B17

Parcel B19

Parcel B4

Parcel B5

Parcel B9

Parcel B18

Parcel B10

Parcel B13

Parcel B20

Parcel B11

Parcel B12

Patapsco River

Approximate Shoreline 1916

September 22, 2020

Adapted from Figure 2-20 of the Description of Current Conditions Report prepared by Rust Environmental and Infrastructure, dated January 1998

Figure 2

ARM Group LLC
Engineers and Scientists

0 500 1,000 2,000 Feet

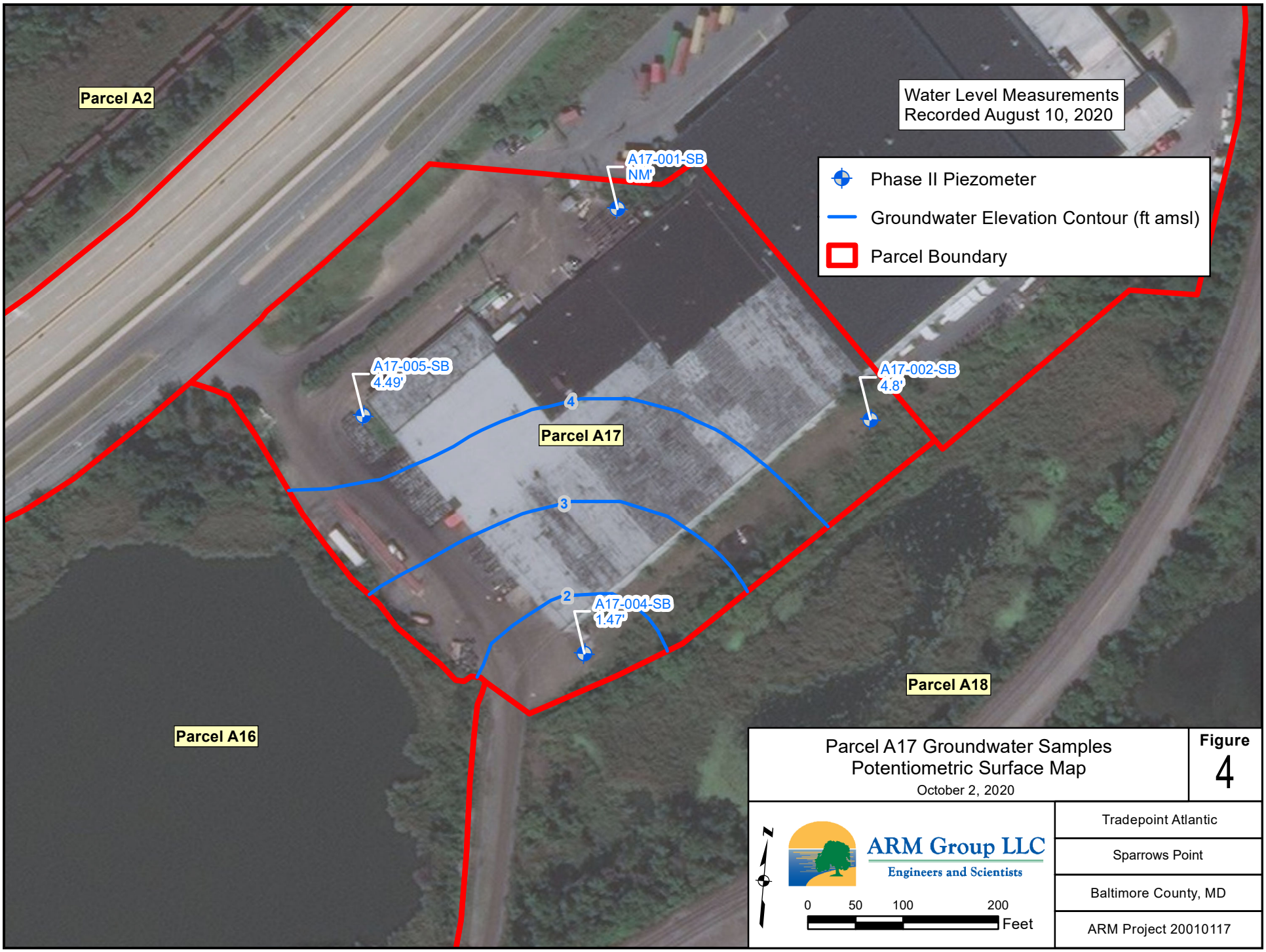
Tradepoint Atlantic

Sparrows Point

Baltimore County, MD

Area A: Project 200101
Area B: Project 200102


Parcel A2
A17-001-SB
Phase II Soil Boring
Parcel Boundary
A17-005-SB
A17-002-SB
Parcel A17
A17-003-SB
A17-004-SB
Parcel A18
Parcel A16
Parcel A17 Soil Samples
1952 Aerial & Shoreline
October 2, 2020
Figure
3
ARM Group LLC
Engineers and Scientists
0
50
100
200
Feet
Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 20010117



Parcel A17 Groundwater Samples
Potentiometric Surface Map
October 2, 2020

Figure
4

ARM Group LLC
Engineers and Scientists

0 50 100 200
Feet

Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 20010117

Parcel A17 CRW BOA Samples
Aerial View
October 2, 2020

Figure 5

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Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 20010117

Parcel A17 Soil Boring Samples
Aerial View
October 2, 2020

Figure
6

ARM Group LLC
Engineers and Scientists

0 50 100 200
Feet

Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 20010117

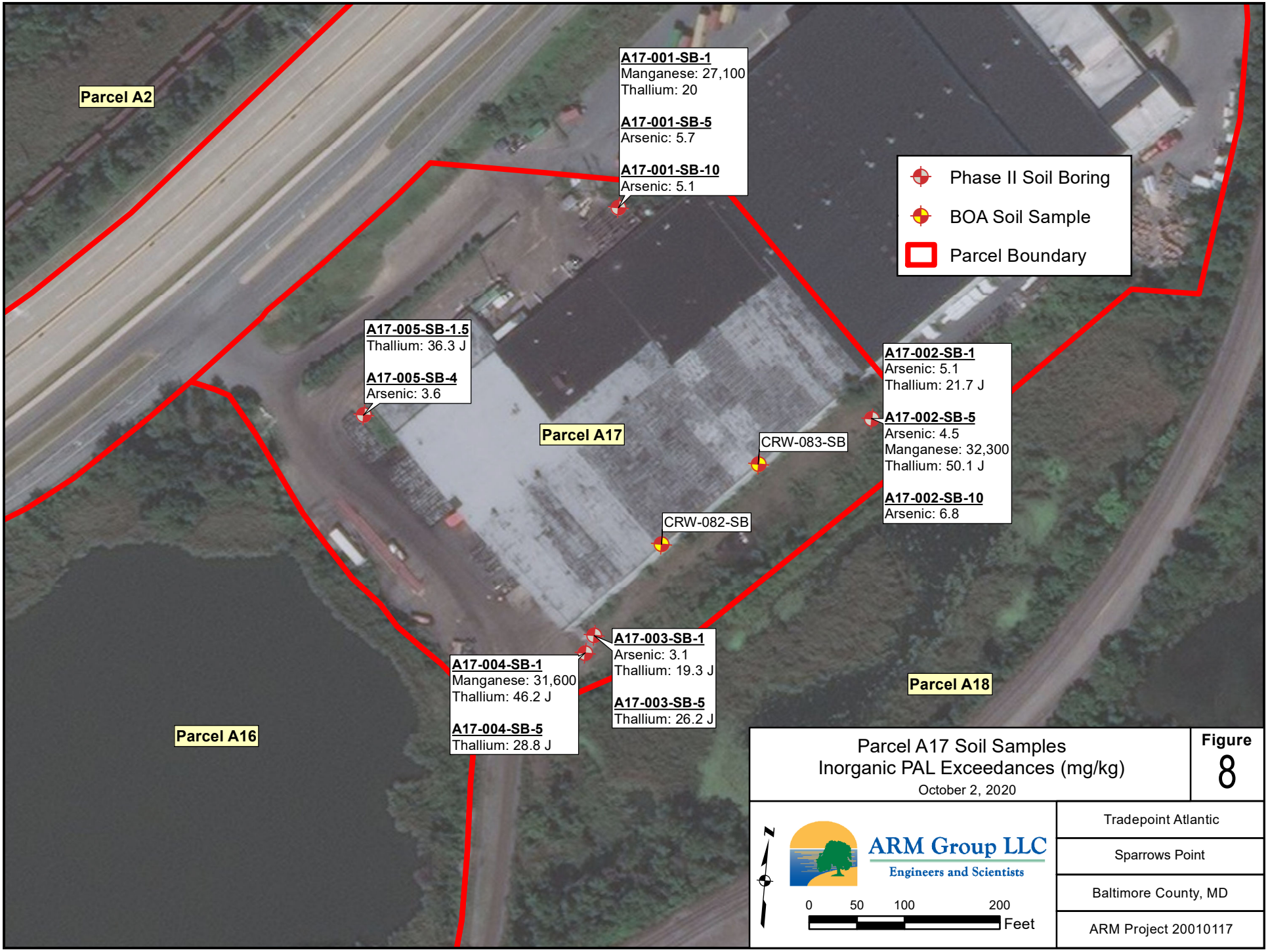
Parcel A17 Historical Groundwater Wells
Aerial View
October 2, 2020

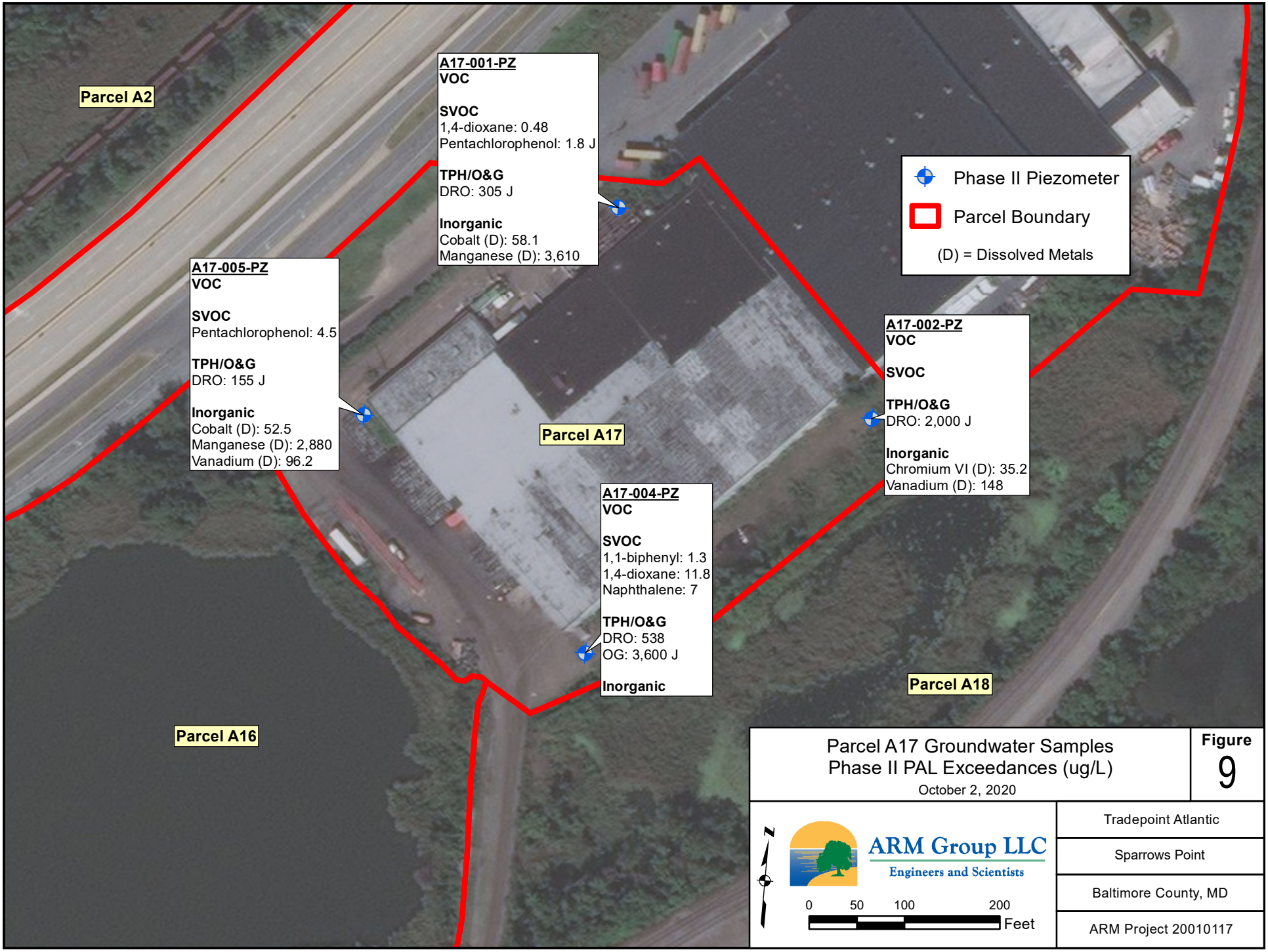
Figure 7

ARM Group LLC
Engineers and Scientists

0 50 100 200 Feet

Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 20010117


Parcel A2
A17-001-SB-1
Manganese: 27,100
Thallium: 20
A17-001-SB-5
Arsenic: 5.7
A17-001-SB-10
Arsenic: 5.1
Phase II Soil Boring
BOA Soil Sample
Parcel Boundary
A17-005-SB-1.5
Thallium: 36.3 J
A17-005-SB-4
Arsenic: 3.6
Parcel A17
CRW-083-SB
A17-002-SB-1
Arsenic: 5.1
Thallium: 21.7 J
A17-002-SB-5
Arsenic: 4.5
Manganese: 32,300
Thallium: 50.1 J
A17-002-SB-10
Arsenic: 6.8
CRW-082-SB
A17-003-SB-1
Arsenic: 3.1
Thallium: 19.3 J
A17-003-SB-5
Thallium: 26.2 J
A17-004-SB-1
Manganese: 31,600
Thallium: 46.2 J
A17-004-SB-5
Thallium: 28.8 J
Parcel A18
Parcel A16
Parcel A17 Soil Samples
Inorganic PAL Exceedances (mg/kg)
October 2, 2020
Figure
8
ARM Group LLC
Engineers and Scientists
0 50 100 200
Feet
Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 20010117


Parcel A2
A17-001-PZ
VOC
SVOC
1,4-dioxane: 0.48
Pentachlorophenol: 1.8 J
TPH/O&G
DRO: 305 J
Inorganic
Cobalt (D): 58.1
Manganese (D): 3,610
Phase II Piezometer
Parcel Boundary
(D) = Dissolved Metals
A17-005-PZ
VOC
SVOC
Pentachlorophenol: 4.5
TPH/O&G
DRO: 155 J
Inorganic
Cobalt (D): 52.5
Manganese (D): 2,880
Vanadium (D): 96.2
A17-002-PZ
VOC
SVOC
TPH/O&G
DRO: 2,000 J
Inorganic
Chromium VI (D): 35.2
Vanadium (D): 148
Parcel A17
A17-004-PZ
VOC
SVOC
1,1-biphenyl: 1.3
1,4-dioxane: 11.8
Naphthalene: 7
TPH/O&G
DRO: 538
OG: 3,600 J
Inorganic
Parcel A18
Parcel A16
Parcel A17 Groundwater Samples
Phase II PAL Exceedances (ug/L)
October 2, 2020
Figure
9
ARM Group LLC
Engineers and Scientists
0 50 100 200
Feet
Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 20010117

TABLES

Table 1 - Parcel A17
Groundwater Elevation Data

Location Name	TOC Elevation (feet AMSL)	Ground Elevation (feet AMSL)	Measured DTW (feet)	Groundwater Elevation (feet AMSL)
A17-001-PZ	15.62	12.53	NM	NM
A17-002-PZ	14.22	11.21	9.42	4.80
A17-004-PZ	11.07	7.99	9.60	1.47
A17-005-PZ	8.90	8.89	4.41	4.49

DTW = Depth to water
TOC = Top of casing
AMSL = Above mean sea level
NM = Not Measured
DTW measurements recorded August 10, 2020.
A17-005-PZ was broken at base, and accurately recorded with survey.

Table 2 - Parcel A17
Field Shifted Boring Locations

Location ID	Sample Target	Proposed Location*		Final Location*		Relocation Distance (ft.) & Direction	
		Northing	Easting	Northing	Easting		
A17-002-SB	REC 28A, Finding 281	573,207	1,465,332	573,195	1,465,323	10	SW
A17-004-SB	Ejector/Pump Station	572,937	1,465,040	572,924	1,465,046	3	E
A17-005-SB	Parcel Coverage	573,124	1,464,793	573,152	1,464,793	15	N

*Reported northings and eastings are not survey accurate. Coordinates are reported in NAD 1983 Maryland State Plane (US feet).

Table 3 - Parcel A17
Characterization Results for Solid IDW

Sample ID	Parameter	Result (mg/L)	TCLP Limit (mg/L)	TCLP Exceedance	Laboratory Flag	LOQ (mg/L)
A17 IDW 5/19/20	1,1-Dichloroethene	0.05	0.7	no	U	0.05
	1,2-Dichloroethane	0.05	0.5	no	U	0.05
	1,4-Dichlorobenzene	0.5	7.5	no	U	0.5
	2,4,5-Trichlorophenol	5	400	no	U	5
	2,4,6-Trichlorophenol	0.1	2	no	U	0.1
	2,4-Dinitrotoluene	0.1	0.13	no	U	0.1
	2-Butanone (MEK)	0.1	200	no	U	0.1
	2-Methylphenol	2	200	no	U	2
	3&4-Methylphenol(m&p Cresol)	2	200	no	U	2
	Arsenic	0.025	5	no	U	0.025
	Barium	0.2	100	no		0.05
	Benzene	0.05	0.5	no	U	0.05
	Cadmium	0.015	1	no	U	0.015
	Carbon tetrachloride	0.05	0.5	no	U	0.05
	Chlorobenzene	0.05	100	no	U	0.05
	Chloroform	0.05	6	no	U	0.05
	Chromium	0.025	5	no	U	0.025
	Hexachlorobenzene	0.1	0.13	no	U	0.1
	Hexachloroethane	0.2	3	no	U	0.2
	Lead	0.05	5	no	U	0.05
	Mercury	0.001	0.2	no	U	0.001
	Nitrobenzene	0.1	2	no	U	0.1
	Pentachlorophenol	5	100	no	U	5
	Selenium	0.04	1	no	U	0.04
	Silver	0.03	5	no	U	0.03
	Tetrachloroethene	0.05	0.7	no	U	0.05
	Trichloroethene	0.05	0.5	no	U	0.05
	Vinyl chloride	0.05	0.2	no	U	0.05

U: The analyte was not detected in the sample. The numeric value represents the sample LOQ.
LOQ: Limit of Quantitation

Table 4 - Parcel A17
Characterization Results for Liquid IDW

Sample ID	Parameter	Result (mg/L)	TCLP Limit (mg/L)	TCLP Exceedance	Laboratory Flag	LOQ (mg/L)
Water IDW 5-19-20	1,1-Dichloroethene	0.001	0.7	no	U	0.001
	1,2-Dichloroethane	0.001	0.5	no	U	0.001
	1,4-Dichlorobenzene	0.001	7.5	no	U	0.001
	2,4,5-Trichlorophenol	0.0025	400	no	U	0.0025
	2,4,6-Trichlorophenol	0.00099	2	no	U	0.00099
	2,4-Dinitrotoluene	0.00099	0.13	no	U	0.00099
	2-Butanone (MEK)	0.01	200	no	U	0.01
	2-Methylphenol	0.00099	200	no	U	0.00099
	3&4-Methylphenol(m&p Cresol)	0.002	200	no	U	0.002
	Arsenic	0.005	5	no	U	0.005
	Barium	0.0623	100	no		0.01
	Benzene	0.0063	0.5	no		0.001
	Cadmium	0.0061	1	no		0.003
	Carbon tetrachloride	0.001	0.5	no	U	0.001
	Chlorobenzene	0.001	100	no	U	0.001
	Chloroform	0.001	6	no	U	0.001
	Chromium	0.0023	5	no	J	0.005
	Hexachlorobenzene	0.00099	0.13	no	U	0.00099
	Hexachloroethane	0.00099	3	no	U	0.00099
	Lead	0.005	5	no	U	0.005
	Mercury	0.0002	0.2	no	U	0.0002
	Nitrobenzene	0.00099	2	no	U	0.00099
	Pentachlorophenol	0.0025	100	no	U	0.0025
	Selenium	0.008	1	no	U	0.008
	Silver	0.006	5	no	U	0.006
	Tetrachloroethene	0.001	0.7	no	U	0.001
	Trichloroethene	0.00092	0.5	no	J	0.001
	Vinyl chloride	0.001	0.2	no	U	0.001

Table 4 - Parcel A17
Characterization Results for Liquid IDW

Sample ID	Parameter	Result (mg/L)	TCLP Limit (mg/L)	TCLP Exceedance	Laboratory Flag	LOQ (mg/L)
Water IDW 7-1-20	1,1-Dichloroethene	0.001	0.7	no	U	0.001
	1,2-Dichloroethane	0.001	0.5	no	U	0.001
	1,4-Dichlorobenzene	0.001	7.5	no	U	0.001
	2,4,5-Trichlorophenol	0.0025	400	no	U	0.0025
	2,4,6-Trichlorophenol	0.00098	2	no	U	0.00098
	2,4-Dinitrotoluene	0.00098	0.13	no	U	0.00098
	2-Butanone (MEK)	0.01	200	no	U	0.01
	2-Methylphenol	0.00098	200	no	U	0.00098
	3&4-Methylphenol(m&p Cresol)	0.002	200	no	U	0.002
	Arsenic	0.005	5	no	U	0.005
	Benzene	0.00069	0.5	no	J	0.001
	Cadmium	0.0293	1	no		0.003
	Carbon tetrachloride	0.001	0.5	no	U	0.001
	Chlorobenzene	0.001	100	no	U	0.001
	Chloroform	0.001	6	no	U	0.001
	Chromium	0.0047	5	no	J	0.005
	Hexachlorobenzene	0.00098	0.13	no	U	0.00098
	Hexachloroethane	0.00098	3	no	U	0.00098
	Lead	0.005	5	no	U	0.005
	Mercury	0.0002	0.2	no	U	0.0002
	Nitrobenzene	0.00098	2	no	U	0.00098
	Pentachlorophenol	0.0025	100	no	U	0.0025
	Selenium	0.008	1	no	U	0.008
	Silver	0.006	5	no	U	0.006
	Tetrachloroethene	0.001	0.7	no	U	0.001
	Trichloroethene	0.00038	0.5	no	J	0.001
	Vinyl chloride	0.001	0.2	no	U	0.001

J: The positive result reported for this analyte is a quantitative estimate below the laboratory LOQ.
U: The analyte was not detected in the sample. The numeric value represents the sample LOQ.
LOQ: Limit of Quantitation

Table 5 - Parcel A17
Summary of Organics Detected in Soil

Parameter	Units	PAL	A17-001-SB-1* 5/12/2020	A17-001-SB-5* 5/12/2020	A17-002-SB-1 5/11/2020	A17-002-SB-5 5/11/2020	A17-003-SB-1 5/11/2020	A17-003-SB-5 5/11/2020	A17-004-SB-1 5/11/2020	A17-004-SB-5 5/11/2020	A17-005-SB-1.5 5/11/2020	A17-005-SB-4 5/11/2020
Semi-Volatile Organic Compounds^												
1,1-Biphenyl	mg/kg	200	0.7 U	0.077 U	0.73 U	**0.07 J**	**0.052 J**	**0.021 J**	0.072 U	0.077 U	0.7 U	0.076 U
2-Methylnaphthalene	mg/kg	3,000	**0.034**	0.0084 U	**0.053**	**0.054**	**0.041**	**0.064**	**0.032**	**0.12**	**0.21**	**0.0024 J**
Acenaphthene	mg/kg	45,000	**0.012**	0.0084 U	**0.049**	**0.042**	**0.013**	**0.026**	**0.014**	**0.062**	**0.0096**	0.0078 U
Acenaphthylene	mg/kg	45,000	**0.0045 J**	0.0084 U	**0.017**	**0.0082**	**0.01**	**0.012**	**0.021**	**0.018**	**0.016**	0.0078 U
Anthracene	mg/kg	230,000	**0.013**	0.0084 U	**0.033**	**0.029**	**0.016**	**0.026**	**0.03**	**0.12**	**0.031**	**0.00097 J**
Benz[a]anthracene	mg/kg	21	**0.1**	**0.003 J**	**0.29**	**0.17**	**0.23**	**0.3**	**0.22**	**0.56**	**0.14**	**0.0038 J**
Benzo[a]pyrene	mg/kg	2.1	**0.17**	**0.0025 J**	**0.45**	**0.28**	**0.21**	**0.5**	**0.31**	**0.71**	**0.15**	**0.0033 J**
Benzo[b]fluoranthene	mg/kg	21	**0.21**	**0.0036 J**	**0.54**	**0.31**	**0.22**	**0.6**	**0.42**	**1.1 J**	**0.2**	**0.0043 J**
Benzo[g,h,i]perylene	mg/kg		**0.11**	**0.0027 J**	**0.34**	**0.2**	**0.14**	**0.35**	**0.22**	**0.47**	**0.11**	**0.0026 J**
Benzo[k]fluoranthene	mg/kg	210	**0.066**	**0.001 J**	**0.15**	**0.1**	**0.061**	**0.17**	**0.12**	**0.22**	**0.053**	**0.0011 J**
bis(2-Ethylhexyl)phthalate	mg/kg	160	0.7 U	**0.033 J**	0.73 U	0.029 B	0.036 B	0.025 B	0.02 B	0.035 B	0.7 U	0.031 B
Carbazole	mg/kg		0.7 U	0.077 U	0.73 U	**0.019 J**	**0.018 J**	**0.024 J**	0.072 U	0.077 U	0.7 U	0.076 U
Chrysene	mg/kg	2,100	**0.11**	**0.0028 J**	**0.31**	**0.15**	**0.26**	**0.32**	**0.22**	**0.52**	**0.13**	**0.0025 J**
Dibenz[a,h]anthracene	mg/kg	2.1	**0.027**	0.0084 U	**0.09**	**0.051**	**0.04**	**0.089**	**0.057**	**0.12**	**0.03**	0.0078 U
Di-n-butylphthalate	mg/kg	82,000	0.7 U	**0.14**	0.73 U	**0.096 J**	**0.14 J**	0.091 B	0.075 B	**0.13 J**	0.7 U	**0.14 J**
Di-n-ocytlphthalate	mg/kg	8,200	**0.47 J**	**0.052 J**	0.73 UJ	**0.049 J**	0.073 U	0.073 U	**0.049 J**	**0.054 J**	0.7 U	0.076 U
Fluoranthene	mg/kg	30,000	**0.11**	**0.003 J**	**0.26**	**0.21**	**0.13**	**0.3**	**0.21**	**0.73**	**0.18**	**0.0049 J**
Fluorene	mg/kg	30,000	**0.0028 J**	0.0084 U	**0.0079**	**0.0067 J**	0.0073 U	**0.0046 J**	**0.0032 J**	**0.032**	**0.0026 J**	0.0078 U
Indeno[1,2,3-c,d]pyrene	mg/kg	21	**0.12**	**0.0021 J**	**0.37**	**0.23**	**0.13**	**0.38**	**0.25**	**0.53**	**0.12**	**0.0028 J**
Naphthalene	mg/kg	8.6	**0.1**	**0.0024 J**	**0.091**	**0.23**	**0.1**	**0.14**	**0.06**	**0.18**	**0.93**	**0.011**
Phenanthrene	mg/kg		**0.087**	**0.0015 J**	**0.13**	**0.14**	**0.071**	**0.14**	**0.068**	**0.5**	**0.31**	**0.0056 J**
Pyrene	mg/kg	23,000	**0.1**	**0.0027 J**	**0.26**	**0.2**	**0.26**	**0.29**	**0.21**	**0.64**	**0.14**	**0.0039 J**
PCBs												
Aroclor 1260	mg/kg	0.99	0.018 U	N/A	0.089 U	N/A	**0.031 J**	N/A	0.091 U	N/A	0.089 U	N/A
TPH/Oil and Grease												
Diesel Range Organics	mg/kg	6,200	**64.8**	**12.8**	**82**	**71.1 J**	**43.5**	**132**	**51.4**	**97.9**	**97.3**	**11**
Oil & Grease	mg/kg	6,200	**463**	**88.1 J**	**186 J-**	**208 J-**	**286 J-**	**172 J-**	**71.4 J-**	**162 J-**	**270 J-**	**51.3 J-**

Detections in bold
Values in red indicate an exceedance of the Project Action Limit (PAL)
N/A indicates that the parameter was not analyzed for this sample
*indicates non-validated data
^PAH Compounds were analyzed via SIM

U: This analyte was not detected in the sample. The numeric value represents the sample. quantitation/detection limit
UJ: This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.
J: The positive result reported for this analyte is a quantitative estimate.
J-: The positive result reported for this analyte is a quantitative estimate but may be biased low.
B: This analyte was not detected substantially above the level of the assoicated method blank or field blank.

Table 6 - Parcel A17
Summary of Inorganics Detected in Soil

Parameter	Units	PAL	A17-001-SB-1*	A17-001-SB-5*	A17-001-SB-10*	A17-002-SB-1	A17-002-SB-5	A17-002-SB-10*	A17-003-SB-1	A17-003-SB-5	A17-004-SB-1	A17-004-SB-5	A17-005-SB-1.5	A17-005-SB-4
			5/12/2020	5/12/2020	5/12/2020	5/11/2020	5/11/2020	5/11/2020	5/11/2020	5/11/2020	5/11/2020	5/11/2020	5/11/2020	5/11/2020
Metals														
Aluminum	mg/kg	1,100,000	**7,130**	**11,600**	N/A	**8,740**	**7,360**	N/A	**13,900**	**8,390**	**8,760**	**7,400**	**6,590**	**45,700**
Arsenic	mg/kg	3	2.2 U	**5.7**	**5.1**	**5.1**	**4.5**	**6.8**	**3.1**	2.3 U	2.1 U	2.4 U	2.1 U	**3.6**
Barium	mg/kg	220,000	**135**	**60.1**	N/A	**119 J**	**97.3 J**	N/A	**119 J**	**107 J**	**295 J**	**191 J**	**165 J**	**406 J**
Beryllium	mg/kg	2,300	**0.63 J**	**0.97**	N/A	**1.1**	**0.73 J**	N/A	**1.2**	**0.81 J**	**0.78 J**	**0.7 J**	**0.58 J**	**6.3**
Cadmium	mg/kg	980	**0.81 J**	1.4 U	N/A	**1.1 J**	**0.74 J**	N/A	**0.77 J**	**0.76 J**	**0.93 J**	**0.88 J**	**0.74 J**	1.4 U
Chromium	mg/kg	120,000	**1,370**	**29**	N/A	**762**	**1,220**	N/A	**727**	**898**	**1,370**	**876**	**1,260**	**32**
Chromium VI	mg/kg	6.3	1.1 U	**1 J**	N/A	1 B	1 B	N/A	1 B	1.1 B	0.99 B	0.99 B	0.74 B	0.82 B
Cobalt	mg/kg	350	**2.7 J**	**5.8**	N/A	**15.5**	**21.6**	N/A	**5.2**	**7.6**	**4.9**	**6.7**	**3 J**	**1.7 J**
Copper	mg/kg	47,000	**34.2**	**10.1**	N/A	**60.9 J**	**147 J**	N/A	**55.5 J**	**165 J**	**53.2 J**	**74.3 J**	**44.1 J**	**5.6 J**
Iron	mg/kg	820,000	**164,000**	**20,700**	N/A	**186,000 J**	**168,000 J**	N/A	**118,000 J**	**192,000 J**	**184,000 J**	**186,000 J**	**184,000 J**	**19,100 J**
Lead	mg/kg	800	**39.7**	**10.2**	N/A	**106 J**	**80.2 J**	N/A	**54.2 J**	**65.1 J**	**72.3 J**	**72 J**	**38.8 J**	**3.2 J**
Manganese	mg/kg	26,000	**27,100**	**228**	N/A	**19,600**	**32,300**	**137**	**15,600**	**17,900**	**31,600**	**22,200**	**25,200**	**4,110**
Mercury	mg/kg	350	0.1 U	0.12 U	N/A	**0.069 J**	**0.084 J**	N/A	**0.044 J**	**0.025 J**	**0.011 J**	**0.019 J**	**0.0062 J**	0.11 U
Nickel	mg/kg	22,000	**12.1**	**13**	N/A	**30.2 J**	**23.6 J**	N/A	**13.4 J**	**21.4 J**	**21 J**	**38.1 J**	**20.6 J**	**2.2 J**
Selenium	mg/kg	5,800	3.5 U	3.7 U	N/A	3.5 U	3.4 U	N/A	3.6 U	3.7 U	3.4 U	3.8 U	3.4 U	**3.9**
Thallium	mg/kg	12	**20**	9.4 U	N/A	**21.7 J**	**50.1 J**	11.6 U	**19.3 J**	**26.2 J**	**46.2 J**	**28.8 J**	**36.3 J**	9.1 U
Vanadium	mg/kg	5,800	**3,480**	**56.3**	N/A	**1,650**	**3,450**	N/A	**1,610**	**2,100**	**3,580**	**2,240**	**2,550**	**136**
Zinc	mg/kg	350,000	**192**	**51**	N/A	**222 J**	**259 J**	N/A	**206 J**	**141 J**	**177 J**	**223 J**	**137 J**	**7.5 J**
Other														
Cyanide	mg/kg	150	**0.48 J**	**0.14 J**	N/A	**1.4**	**1.8**	N/A	**0.69 J**	**0.73 J**	**0.67 J**	**0.84 J**	**0.82 J**	**1**

Detections in bold
Values in red indicate an exceedance of the Project Action Limit (PAL)
N/A indicates that the parameter was not analyzed for this sample
*indicates non-validated data

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.
B: This analyte was not detected substantially above the level of the assoicated method blank or field blank.

Table 7 - Parcel A17
Summary of Organics and Inorganics Detected in BOA Soil/Ballast

Parameter	Units	PAL	CRW-082-SB-1* 2/10/2015	CRW-082-SB-2* 2/10/2015	CRW-083-SB-1* 2/10/2015	CRW-083-SB-2* 2/10/2015
Semi-Volatile Organic Compounds^						
Acenaphthene	mg/kg	45,000	**0.45**	**0.0057 J**	**0.0051 J**	**0.0041 J**
Acenaphthylene	mg/kg	45,000	**0.0455**	0.0065 U	0.0066 U	0.0066 U
Anthracene	mg/kg	230,000	**0.432**	0.0065 U	**0.0246**	**0.0099**
Benz[a]anthracene	mg/kg	21	**1.1**	**0.0039 J**	**0.125**	**0.0456**
Benzo[a]pyrene	mg/kg	2.1	**0.349**	**0.0036 J**	**0.137**	**0.0552**
Benzo[b]fluoranthene	mg/kg	21	**1.19**	**0.0139**	**0.277**	**0.133**
Benzo[g,h,i]perylene	mg/kg		**0.192**	**0.0047 J**	**0.0934**	**0.0515**
Benzo[k]fluoranthene	mg/kg	210	**0.406**	**0.0123**	**0.246**	**0.118**
Chrysene	mg/kg	2,100	**1.31**	**0.0115**	**0.14**	**0.0658**
Dibenz[a,h]anthracene	mg/kg	2.1	**0.083**	0.0065 U	**0.0281**	**0.0153**
Fluoranthene	mg/kg	30,000	**5.27**	**0.0887**	**0.232**	**0.0868**
Fluorene	mg/kg	30,000	**0.233**	0.0065 U	**0.0043 J**	0.0066 U
Indeno[1,2,3-c,d]pyrene	mg/kg	21	**0.233**	0.0065 U	**0.094**	**0.0465**
Naphthalene	mg/kg	17	**0.406**	**0.0055 J**	**0.0205**	**0.0225**
Phenanthrene	mg/kg		**6.71**	**0.0613**	**0.102**	**0.0396**
Pyrene	mg/kg	23,000	**3.44**	**0.0209**	**0.173**	**0.0597**
Metals						
Arsenic	mg/kg	3	**2.2**	**1.9**	**1.9**	**1.8**
Beryllium	mg/kg	2,300	**6**	**5.2**	**4.8**	**5.2**
Chromium	mg/kg	120,000	**28.5**	**11.3**	**14.6**	**19.2**
Cobalt	mg/kg	350	**0.95**	**0.49 J**	**0.94**	**0.46 J**
Copper	mg/kg	47,000	**4.6**	**1.1**	**2.2**	**1.8**
Iron	mg/kg	820,000	**9,620**	**10,300**	**12,200**	**5,510**
Lead	mg/kg	800	**7.5**	**5.7**	**4.5**	**4.3**
Nickel	mg/kg	22,000	**2.1**	1.4 B	**5.6**	**4.3**
Selenium	mg/kg	5,800	**2.1**	**1.3**	**0.69**	**1**
Zinc	mg/kg	350,000	**13**	0.6 B	**7.1**	**7.8**

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

^PAH Compounds were analyzed via SIM *indicates non-validated data

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

B: The analyte was not detected substantially above the level of the associated method blank or field blank.

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

Table 8 - Parcel A17
Summary of Organics Detected in Groundwater

Parameter	Units	PAL	A17-001-PZ 7/6/2020	A17-002-PZ 7/6/2020	A17-004-PZ* 7/7/2020	A17-005-PZ 7/6/2020
Volatile Organic Compounds						
2-Butanone (MEK)	µg/L	5,600	10 U	10 U	**3.1 J**	10 U
Acetone	µg/L	14,000	10 U	**7.6 J**	**13.7**	10 U
Benzene	µg/L	5	1 U	1 U	**1.8**	1 U
Carbon disulfide	µg/L	810	1 U	1 U	**0.42 J**	1 U
Toluene	µg/L	1,000	1 U	1 U	**0.49 J**	1 U
Semi-Volatile Organic Compounds^						
1,1-Biphenyl	µg/L	0.83	0.98 U	0.99 U	**1.3**	1 U
1,4-Dioxane	µg/L	0.46	**0.48**	0.099 U	**11.8**	**0.16 J**
2,3,4,6-Tetrachlorophenol	µg/L	240	0.98 U	0.99 U	0.99 U	**0.59 J**
2,4-Dinitrophenol	µg/L	39	2.4 U	2.5 U	**0.87 J**	2.5 U
2-Methylnaphthalene	µg/L	36	0.098 U	0.99 U	**0.48**	0.1 U
3&4-Methylphenol(m&p Cresol)	µg/L	930	**8**	2 U	2 U	2 U
4-Chloroaniline	µg/L	0.36	0.98 U	**0.32 J**	0.99 U	1 U
Acenaphthene	µg/L	530	0.098 U	0.99 U	**0.28**	0.1 U
Acenaphthylene	µg/L	530	0.098 U	0.99 U	**0.46**	0.1 U
Anthracene	µg/L	1,800	0.098 U	0.99 U	**0.2**	**0.068 J**
Benzo[a]pyrene	µg/L	0.2	0.098 U	**0.14 J**	0.099 U	0.1 U
bis(2-Ethylhexyl)phthalate	µg/L	6	0.44 B	0.52 B	**0.46 J**	0.4 B
Caprolactam	µg/L	9,900	2.4 U	2.5 U	**0.62 J**	2.5 U
Carbazole	µg/L		0.98 U	0.99 U	**0.95 J**	1 U
Chrysene	µg/L	25	0.098 U	0.99 U	**0.043 J**	0.1 U
Diethylphthalate	µg/L	15,000	0.98 U	**0.71 J**	0.99 U	1 U
Di-n-butylphthalate	µg/L	900	0.54 B	0.56 B	**0.51 J**	0.42 B
Fluoranthene	µg/L	800	0.098 U	**0.39 J**	**0.48**	0.1 U
Fluorene	µg/L	290	0.098 U	0.99 U	**0.58**	0.1 U
Naphthalene	µg/L	0.12	0.098 U	0.99 U	**7**	0.1 U
N-Nitrosodiphenylamine	µg/L	12	0.98 U	**0.53 J**	0.99 U	1 U
Pentachlorophenol	µg/L	1	**1.8 J**	2.5 U	2.5 U	**4.5**
Phenanthrene	µg/L		0.098 U	0.99 U	**1.4**	**0.051 J**
Phenol	µg/L	5,800	**1.3**	0.99 U	**3.4**	1 U
Pyrene	µg/L	120	0.098 U	**0.51 J**	**0.3**	0.1 U
TPH/Oil & Grease						
Diesel Range Organics	µg/L	47	**305 J**	**2,000 J**	**538**	**155 J**
Oil & Grease	µg/L	47	4,750 UJ	4,750 UJ	**3,600 J**	4,750 UJ

Detections in bold
Values in red indicate an exceedance of the Project Action Limit (PAL)
*indicates non-validated data
^PAH Compounds were analyzed via SIM

U: This analyte was not detected in the sample. The numeric value represents the sample. quantitation/detection limit
UJ: This analyte was not detected in the sample. The actual quantitation/detection limit may be higher than reported.
J: The positive result reported for this analyte is a quantitative estimate.
B: This analyte was not detected substantially above the level of the assoicated method blank or field blank.

Table 9 - Parcel A17
Summary of Inorganics Detected in Groundwater

Parameter	Units	PAL	A17-001-PZ	A17-002-PZ	A17-004-PZ*	A17-005-PZ
			7/6/2020	7/6/2020	7/7/2020	7/6/2020
Dissolved Metals						
Aluminum, Dissolved	µg/L	20,000	**151**	**1,150**	**103**	**180**
Arsenic, Dissolved	µg/L	10	**3.7 J**	5 U	5 U	**4.2 J**
Barium, Dissolved	µg/L	2,000	**62.3**	**53.9**	**658**	**30.6**
Cadmium, Dissolved	µg/L	5	**0.8 J**	3 U	3 U	3 U
Chromium, Dissolved	µg/L	100	2.1 B	**42.6**	**1.1 J**	2.1 B
Chromium VI, Dissolved	µg/L	0.035	10 U	**35.2**	10 U	100 U
Cobalt, Dissolved	µg/L	6	**58.1**	5 U	5 U	**52.5**
Iron, Dissolved	µg/L	14,000	**8,230**	**157**	**687**	**3,420**
Manganese, Dissolved	µg/L	430	**3,610**	**4 J**	**2.2 J**	**2,880**
Nickel, Dissolved	µg/L	390	**24.6**	10 U	10 U	**7.9 J**
Vanadium, Dissolved	µg/L	86	**1.6 J**	**148**	**14**	**96.2**
Zinc, Dissolved	µg/L	6,000	**30.6**	**2.9 J**	10 U	**10.8**
Other						
Cyanide	µg/L	200	10 U	**14**	10 U	**6.1 J**

Detections in bold
Values in red indicate an exceedance of the Project Action Limit (PAL)
*indicates non-validated data

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.
B: This analyte was not detected substantially above the level of the assoicated method blank or field blank.

Table 10 - Parcel A17
Cumulative Vapor Intrusion Criteria Comparison

				A17-001-PZ		A17-002-PZ		A17-004-PZ*		A17-005-PZ	
				7/6/2020		7/6/2020		7/7/2020		7/6/2020	
Parameter	Type	Organ Systems	VI Screening Criteria (ug/L)	Conc. (ug/L)	Risk/ Hazard	Conc. (ug/L)	Risk/ Hazard	Conc. (ug/L)	Risk/ Hazard	Conc. (ug/L)	Risk/ Hazard
Cancer Risk											
1,4-Dioxane	SVOC		130,000	0.48	3.7E-11	0.099 U	0	11.8	9.1E-10	0.16 J	1.2E-11
Naphthalene	SVOC		200	0.098 U	0	0.99 U	0	7	3.5E-07	0.1 U	0
Benzene	VOC		69	1 U	0	1 U	0	1.8	2.6E-07	1 U	0
Cumulative Vapor Intrusion Risk					4E-11		0		6E-07		1E-11
Non-Cancer Hazard											
Cumulative Vapor Intrusion Non-Cancer Hazard					0		0		0		0

Highlighted values indicate an exceedance of the cumulative vapor intrusion criteria:
TCR>1E-05
THI>1
Conc. = Concentration
*Indicates non-validated data

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 11 - Parcel A17
Summary of VOCs Detected in BOA Sub-Slab Soil Gas

Parameter	Units	PAL	May 2019 MDE SL	CRW-084-SG* 2/13/2015	CRW-085-SG* 2/13/2015	CRW-086-SG* 2/13/2015	CRW-087-SG* 2/13/2015	CRW-088-SG* 2/13/2015	CRW-089-SG* 2/13/2015
Volatile Organic Compounds									
2-Butanone (MEK)	µg/m3	2,200,000	2,200,000	**12.7**	**13.1**	**7.9**	**9.5**	**18.3**	**7.8**
Acetone	µg/m3	14,000,000	13,700,000	**43.9**	**16.7**	**14**	**28**	**51.8**	**22.6**
Benzene	µg/m3	1,600	1,600	**6.2**	**3.5**	**3**	**6.5**	**2.5**	**1.4**
Carbon disulfide	µg/m3	310,000	310,000	**19.8**	**26.4**	**33.6**	**10**	**5.3**	**1.5**
Chloroform	µg/m3	540	540	**4.4**	**28.2**	**37.7**	**5**	**2.7**	**16.5**
Cyclohexane	µg/m3	2,700,000	2,650,000	**10.1**	**5.5**	**6.1**	**7.4**	**7.5**	1.3 U
Dichlorodifluoromethane	µg/m3	44,000	44,000	1.4 U	**2.1**	**2**	1.4 U	**1.8**	**2**
Ethylbenzene	µg/m3	5,000	5,000	**1.6**	**1.7**	1.2 U	1.2 U	**2.9**	1.6 U
Methylene Chloride	µg/m3	270,000	265,000	4.7 U	4.7 U	4.7 U	4.9 U	**65.1**	**14.1**
Toluene	µg/m3	2,200,000	2,200,000	**7.5**	**7.4**	**2.9**	**2.7**	**27**	**6.1**
trans-1,2-Dichloroethene	µg/m3	27,000	31,000	1.1 U	1.1 U	1.1 U	1.1 U	**5**	1.5 U
o-Xylene^	µg/m3	44,000	44,000	**1.9**	**2**	1.2 U	1.2 U	**2.8**	1.6 U
m&p-Xylene^	µg/m3	44,000	44,000	**5.4**	**5.5**	2.4 U	2.4 U	**9.6**	**3.6**

Detections in bold
Values in red indicate an exceedance of the Project Action Limit (PAL) or
the MD Dept. of the Environment Tier 1 Commercial Screening Level updated May 2019 (MDE SL)
^o-Xylene and m&p-Xylene are using Total Xylenes PAL
*indicates non-validated data

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

Table 12 - Parcel A17
Rejected Analytical Results

Sample ID	Parameter	Result (mg/kg)	Flag	PAL (mg/kg)	Exceeds PAL?
A17-003-SB-5	2,3,4,6-Tetrachlorophenol	0.073	R	25,000	no
	2,4,5-Trichlorophenol	0.18	R	82,000	no
	2,4,6-Trichlorophenol	0.073	R	210	no
	2,4-Dichlorophenol	0.073	R	2,500	no
	2,4-Dimethylphenol	0.073	R	16,000	no
	2,4-Dinitrophenol	0.18	R	1,600	no
	2-Chlorophenol	0.073	R	5,800	no
	2-Methylphenol	0.073	R	41,000	no
	3&4-Methylphenol(m&p Cresol)	0.15	R	41,000	no
	Pentachlorophenol	0.18	R	4	no
	Phenol	0.073	R	250,000	no
A17-004-SB-5	2,3,4,6-Tetrachlorophenol	0.077	R	25,000	no

Sample ID	Parameter	Result (ug/L)	Flag	PAL (ug/L)	Exceeds PAL?
A17-005-PZ	3,3'-Dichlorobenzidine	1	R	0.12	YES

APPENDIX A

Parcel A17 Sampling Plan Summary
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

Table 1 - Soil Sampling Summary

Source Area/ Description	REC & Finding/ SWMU/ AOC	Figure or Drawing of Reference	Rationale	Number of Locations	Sample Locations	Boring Depth	Sample Depth	Analytical Parameters: Soil Samples
Offsite REC	REC 28A, Finding 281	REC Location Map	Investigate potential impacts related to the adjacent facility that is listed on the UST database for two USTs listed as permanently out of use (potential leaks or releases that could have impacted the property).	2	A17-001 and A17-002	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC^, SVOC, Metals, DRO/GRO, O&G, PCBs (0-1')
Ejector/Pump Station		Sanitary Sewer Map and Site Visit	Investigate potential impacts related to the ejector/pump station and associated machinery and storage observed during the site visit (potential leaks or releases).	2	A17-003 and A17-004	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC^, SVOC, Metals, DRO/GRO, O&G, PCBs (0-1')
Parcel A17 Coverage			Investigate potential impacts related to unknown historical activities, and characterize soil in areas not previously sampled.	1	A17-005	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC^, SVOC, Metals, DRO/GRO, O&G, PCBs (0-1')
			Total:	5				

Soil Borings Sampling Density Requirements (from **Worksheet 17 - Sampling Design and Rationale**)
No Engineered Barrier (1-15 acres): 1 boring per acre with no less than 3 borings.
Engineered Barrier (N/A)
No Engineered Barrier (3.54 acres) = **4 borings required, 5 completed**
Building Footprints (2.76 acres)*

*Building was previously investigated during a separate Building Occupancy Assessment in 2015 and, therefore, not included for additional sampling.

VOCs - Volatile Organic Compounds (Target Compound List)
^VOCs are only collected if the PID reading exceeds 10 ppm
SVOCs - Semivolatile Organic Compounds (Target Compound List)
Metals - (Target Analyte List plus Hexavalent Chromium and Cyanide)
O&G - Oil and Grease
DRO/GRO - Diesel Range Organics/Gasoline Range Organics
PCBs - Polychlorinated Biphenyls
bgs - Below Ground Surface

Parcel A17 Sampling Plan Summary
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

Table 2 - Groundwater Sampling Summary

Source Area/ Description	REC & Finding/ SWMU/ AOC	Figure or Drawing of Reference	Condition of Existing Well	Number of Locations	Sample Locations	Boring Depth	Screen Interval	Analytical Parameters: Groundwater Samples
Offsite REC	REC 28A, Finding 281	REC Location Map	N/A	2	A17-001 and A17-002	Total depth of 7 feet below water table.	7 feet below water table to 3 feet above water table.	VOC, SVOC, Metals (dissolved), Cyanide (total), O&G, DRO/GRO
Ejector/Pump Station		Sanitary Sewer Map and Site Visit	N/A	1	A17-004	Total depth of 7 feet below water table.	7 feet below water table to 3 feet above water table.	VOC, SVOC, Metals (dissolved), Cyanide (total), O&G, DRO/GRO
Parcel A17 Coverage			N/A	1	A17-005	Total depth of 7 feet below water table.	7 feet below water table to 3 feet above water table.	VOC, SVOC, Metals (dissolved), Cyanide (total), O&G, DRO/GRO
			Total:	4				

Field measurements include pH, DO, ORP, conductivity, temperature.

Metals analysis includes dissolved hexavalent chromium.

VOCs - Volatile Organic Compounds (Target Compound List)
SVOCs - Semivolatile Organic Compounds (Target Compound List)
Metals - (Target Analyte List plus Hexavalent Chromium)
O&G - Oil and Grease
DRO/GRO - Diesel Range Organics/Gasoline Range Organics

APPENDIX B

ARM Group LLC
Engineers and Scientists

Boring ID: A17-001-SB/PZ

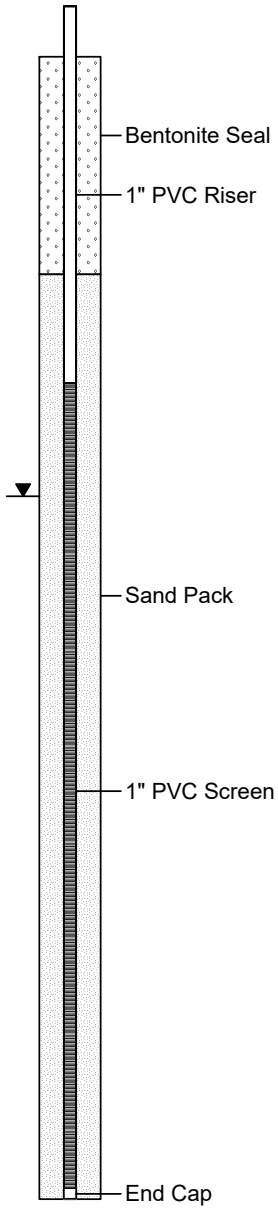
(page 1 of 1)

Client	: Tradepoint Atlantic
ARM Project No.	: 20010117
Project Description	: Sparrows Point - Parcel A17
Site Location	: Sparrows Point, MD
ARM Representative	: L. Perrin
Checked by	: M. Replogle, E.I.T.
Drilling Company	: GSI
Driller	: Don Marchese
Drilling Equipment	: Geoprobe 7822DT

Soil Boring Installation Date	: 05/12/2020
Piezometer Installation Date	: 05/12/2020
Casing/Riser/Screen Type	: PVC
Borehole Diameter	: 2.25"
Riser/Screen Diameter	: 1"
Northing (US ft)	: 573395.38
Easting (US ft)	: 1465039.03
48-Hr DTW	: 11.11' TOC

No LNAPL or DNAPL detected at 0 or 48 hours

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0						
	90	0.2	A17-001-SB-1	(0-0.2') Asphalt	-	
		0.3		(0.2-2.1') SAND and SLAG GRAVEL, fine to coarse, with trace SILT throughout and trace CLAY from 0.2-0.3' bgs, medium dense, dark brown with some gray and trace reddish yellow, dry, no plasticity, no cohesion	SW/GW	
		0.2				
		0.1		(2.1-6.5') CLAY, hard, reddish yellow and light gray, dry, low plasticity, cohesive, roots throughout	CL	
		0.1	A17-001-SB-5			
5		-				
		0.2		(6.5-7') CLAYEY SAND, dense, light brownish gray and reddish yellow, moist, no plasticity, no cohesion	SC	
	80	0.7				
		0.2		(7-11') CLAY, hard, reddish yellow and pale brown, dry to moist, low plasticity, cohesive	CL	
		0.1	A17-001-SB-10			
10		-				
		-		(11-13.9') CLAY with trace SAND, soft, light brown to reddish yellow, very moist, low plasticity, cohesive	CL	
	60	0.0				
		0.0				
		0.0		(13.9-20') SAND, fine to medium, medium dense, very pale brown and reddish yellow, with trace yellowish red clay at 16' bgs, wet, no plasticity, no cohesion	SW	Wet at 13.9' bgs
15		0.0				
		0.0				
	100	0.0				
		0.0				
		0.0				
20						
	0	-		(20-21') No recovery	-	
				End of Boring		



Boring terminated at 21' bgs due to water and piezometer installation
TOC: Top of PVC casing
DTW: Depth to water
bgs: Below ground surface

Riser Stickup: 3.03' ags
Riser: 0 - 6' bgs
Screen: 6 - 21' bgs [Slot Size: 0.010"]
Sand Pack: 4 - 21' bgs [Grain Size: WG #2]
Bentonite Seal: 0 - 4' bgs [Grain Size: bentonite chips]

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ARM Group LLC
Engineers and Scientists

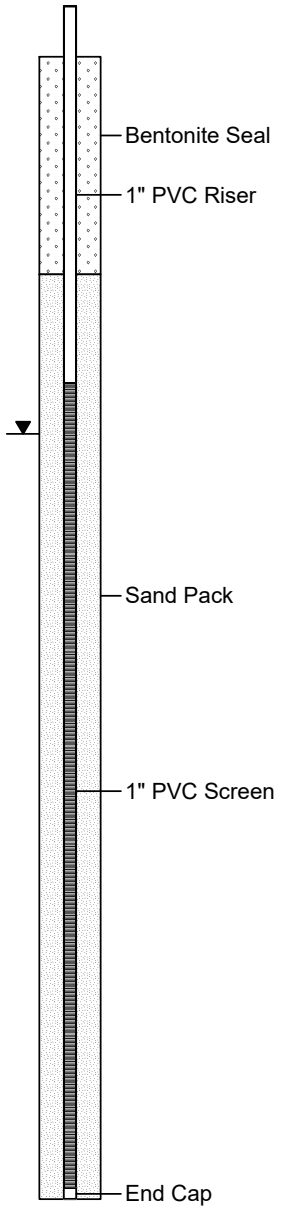
Boring ID: A17-002-SB/PZ

Client	: Tradepoint Atlantic
ARM Project No.	: 20010117
Project Description	: Sparrows Point - Parcel A17
Site Location	: Sparrows Point, MD
ARM Representative	: L. Perrin
Checked by	: M. Replogle, E.I.T.
Drilling Company	: GSI
Driller	: Don Marchese
Drilling Equipment	: Geoprobe 7822DT

Soil Boring Installation Date	: 05/11/2020
Piezometer Installation Date	: 05/11/2020
Casing/Riser/Screen Type	: PVC
Borehole Diameter	: 2.25"
Riser/Screen Diameter	: 1"
Northing (US ft)	: 573198.06
Easting (US ft)	: 1465322.63
48-Hr DTW	: 9.81' TOC

No LNAPL or DNAPL detected at 0 or 48 hours

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0	92	0.3	A17-002-SB-1	(0-1') SILT with SAND and some organics, loose, dark brown, dry, no plasticity, no cohesion	ML	
		0.1		(1-6.8') Non-native SAND and SLAG GRAVEL, fine to coarse, medium dense, dark brown gray and light brownish gray, dry then very moist at 6.3-6.8' bgs, no plasticity, no cohesion	SW/GW	
		0.6				
		1.9				
		0.2	A17-002-SB-5			
5	96	0.2				
		1.5				
		0.9		(6.8-14.3') CLAY then CLAY with SAND at 13.2' bgs, very firm to hard then soft at 13' bgs, brownish yellow and light brownish gray, low plasticity, cohesive	CL	
		0.0				
		0.0	A17-002-SB-10			
10	76	-				
		0.0				
		0.1				
		0.0				
		0.0		(14.3-20') SAND, fine to medium, medium dense, yellowish red with trace light gray then reddish yellow grading to very pale brown from 15.5-18.5' bgs, yellowish red from 18.5-20' bgs, wet, no plasticity, no cohesion	SW	Wet at 14.3' bgs
15	90	0.1				
		0.1				
		0.1				
		0.1				
20	0	-		(20-21') No recovery	-	
				End of Boring		



Boring terminated at 21' bgs due to water and piezometer installation
TOC: Top of PVC casing
DTW: Depth to water
bgs: Below ground surface

Riser Stickup: 2.88' ags
Riser: 0 - 6' bgs
Screen: 6 - 21' bgs [Slot Size: 0.010"]
Sand Pack: 4 - 21' bgs [Grain Size: WG #2]
Bentonite Seal: 0 - 4' bgs [Grain Size: bentonite chips]

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ARM Group LLC
Engineers and Scientists

Boring ID: A17-003-SB

(page 1 of 1)

Client	: Tradepoint Atlantic
ARM Project No.	: 20010117
Project Description	: Sparrows Point - Parcel A17
Site Location	: Sparrows Point, MD
ARM Representative	: L. Perrin
Checked by	: M. Replogle, E.I.T.
Drilling Company	: GSI
Driller	: D. Marchese
Drilling Equipment	: Geoprobe 7822DT

Date	: 05/11/2020
Weather	: Cloudy, 50's
Northing (US ft)	: 572946.35
Easting (US ft)	: 1465052.73

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0						
1	78	-	A17-003-SB-1	(0-8') Non-native SAND with some SLAG GRAVEL, fine to coarse, medium dense, brown grading to dark brown with trace reddish yellow and gray, dry, no plasticity, no cohesion	SW	Some silt and organics at surface
2		0.2				
3		0.1				
4		0.1				
5	60	0.0	A17-003-SB-5			
6		-				
7		-				
8		0.8		(8-10') SLAG GRAVEL, fine to coarse, with SILT, medium dense to dense, dark brownish gray, wet, no plasticity, no cohesion	GW-GM	Wet at 8' bgs
9		8.1				
10		0.3		End of Boring		
11						

Total Borehole Depth: 10' bgs due to water

09-22-2020 \\mdfs01\Projects\EnviroAnalytics Group\20010117 EAG Parcel A17\Boring Logs\2_.bor logs\A17-003-SB.bor

ARM Group LLC
Engineers and Scientists

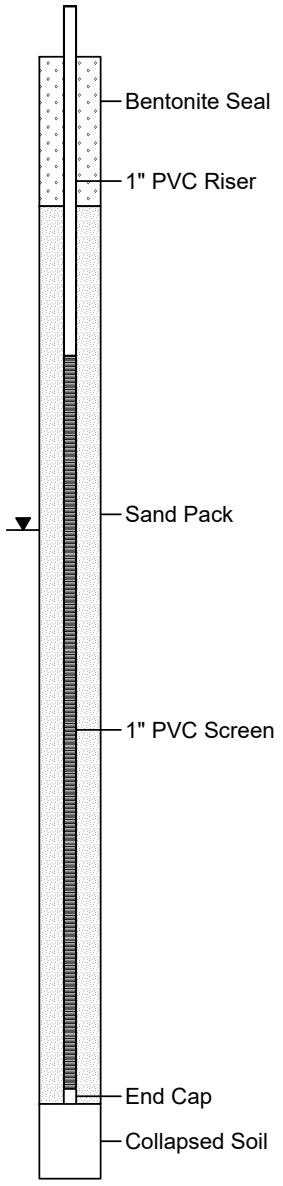
Boring ID: A17-004-SB/PZ

Client	: Tradepoint Atlantic
ARM Project No.	: 20010117
Project Description	: Sparrows Point - Parcel A17
Site Location	: Sparrows Point, MD
ARM Representative	: L. Perrin
Checked by	: M. Replogle, E.I.T.
Drilling Company	: GSI
Driller	: Don Marchese
Drilling Equipment	: Geoprobe 7822DT

Soil Boring Installation Date	: 05/11/2020
Piezometer Installation Date	: 05/11/2020
Casing/Riser/Screen Type	: PVC
Borehole Diameter	: 2.25"
Riser/Screen Diameter	: 1"
Northing (US ft)	: 572927.26
Easting (US ft)	: 1465045.06
48-Hr DTW	: 9.41' TOC

No LNAPL or DNAPL detected at 0 or 48 hours

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0	80	-	A17-004-SB-1	(0-7') Non-native SAND with SLAG GRAVEL, fine to coarse, medium dense, dark brown with gray, dry, no plasticity, no cohesion, some SILT and organics at surface	SW/GW	
		0.2				
		1.0				
		0.8				
		0.0	A17-004-SB-5			
5	80	-				
		0.1				Wet at 7' bgs
		0.2		(7-14') SLAG GRAVEL with some SILT, fine to coarse, dense to medium dense, light gray, wet, no plasticity, no cohesion		
		0.6				
		0.0				
10		-			GW	
		-				
		-				
		-				
		-				
15				End of Boring		



Boring terminated at 15' bgs due to water and piezometer installation
Piezometer set at 14' bgs
TOC: Top of PVC casing
DTW: Depth to water
bgs: Below ground surface

Riser Stickup: 3.08' ags
Riser: 0 - 4' bgs
Screen: 4 - 14' bgs [Slot Size: 0.010"]
Sand Pack: 2 - 14' bgs [Grain Size: WG #2]
Bentonite Seal: 0 - 2' bgs [Grain Size: bentonite chips]

ARM Group LLC
Engineers and Scientists

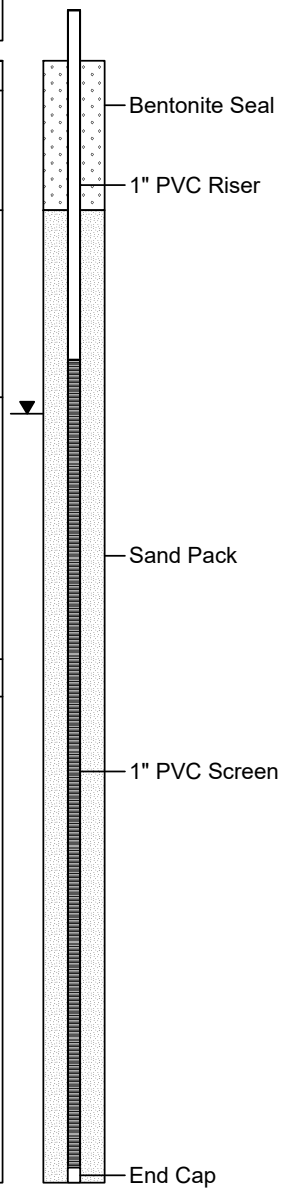
Boring ID: A17-005-SB/PZ

Client	: Tradepoint Atlantic
ARM Project No.	: 20010117
Project Description	: Sparrows Point - Parcel A17
Site Location	: Sparrows Point, MD
ARM Representative	: L. Perrin
Checked by	: M. Replogle, E.I.T.
Drilling Company	: GSI
Driller	: Don Marchese
Drilling Equipment	: Geoprobe 7822DT

Soil Boring Installation Date	: 05/11/2020
Piezometer Installation Date	: 05/11/2020
Casing/Riser/Screen Type	: PVC
Borehole Diameter	: 2.25"
Riser/Screen Diameter	: 1"
Northing (US ft)	: 573155.19
Easting (US ft)	: 1464792.15
48-Hr DTW	: 7.97' TOC

No LNAPL or DNAPL detected at 0 or 48 hours

Depth (ft.)	% Recovery	PID Reading (PPM)	Sample No/Interval	DESCRIPTION	USCS	REMARKS
0		-		(0-0.4') Asphalt	-	
			A17-005-SB-1.5	(0.4-2') Non-native SAND and SLAG GRAVEL, fine to coarse, medium dense, dark brown and gray	SW/GW	
		0.1				
	86	0.2		(2-4.5') SLAG GRAVEL, fine to coarse, medium dense to dense, light gray and gray, dry, then moist at dept, wet, no plasticity, no cohesion	GW	
		8.0	A17-005-SB-4			
		0.1		(4.5-8') CLAY, soft to firm then hard at 7' bgs, black to dark brown then yellowish brown at 6' bgs, very moist then dry to moist at 6.5' bgs, low plasticity, cohesive		Organic matter from 4.5-5' bgs
5		0.0			CL	
		0.0				
	92	0.0				
		0.0		(8-8.5') SAND with CLAY, medium dense, yellow brown to reddish yellow, wet, no plasticity, no cohesion	SW-SC	Wet at 8' bgs
		0.0		(8.5-15') SAND, fine to medium medium dense, reddish yellow with some pale brown, wet, no plasticity, no cohesion		
10		-			SW	
		-				
	100	-				
		-				
		-				
15				End of Boring		



Boring terminated at 15' bgs due to water and piezometer installation
TOC: Top of PVC casing
DTW: Depth to water
bgs: Below ground surface

Riser Stickup: 3.25' ags
Riser: 0 - 4' bgs
Screen: 4 - 15' bgs [Slot Size: 0.010"]
Sand Pack: 2 - 15' bgs [Grain Size: WG #2]
Bentonite Seal: 0 - 2' bgs [Grain Size: bentonite chips]

APPENDIX C

August 25, 2020

Mr. Taylor Smith, P.E.
ARM Group, Inc.
9175 Guilford Road, Suite 310
Columbia, MD 21046

Re: Sparrows Point Well Survey
Sparrows Point, MD
Triad Engineering Job No. 03-15-0343

Mr. Smith:
Below are the specified surveyed wells and piezometers, date of last field work completed on August 18th, 2020. The coordinate values shown were derived from G.P.S. observations based on National Geodetic Surveys stations "GIS 1", PID AC7684 and "GIS 2", PID AC7685 which purport to be on NAD83(2011) Maryland Grid coordinate system with NAVD88 (AMSL) elevations.

DESCRIPTION	***NORTHING***	***EASTING***	***TOP ELEVATION (CASING UNLESS NOTED)***	***GROUND (NAIL SET) AT WELL/ PIEZOMETER***	***NOTES***
A17-001-PZ LOW PNT SW MARKED **	573392.360	1465036.928	15.62	12.53	GROUND/CONCRETE /PAVEMENT*
A17-002-PZ LOW PNT SW MARKED **	573196.983	1465323.773	14.22	11.21	GROUND/CONCRETE /PAVEMENT*
A17-004-PZ LOW PNT SW MARKED **	572924.284	1465046.601	11.07	7.99	GROUND/CONCRETE /PAVEMENT*
A17-005-PZ	573143.975	1464795.328	8.90	8.89	GROUND/CONCRETE /PAVEMENT*
* GROUND ELEVATION WAS SHOT AT NAIL SET OR MARKED POINT ON CONCRETE OR PAVEMENT.					
** FOR WELL DESCRIPTIONS LABELED "MARKED", TOP OF CASING WAS SHOT AT THE MARKED LOCATION. ALL OTHER WELLS WERE SHOT AT THE HIGH POINT OF CASING AND/OR ON THE NORTH SIDE.					

APPENDIX D

PID CALIBRATION LOG

PROJECT NAME: Area A, Parcel A17 Phase II	SAMPLER NAME: L. Perrin	
PROJECT NUMBER: 20010117	DATE: May 2020	PAGE 1 of 1

DATE/TIME	SAMPLER INITIALS	PID SERIAL #	FRESH AIR CAL	STANDARD	STANDARD CONCENTRATION	METER READING	COMMENTS
5/11/20 0855	LLP	592-913262	0.0	Isobutylene	100 ppm	100.0	-
5/12/20 0850	LLP	592-913262	0.0	Isobutylene	100 ppm	100.0	-

APPENDIX E

WELL INSPECTION FORM

Site: Sparrows Point Area A Location of Well: Parcel A17

ARM Representative: TRS Date: 4/24/19 Project Number: 20010117

WELL INFORMATION

Well ID: SG05-PDM004 Well Permit No.: SG 05 PD

Coordinates:

Latitude/Northing 573150.93 Longitude/Easting 1464789.38

Condition of pad and/or cover: Poor Flush Mount or Stick-Up? Fmr. Stick-up

Well ID Marked? Yes If yes, where? Metal Well Tag

Locking cap? See notes Lock? No Diameter of Well: 2”

Structural integrity of well: Poor above grade, but may be salvaged

WELL MEASUREMENTS

	Measured (Current)	Historic Reported
Depth to Water (feet BGS/TOC)	4.70’ BGS	----
Depth to Bottom (feet BGS/TOC)	6.35’ BGS	13’ BGS

Notes: BGS = below ground surface, TOC = top of casing

Additional Comments: The well was historically installed with a stick-up, but was improperly abandoned/converted to a flush mount and buried by soil. The well was located by digging below the collapsed well casing, and overlying soil. The PVC was broken, but had a locking well cap (no lock). However, after digging to expose the well, the cap slipped into the casing while attempting to replace it. The diameter of the cap was roughly equal to the well diameter. The cap is believed to have lodged in the well at roughly 6 to 7 feet bgs. The drilling subcontractor will attempt to clear and refurbish the well for sampling, if possible.

PICTURE OF WELL DURING INSPECTION

WELL INSPECTION FORM

Site: Sparrows Point Area A Location of Well: Parcel A17

ARM Representative: TRS Date: 4/24/19 Project Number: 20010117

WELL INFORMATION

Well ID: SG05-PPM006 Well Permit No.: SG 05 PP

Coordinates:

Latitude/Northing 573050.87 Longitude/Easting 1464737.49

Condition of pad and/or cover: Destroyed Flush Mount or Stick-Up? Stick-up

Well ID Marked? Yes If yes, where? Metal Well Tag

Locking cap? Yes Lock? Yes (cut) Diameter of Well: 2”

Structural integrity of well: Destroyed – well was observed to be knocked over

WELL MEASUREMENTS

	Measured (Current)	Historic Reported
Depth to Water (feet BGS/TOC)	N/A	----
Depth to Bottom (feet BGS/TOC)	N/A	13’ BGS

Notes: BGS = below ground surface, TOC = top of casing

Additional Comments: Well was observed to be knocked over and partially buried by rubble at the expected location. The well does not appear to be salvageable. The lock was cut and the well ID was confirmed by the metal well tag attached to the well plug (still intact).

PICTURE OF WELL DURING INSPECTION

Well/Piezometer Abandonment Form

Well/Piezometer ID: SG05-PDM004

General Project Information:

Client: Tradepoint Atlantic

Site Location: Sparrows Point, MD

Parcel ID: A17

Abandonment Date: 5/12/2020

Abandonment Contractor: GSI

Abandonment Method (circle appropriate):

1. PVC → (Pulled) / Split / Perforated / Left-In-Place / Overdrilled, 4.25" hollow stem
2. Abandoned → Grout / (Bentonite Chips)

Field Equipment: Geoprobe 7822DT

ARM Representative(s): L. Perrin

Well Diameter: 2"

Depth to Bottom (TOC)	Final Gauging Prior to Abandonment:
Reported (historical/log): 13'	Depth to Water (TOC): 4.56'
Measured: 12.74'	Depth to NAPL (TOC): No LNAPL/DNAPL

Please note if this abandonment is for a known NAPL delineation/monitoring area or individual NAPL screening piezometer and identify the name of the delineation area (e.g., B6-066 NAPL Area or B5-144 Screening Piezometer): N/A

Please Note: If NAPL is identified in a piezometer, the Project Manager should be notified and the piezometer may not be abandoned unless the presence of NAPL is already known and a decision has been made to abandon the NAPL monitoring network.

Additional Comments (if any):

Removed ~13' PVC.

Well was initially shallower (blocked) and replacement piezometer was installed for Phase II.

ARM Group LLC
Engineers and Scientists
9175 Guilford Road - Suite 310
Columbia, Maryland 21046
(410) 290-7775 FAX: (410) 290-7775

Well/Piezometer Abandonment Form

Well/Piezometer ID: SG05-PPM006

General Project Information:

Client: Tradepoint Atlantic

Site Location: Sparrows Point, MD

Parcel ID: A17

Abandonment Date: 5/12/2020

Abandonment Contractor: GSI

Abandonment Method (circle appropriate):

1. PVC → Pulled / Split / Perforated / (Left-In-Place) / Overdrilled, 4.25" hollow stem
2. Abandoned → Grout / Bentonite Chips

Field Equipment: Geoprobe 7822DT

ARM Representative(s): L. Perrin

Well Diameter: 2"

Depth to Bottom (TOC)	Final Gauging Prior to Abandonment:
Reported (historical/log): 13'	Depth to Water (TOC): ---
Measured: ---	Depth to NAPL (TOC): ---

Please note if this abandonment is for a known NAPL delineation/monitoring area or individual NAPL screening piezometer and identify the name of the delineation area (e.g., B6-066 NAPL Area or B5-144 Screening Piezometer): N/A

Please Note: If NAPL is identified in a piezometer, the Project Manager should be notified and the piezometer may not be abandoned unless the presence of NAPL is already known and a decision has been made to abandon the NAPL monitoring network.

Additional Comments (if any):

Pulled only casing (steel) and 1' PVC below casing. Both were detached and in different location than expected. Could not abandon due to inability to locate the well. Used a GPS to locate where well is supposed to be and dug down 6", but the well was not found.

ARM Group LLC
Engineers and Scientists
9175 Guilford Road - Suite 310
Columbia, Maryland 21046
(410) 290-7775 FAX: (410) 290-7775

APPENDIX F

Low Flow Sampling
~~Permanent~~ Temp Wells

ARM Group Inc.
Earth Resource Engineers and Consultants

Project Name:	AIT Phase II	Project Number:	2001017
Well Number:	AIT-001-P2	Date:	7/6/20
Well Diameter (in):	1	One Well Volume (gal):	—
Depth to Product (ft):	NA	QED Controller Settings:	—
Depth to Water (ft):	3.10	Flow Rate (mL/min)	
Product Thickness (ft):	NA	Length of time Purged (min)	40
Depth to Bottom (ft):	22.19	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
1137	0.1	3.11	30.61	5.13	1.34	2.08	3	overrange	Turbid
1142	1.5	3.12	29.84	5.06	1.41	0.88	5	overrange	↓
1147	1.0	3.12	29.48	4.98	1.51	0.69	10	775	↓
1152	1.5	3.12	29.51	4.99	1.53	0.61	7	790	↓
1157	2.0	3.12	29.60	4.97	1.54	0.56	8	800	↓
1202	2.5	3.13	29.10	4.98	1.58	0.51	8	857	↓
1207	3.0	3.13	29.47	5.03	1.59	0.46	8	833	↓
1212	3.5	3.14	28.77	8.91	1.65	0.88	-194	76.9	
1217	4.0	3.14	28.69	8.88	1.69	0.72	-193	53.7	

MONITORING SAMPLE RECORD

Sample ID	Time Collected	Parameter/Order	Container	Perservative	Collected?
AIT-001-P2	1230	TCL-VOCs	3 - 40 mL VOA	HCl	Y
		TPH-GRO	3 - 40 mL VOA	HCl	Y
		TPH-DRO	2 - 1 L Amber	none	Y
		TCL-SVOCs	2- 1 L Amber	none	Y
		Oil & Grease	2- 1 L Amber	HCl	Y
		TAL-Metals & Mercury (total)	1 - 250 mL Plastic	HNO3	N
		Hexavalent Chromium (total)	1 - 250 mL Plastic	none	N
		Total Cyanide	1 - 250 mL Plastic	NaOH	Y
		TAL-Metals & Mercury (Dissolved) **Field Filtered**	1 - 250 mL Plastic	HNO3	Y
		Hexavalent Chromium (Dissolved) **Field Filtered**	1 - 250 mL Plastic	none	Y
		PCB	2 - 1 L Amber	None	N
Matrix Spike					N
Duplicate					

Sampled By: LLP

Comments: Purged 15 min prior
Top 5' PVC disconnected

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~~ Temp Wells

ARM Group Inc.
Earth Resource Engineers and Consultants

Project Name:	A17 Phase II	Project Number:	2001017
Well Number:	A17-002-P2	Date:	7/6/20
Well Diameter (in):	1	One Well Volume (gal):	—
Depth to Product (ft):	NA	QED Controller Settings:	—
Depth to Water (ft):	3.02 (?)	Flow Rate (mL/min)	
Product Thickness (ft):	NA	Length of time Purged (min)	40
Depth to Bottom (ft):	23.86	Condition of Pad/Cover:	~~Good/Good~~ →

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
1410	0.0	10.35	28.77	10.62	1.13	6.57	-102	221.0	
1415	0.6	10.37	28.18	10.62	1.15	4.36	-90	65.9	
1420	1.2	10.41	27.56	10.67	1.16	3.54	-77	37.4	
1425	1.8	10.48	27.88	10.69	1.14	3.25	-70	29.6	
1430	2.4	10.49	28.07	10.73	1.11	3.07	-68	overrange	cloudy
1435	3.0	10.49	27.42	10.74	1.13	3.16	-65	712.0	
1440	3.6	10.50	27.66	10.79	1.14	3.21	-60	354.1	brown
1445	4.2	10.61	28.12	10.77	1.13	3.11	-59	122.8	
1450	4.8	10.76	28.50	10.76	1.12	3.05	-58	104.1	

MONITORING SAMPLE RECORD

Sample ID	Time Collected	Parameter/Order	Container	Perservative	Collected?
A17-002-P2	1455	TCL-VOCs	3 - 40 mL VOA	HCl	Y
		TPH-GRO	3 - 40 mL VOA	HCl	Y
		TPH-DRO	2 - 1 L Amber	none	Y
		TCL-SVOCs	2- 1 L Amber	none	Y
		Oil & Grease	2- 1 L Amber	HCl	Y
		TAL-Metals & Mercury (total)	1 - 250 mL Plastic	HNO3	N
		Hexavalent Chromium (total)	1 - 250 mL Plastic	none	N
		Total Cyanide	1 - 250 mL Plastic	NaOH	Y
		TAL-Metals & Mercury (Dissolved) **Field Filtered**	1 - 250 mL Plastic	HNO3	~~Y~~ Y
		Hexavalent Chromium (Dissolved) **Field Filtered**	1 - 250 mL Plastic	none	Y
		PCB	2 - 1 L Amber	None	N
		Matrix Spike			N
		Duplicate			

Sampled By: LLP

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~~ Temp Wells

ARM Group Inc.
Earth Resource Engineers and Consultants

Project Name:	A17 Phase II	Project Number:	2001017
Well Number:	A17-004-PZ	Date:	7/7/20
Well Diameter (in):	1	One Well Volume (gal):	—
Depth to Product (ft):	NA	QED Controller Settings:	—
Depth to Water (ft):	9.33	Flow Rate (mL/min)	
Product Thickness (ft):	NA	Length of time Purged (min)	20
Depth to Bottom (ft):	16.69	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
824	0.0	9.33	18.64	12.10	4.19	0.58	-367	4.49	light gray
829	0.45	9.34	19.04	12.11	4.26	0.51	-397	3.22	
834	0.90	9.35	19.41	12.31	4.25	0.53	-415	2.44	
839	1.35	9.35	19.72	12.35	4.24	0.54	-422	2.15	
844	1.80	9.35	19.87	12.41	4.22	0.54	-440	1.97	

MONITORING SAMPLE RECORD

Sample ID	Time Collected	Parameter/Order	Container	Perservative	Collected?
A17-004-PZ	850	TCL-VOCs	3 - 40 mL VOA	HCl	Y
		TPH-GRO	3 - 40 mL VOA	HCl	Y
		TPH-DRO	2 - 1 L Amber	none	Y
		TCL-SVOCs	2- 1 L Amber	none	Y
		Oil & Grease	2- 1 L Amber	HCl	Y
		TAL-Metals & Mercury (total)	1 - 250 mL Plastic	HNO3	N
		Hexavalent Chromium (total)	1 - 250 mL Plastic	none	N
		Total Cyanide	1 - 250 mL Plastic	NaOH	Y
		TAL-Metals & Mercury (Dissolved) **Field Filtered**	1 - 250 mL Plastic	HNO3	Y
		Hexavalent Chromium (Dissolved) **Field Filtered**	1 - 250 mL Plastic	none	Y
		PCB	2 - 1 L Amber	None	N
		Matrix Spike			N
		Duplicate			N

Sampled By: LLP

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 temp

ARM Group Inc.
Earth Resource Engineers and Consultants

Project Name:	A17 Phase II	Project Number:	20010117
Well Number:	A17-005-P2	Date:	7/6/20
Well Diameter (in):	1	One Well Volume (gal):	
Depth to Product (ft):	NA	QED Controller Settings:	
Depth to Water (ft):	~~TOR~~ 5.32 bgs	Flow Rate (mL/min)	409
Product Thickness (ft):	NA	Length of time Purged (min)	1hr 4min
Depth to Bottom (ft):	~~TOR~~ 16.00 bgs	Condition of Pad/Cover:	I

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
842	1.0	5.32	23.03	5.54	0.680	1.50	0	840	Cloudy
	Became very silty → Purged more sand from bottom								
854	2.0	5.32	23.38	5.51	0.701	2.25	-6	750	
859	2.6	5.32	24.42	5.73	0.697	1.97	-75	320	
904	3.2	5.32	24.80	5.79	0.700	2.14	-90	44.1	
909	3.8	5.32	25.01	5.92	0.702	2.22	-95	22.3	
914	4.4	5.32	25.39	5.93	0.703	2.38	-97	19.7	
919	5.0	5.32	25.75	5.97	0.702	2.42	-97	19.3	

MONITORING SAMPLE RECORD

Sample ID	Time Collected	Parameter/Order	Container	Perservative	Collected?
A17-005-P2	930	TCL-VOCs	3 - 40 mL VOA	HCl	Y
		TPH-GRO	3 - 40 mL VOA	HCl	Y
		TPH-DRO	2 - 1 L Amber	none	Y
		TCL-SVOCs	2- 1 L Amber	none	Y
		Oil & Grease	2- 1 L Amber	HCl	Y
		TAL-Metals & Mercury (total)	1 - 250 mL Plastic	HNO3	N
		Hexavalent Chromium (total)	1 - 250 mL Plastic	none	N
		Total Cyanide	1 - 250 mL Plastic	NaOH	Y
		TAL-Metals & Mercury (Dissolved) **Field Filtered**	1 - 250 mL Plastic	HNO3	~~Y~~ Y
		Hexavalent Chromium (Dissolved) **Field Filtered**	1 - 250 mL Plastic	none	Y
		PCB	2 - 1 L Amber	None	N
Matrix Spike					Y/N
Duplicate					N

Sampled By: LCP

Comments: Purged ~ 40 min prior to remove sediment

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)

TABLE 1
MULTIPARAMETER CALIBRATION LOG

Project Name Parcel A17 Date 7/6/2020
Weather Sunny, 90s
Calibrated by L. Perrin Instrument Horiba (Auto-calibration)
Serial Number 2BOMSAX4

Parameters	Morning Calibration	Morning Temperature	End of Day Calibration Check	End of Day Temperature
Specific Conductance Standard (4.49 mS/cm)	4.52	84℉	NA	NA
Specific Conductance Standard #2	NA	NA	NA	NA
pH (7)	NA	NA	NA	NA
pH (4)	4.00	84℉	NA	NA
pH(10)	NA	NA	NA	NA
ORP Zobel Solution (240mV)	NA	NA	NA	NA
Dissolved Oxygen 100% water saturated air mg/L	NA	NA	NA	NA
Dissolved Oxygen Zero Dissolved Oxygen Solution mg/L	8.24¥	84℉	NA	NA
Barometric Pressure mm Hg	776.93	84℉	NA	NA
Turbidity #1 (0 NTU)	0.0	84℉	NA	NA
Turbidity Standard #2 (1 NTU)	1.0	84℉	NA	NA
Turbidity Standard #3 (10 NTU)	10.0	84℉	NA	NA

¥ DO is outside of the morning calibration acceptance criteria. Values displayed on field purge logs may be inaccurate.

TABLE 1
MULTIPARAMETER CALIBRATION LOG

Project Name Parcel A17 Date 7/7/2020
Weather Sunny, 90s
Calibrated by L. Perrin Instrument Horiba (Auto-calibration)
Serial Number 2BOMSAX4

Parameters	Morning Calibration	Morning Temperature	End of Day Calibration Check	End of Day Temperature
Specific Conductance Standard (4.49 mS/cm)	4.49	77℉	NA	NA
Specific Conductance Standard #2	NA	NA	NA	NA
pH (7)	NA	NA	NA	NA
pH (4)	4.01	77℉	NA	NA
pH(10)	NA	NA	NA	NA
ORP Zobel Solution (240mV)	NA	NA	NA	NA
Dissolved Oxygen 100% water saturated air mg/L	NA	NA	NA	NA
Dissolved Oxygen Zero Dissolved Oxygen Solution mg/L	8.98¥	77℉	NA	NA
Barometric Pressure mm Hg	779.78	77℉	NA	NA
Turbidity #1 (0 NTU)	0.0	77℉	NA	NA
Turbidity Standard #2 (1 NTU)	1.0	77℉	NA	NA
Turbidity Standard #3 (10 NTU)	10.0	77℉	NA	NA

¥ DO is outside of the morning calibration acceptance criteria. Values displayed on field purge logs may be inaccurate.

APPENDIX G

Parcel A17 - IDW Drum Log

Drum Identification Number	Designation	Activity/Phase	Contents	Open Date
1391-Decon Water-4/14/20-B24/A14/A18/A17/B20/ B22/ B19	Non-Haz	Parcel A17 Phase II Investigation	Water	5/11/2020
1397-Nitric Acid-4/20/20-A14/B24/A18/A17/B20	Non-Haz	Parcel A17 Phase II Investigation	Nitric Acid	5/11/2020
1399-Soil-05/11/20-A17	Non-Haz	Parcel A17 Phase II Investigation	Soil	5/11/2020
1415-Purge Water-7/6/20-A17	Non-Haz	Parcel A17 Phase II Investigation	Water	7/6/2020

APPENDIX H

QA/QC Tracking Log

Trip Blank:	Date:	Sample IDs:	
TB 1	5/11/2020	1) A17-005-SB-1.5	QA/QC for all soil samples; not including samples analyzed by ALPH for PAH SVOCs
		2) A17-005-SB-4	
		3) A17-004-SB-1	
		4) A17-004-SB-5	
		5) A17-003-SB-1	
		6) A17-003-SB-5	
		7) A17-002-SB-1	Duplicate: A17-002-SB-1
		8) A17-002-SB-5	Date: 5/11/2020
		9) A17-002-SB-10	MS/MSD: A17-004-SB-5
TB 1	5/12/2020	10) A17-001-SB-1	Date: 5/11/2020
		11) A17-001-SB-5	Field Blank:
		12) A17-001-SB-10	Date: 5/11/2020
		13)	Eq. Blank:
		14)	Date: 5/11/2020
		15)	
		16)	
		17)	
		18)	
		19)	
		20)	

Trip Blank:	Date:	Sample IDs:	
TB 1	7/6/2020	1) A17-005-PZ	QA/QC for all groundwater samples
		2) A17-001-PZ	
		3) A17-002-PZ	
TB 1	7/7/2020	4) A17-004-PZ	
		5)	
		6)	
		7)	Duplicate: A17-002-PZ
		8)	Date: 7/6/2020
		9)	MS/MSD: A17-005-PZ
		10)	Date: 7/6/2020
		11)	Field Blank:
		12)	Date: 7/7/2020
		13)	Eq. Blank:
		14)	Date:
		15)	
		16)	
		17)	
		18)	
		19)	
		20)	

	5/11/2020	1) A17-005-SB-1.5	QA/QC for all PAH SVOC samples that were submitted to ALPH
		2) A17-005-SB-4	
		3) A17-004-SB-1	
		4) A17-004-SB-5	
		5) A17-003-SB-1	
		6) A17-003-SB-5	
		7) A17-002-SB-1	Duplicate: A17-002-SB-5
		8) A17-002-SB-5	Date: 5/11/2020
		9) A17-002-SB-10	MS/MSD: A17-004-SB-1
	5/12/2020	10) A17-001-SB-1	Date: 5/11/2020
		11) A17-001-SB-5	Field Blank:
		12) A17-001-SB-10	Date: 5/11/2020
		13)	Eq. Blank:
		14)	Date: 5/11/2020
		15)	
		16)	
		17)	
		18)	
		19)	
		20)	

		1)	
		2)	
		3)	
		4)	
		5)	
		6)	
		7)	Duplicate:
		8)	Date:
		9)	MS/MSD:
		10)	Date:
		11)	Field Blank:
		12)	Date:
		13)	Eq. Blank:
		14)	Date:
		15)	
		16)	
		17)	
		18)	
		19)	
		20)	

Soil samples with a sustained PID reading of 10 ppm or greater were collected for VOCs.
VOC samples were placed in a cooler with a trip blank.

APPENDIX I

EVALUATION OF DATA COMPLETENESS
Percentage of Non-Rejected Results vs Total Results

Parameter	Parameter Group	Matrix	Unit	Number of Validated Results	Detections	Number of Rejected Results	Number of Non-rejected Results	Completeness
Cyanide	CN	Soil	mg/kg	8	8	0	8	100.00%
Aluminum	Metal	Soil	mg/kg	8	8	0	8	100.00%
Antimony	Metal	Soil	mg/kg	8	0	0	8	100.00%
Arsenic	Metal	Soil	mg/kg	8	4	0	8	100.00%
Barium	Metal	Soil	mg/kg	8	8	0	8	100.00%
Beryllium	Metal	Soil	mg/kg	8	8	0	8	100.00%
Cadmium	Metal	Soil	mg/kg	8	7	0	8	100.00%
Chromium	Metal	Soil	mg/kg	8	8	0	8	100.00%
Chromium VI	Metal	Soil	mg/kg	8	0	0	8	100.00%
Cobalt	Metal	Soil	mg/kg	8	8	0	8	100.00%
Copper	Metal	Soil	mg/kg	8	8	0	8	100.00%
Iron	Metal	Soil	mg/kg	8	8	0	8	100.00%
Lead	Metal	Soil	mg/kg	8	8	0	8	100.00%
Manganese	Metal	Soil	mg/kg	8	8	0	8	100.00%
Mercury	Metal	Soil	mg/kg	8	7	0	8	100.00%
Nickel	Metal	Soil	mg/kg	8	8	0	8	100.00%
Selenium	Metal	Soil	mg/kg	8	1	0	8	100.00%
Silver	Metal	Soil	mg/kg	8	0	0	8	100.00%
Thallium	Metal	Soil	mg/kg	8	7	0	8	100.00%
Vanadium	Metal	Soil	mg/kg	8	8	0	8	100.00%
Zinc	Metal	Soil	mg/kg	8	8	0	8	100.00%
Aroclor 1016	PCB	Soil	mg/kg	4	0	0	4	100.00%
Aroclor 1221	PCB	Soil	mg/kg	4	0	0	4	100.00%
Aroclor 1232	PCB	Soil	mg/kg	4	0	0	4	100.00%
Aroclor 1242	PCB	Soil	mg/kg	4	0	0	4	100.00%
Aroclor 1248	PCB	Soil	mg/kg	4	0	0	4	100.00%
Aroclor 1254	PCB	Soil	mg/kg	4	0	0	4	100.00%
Aroclor 1260	PCB	Soil	mg/kg	4	1	0	4	100.00%
Aroclor 1262	PCB	Soil	mg/kg	4	0	0	4	100.00%
Aroclor 1268	PCB	Soil	mg/kg	4	0	0	4	100.00%
PCBs (total)	PCB	Soil	mg/kg	4	0	0	4	100.00%
1,1-Biphenyl	SVOC	Soil	mg/kg	8	3	0	8	100.00%
1,2,4,5-Tetrachlorobenzene	SVOC	Soil	mg/kg	8	0	0	8	100.00%
2,3,4,6-Tetrachlorophenol	SVOC	Soil	mg/kg	8	0	2	6	75.00%
2,4,5-Trichlorophenol	SVOC	Soil	mg/kg	8	0	1	7	87.50%
2,4,6-Trichlorophenol	SVOC	Soil	mg/kg	8	0	1	7	87.50%
2,4-Dichlorophenol	SVOC	Soil	mg/kg	8	0	1	7	87.50%
2,4-Dimethylphenol	SVOC	Soil	mg/kg	8	0	1	7	87.50%
2,4-Dinitrophenol	SVOC	Soil	mg/kg	8	0	1	7	87.50%
2,4-Dinitrotoluene	SVOC	Soil	mg/kg	8	0	0	8	100.00%
2,6-Dinitrotoluene	SVOC	Soil	mg/kg	8	0	0	8	100.00%
2-Chloronaphthalene	SVOC	Soil	mg/kg	8	0	0	8	100.00%
2-Chlorophenol	SVOC	Soil	mg/kg	8	0	1	7	87.50%
2-Methylnaphthalene	SVOC	Soil	mg/kg	8	8	0	8	100.00%
2-Methylphenol	SVOC	Soil	mg/kg	8	0	1	7	87.50%
2-Nitroaniline	SVOC	Soil	mg/kg	8	0	0	8	100.00%
3&4-Methylphenol(m&p Cresol)	SVOC	Soil	mg/kg	8	0	1	7	87.50%
3,3'-Dichlorobenzidine	SVOC	Soil	mg/kg	8	0	0	8	100.00%
4-Chloroaniline	SVOC	Soil	mg/kg	8	0	0	8	100.00%
4-Nitroaniline	SVOC	Soil	mg/kg	8	0	0	8	100.00%
Acenaphthene	SVOC	Soil	mg/kg	8	7	0	8	100.00%
Acenaphthylene	SVOC	Soil	mg/kg	8	7	0	8	100.00%
Acetophenone	SVOC	Soil	mg/kg	8	0	0	8	100.00%
Anthracene	SVOC	Soil	mg/kg	8	8	0	8	100.00%
Benz[a]anthracene	SVOC	Soil	mg/kg	8	8	0	8	100.00%
Benzaldehyde	SVOC	Soil	mg/kg	8	0	0	8	100.00%

EVALUATION OF DATA COMPLETENESS
Percentage of Non-Rejected Results vs Total Results

Parameter	Parameter Group	Matrix	Unit	Number of Validated Results	Detections	Number of Rejected Results	Number of Non-rejected Results	Completeness
Benzo[a]pyrene	SVOC	Soil	mg/kg	8	8	0	8	100.00%
Benzo[b]fluoranthene	SVOC	Soil	mg/kg	8	8	0	8	100.00%
Benzo[g,h,i]perylene	SVOC	Soil	mg/kg	8	8	0	8	100.00%
Benzo[k]fluoranthene	SVOC	Soil	mg/kg	8	8	0	8	100.00%
bis(2-chloroethoxy)methane	SVOC	Soil	mg/kg	8	0	0	8	100.00%
bis(2-Chloroethyl)ether	SVOC	Soil	mg/kg	8	0	0	8	100.00%
bis(2-Chloroisopropyl)ether	SVOC	Soil	mg/kg	8	0	0	8	100.00%
bis(2-Ethylhexyl)phthalate	SVOC	Soil	mg/kg	8	0	0	8	100.00%
Caprolactam	SVOC	Soil	mg/kg	8	0	0	8	100.00%
Carbazole	SVOC	Soil	mg/kg	8	3	0	8	100.00%
Chrysene	SVOC	Soil	mg/kg	8	8	0	8	100.00%
Dibenz[a,h]anthracene	SVOC	Soil	mg/kg	8	7	0	8	100.00%
Diethylphthalate	SVOC	Soil	mg/kg	8	0	0	8	100.00%
Di-n-butylphthalate	SVOC	Soil	mg/kg	8	4	0	8	100.00%
Di-n-ocytlphthalate	SVOC	Soil	mg/kg	8	3	0	8	100.00%
Fluoranthene	SVOC	Soil	mg/kg	8	8	0	8	100.00%
Fluorene	SVOC	Soil	mg/kg	8	6	0	8	100.00%
Hexachlorobenzene	SVOC	Soil	mg/kg	8	0	0	8	100.00%
Hexachlorobutadiene	SVOC	Soil	mg/kg	8	0	0	8	100.00%
Hexachlorocyclopentadiene	SVOC	Soil	mg/kg	8	0	0	8	100.00%
Hexachloroethane	SVOC	Soil	mg/kg	8	0	0	8	100.00%
Indeno[1,2,3-c,d]pyrene	SVOC	Soil	mg/kg	8	8	0	8	100.00%
Isophorone	SVOC	Soil	mg/kg	8	0	0	8	100.00%
Naphthalene	SVOC	Soil	mg/kg	8	8	0	8	100.00%
Nitrobenzene	SVOC	Soil	mg/kg	8	0	0	8	100.00%
N-Nitroso-di-n-propylamine	SVOC	Soil	mg/kg	8	0	0	8	100.00%
N-Nitrosodiphenylamine	SVOC	Soil	mg/kg	8	0	0	8	100.00%
Pentachlorophenol	SVOC	Soil	mg/kg	8	0	1	7	87.50%
Phenanthrene	SVOC	Soil	mg/kg	8	8	0	8	100.00%
Phenol	SVOC	Soil	mg/kg	8	0	1	7	87.50%
Pyrene	SVOC	Soil	mg/kg	8	8	0	8	100.00%
Diesel Range Organics	TPH	Soil	mg/kg	8	8	0	8	100.00%
Gasoline Range Organics	TPH	Soil	mg/kg	8	0	0	8	100.00%
Oil and Grease	TPH	Soil	mg/kg	8	8	0	8	100.00%
Total Cyanide	CN	Water	ug/L	3	2	0	3	100.00%
Aluminum	Metal	Water	ug/L	3	3	0	3	100.00%
Antimony	Metal	Water	ug/L	3	0	0	3	100.00%
Arsenic	Metal	Water	ug/L	3	2	0	3	100.00%
Barium	Metal	Water	ug/L	3	3	0	3	100.00%
Beryllium	Metal	Water	ug/L	3	0	0	3	100.00%
Cadmium	Metal	Water	ug/L	3	1	0	3	100.00%
Chromium	Metal	Water	ug/L	3	1	0	3	100.00%
Chromium VI	Metal	Water	ug/L	3	1	0	3	100.00%
Cobalt	Metal	Water	ug/L	3	2	0	3	100.00%
Copper	Metal	Water	ug/L	3	0	0	3	100.00%
Iron	Metal	Water	ug/L	3	3	0	3	100.00%
Lead	Metal	Water	ug/L	3	0	0	3	100.00%
Manganese	Metal	Water	ug/L	3	3	0	3	100.00%
Mercury	Metal	Water	ug/L	3	0	0	3	100.00%
Nickel	Metal	Water	ug/L	3	2	0	3	100.00%
Selenium	Metal	Water	ug/L	3	0	0	3	100.00%
Silver	Metal	Water	ug/L	3	0	0	3	100.00%
Thallium	Metal	Water	ug/L	3	0	0	3	100.00%
Vanadium	Metal	Water	ug/L	3	3	0	3	100.00%
Zinc	Metal	Water	ug/L	3	3	0	3	100.00%
1,1-Biphenyl	SVOC	Water	ug/L	3	0	0	3	100.00%

EVALUATION OF DATA COMPLETENESS
Percentage of Non-Rejected Results vs Total Results

Parameter	Parameter Group	Matrix	Unit	Number of Validated Results	Detections	Number of Rejected Results	Number of Non-rejected Results	Completeness
1,2,4,5-Tetrachlorobenzene	SVOC	Water	ug/L	3	0	0	3	100.00%
2,3,4,6-Tetrachlorophenol	SVOC	Water	ug/L	3	1	0	3	100.00%
2,4,5-Trichlorophenol	SVOC	Water	ug/L	3	0	0	3	100.00%
2,4,6-Trichlorophenol	SVOC	Water	ug/L	3	0	0	3	100.00%
2,4-Dichlorophenol	SVOC	Water	ug/L	3	0	0	3	100.00%
2,4-Dimethylphenol	SVOC	Water	ug/L	3	0	0	3	100.00%
2,4-Dinitrophenol	SVOC	Water	ug/L	3	0	0	3	100.00%
2,4-Dinitrotoluene	SVOC	Water	ug/L	3	0	0	3	100.00%
2,6-Dinitrotoluene	SVOC	Water	ug/L	3	0	0	3	100.00%
2-Chloronaphthalene	SVOC	Water	ug/L	3	0	0	3	100.00%
2-Chlorophenol	SVOC	Water	ug/L	3	0	0	3	100.00%
2-Methylnaphthalene	SVOC	Water	ug/L	3	0	0	3	100.00%
2-Methylphenol	SVOC	Water	ug/L	3	0	0	3	100.00%
2-Nitroaniline	SVOC	Water	ug/L	3	0	0	3	100.00%
3&4-Methylphenol(m&p Cresol)	SVOC	Water	ug/L	3	1	0	3	100.00%
3,3'-Dichlorobenzidine	SVOC	Water	ug/L	3	0	1	2	66.67%
4-Chloroaniline	SVOC	Water	ug/L	3	1	0	3	100.00%
4-Nitroaniline	SVOC	Water	ug/L	3	0	0	3	100.00%
Acenaphthene	SVOC	Water	ug/L	3	0	0	3	100.00%
Acenaphthylene	SVOC	Water	ug/L	3	0	0	3	100.00%
Acetophenone	SVOC	Water	ug/L	3	0	0	3	100.00%
Anthracene	SVOC	Water	ug/L	3	1	0	3	100.00%
Benz[a]anthracene	SVOC	Water	ug/L	3	0	0	3	100.00%
Benzaldehyde	SVOC	Water	ug/L	3	0	0	3	100.00%
Benzo[a]pyrene	SVOC	Water	ug/L	3	1	0	3	100.00%
Benzo[b]fluoranthene	SVOC	Water	ug/L	3	0	0	3	100.00%
Benzo[g,h,i]perylene	SVOC	Water	ug/L	3	0	0	3	100.00%
Benzo[k]fluoranthene	SVOC	Water	ug/L	3	0	0	3	100.00%
bis(2-chloroethoxy)methane	SVOC	Water	ug/L	3	0	0	3	100.00%
bis(2-Chloroethyl)ether	SVOC	Water	ug/L	3	0	0	3	100.00%
bis(2-Chloroisopropyl)ether	SVOC	Water	ug/L	3	0	0	3	100.00%
bis(2-Ethylhexyl)phthalate	SVOC	Water	ug/L	3	0	0	3	100.00%
Caprolactam	SVOC	Water	ug/L	3	0	0	3	100.00%
Carbazole	SVOC	Water	ug/L	3	0	0	3	100.00%
Chrysene	SVOC	Water	ug/L	3	0	0	3	100.00%
Dibenz[a,h]anthracene	SVOC	Water	ug/L	3	0	0	3	100.00%
Diethylphthalate	SVOC	Water	ug/L	3	1	0	3	100.00%
Di-n-butylphthalate	SVOC	Water	ug/L	3	0	0	3	100.00%
Di-n-ocytlphthalate	SVOC	Water	ug/L	3	0	0	3	100.00%
Fluoranthene	SVOC	Water	ug/L	3	1	0	3	100.00%
Fluorene	SVOC	Water	ug/L	3	0	0	3	100.00%
Hexachlorobenzene	SVOC	Water	ug/L	3	0	0	3	100.00%
Hexachlorobutadiene	SVOC	Water	ug/L	3	0	0	3	100.00%
Hexachlorocyclopentadiene	SVOC	Water	ug/L	3	0	0	3	100.00%
Hexachloroethane	SVOC	Water	ug/L	3	0	0	3	100.00%
Indeno[1,2,3-c,d]pyrene	SVOC	Water	ug/L	3	0	0	3	100.00%
Isophorone	SVOC	Water	ug/L	3	0	0	3	100.00%
Naphthalene	SVOC	Water	ug/L	3	0	0	3	100.00%
Nitrobenzene	SVOC	Water	ug/L	3	0	0	3	100.00%
N-Nitroso-di-n-propylamine	SVOC	Water	ug/L	3	0	0	3	100.00%
N-Nitrosodiphenylamine	SVOC	Water	ug/L	3	1	0	3	100.00%
Pentachlorophenol	SVOC	Water	ug/L	3	2	0	3	100.00%
Phenanthrene	SVOC	Water	ug/L	3	1	0	3	100.00%
Phenol	SVOC	Water	ug/L	3	1	0	3	100.00%
Pyrene	SVOC	Water	ug/L	3	1	0	3	100.00%
Diesel Range Organics	TPH	Water	ug/L	3	3	0	3	100.00%

EVALUATION OF DATA COMPLETENESS
Percentage of Non-Rejected Results vs Total Results

Parameter	Parameter Group	Matrix	Unit	Number of Validated Results	Detections	Number of Rejected Results	Number of Non-rejected Results	Completeness
Gasoline Range Organics	TPH	Water	ug/L	3	0	0	3	100.00%
Oil and Grease	TPH	Water	ug/L	3	0	0	3	100.00%
1,1,1-Trichloroethane	VOC	Water	ug/L	3	0	0	3	100.00%
1,1,2,2-Tetrachloroethane	VOC	Water	ug/L	3	0	0	3	100.00%
1,1,2-Trichloro-1,2,2-Trifluoroethane	VOC	Water	ug/L	3	0	0	3	100.00%
1,1,2-Trichloroethane	VOC	Water	ug/L	3	0	0	3	100.00%
1,1-Dichloroethane	VOC	Water	ug/L	3	0	0	3	100.00%
1,1-Dichloroethene	VOC	Water	ug/L	3	0	0	3	100.00%
1,2,3-Trichlorobenzene	VOC	Water	ug/L	3	0	0	3	100.00%
1,2,4-Trichlorobenzene	VOC	Water	ug/L	3	0	0	3	100.00%
1,2-Dibromo-3-chloropropane	VOC	Water	ug/L	3	0	0	3	100.00%
1,2-Dibromoethane	VOC	Water	ug/L	3	0	0	3	100.00%
1,2-Dichlorobenzene	VOC	Water	ug/L	3	0	0	3	100.00%
1,2-Dichloroethane	VOC	Water	ug/L	3	0	0	3	100.00%
1,2-Dichloroethene (Total)	VOC	Water	ug/L	3	0	0	3	100.00%
1,2-Dichloropropane	VOC	Water	ug/L	3	0	0	3	100.00%
1,3-Dichlorobenzene	VOC	Water	ug/L	3	0	0	3	100.00%
1,4-Dichlorobenzene	VOC	Water	ug/L	3	0	0	3	100.00%
2-Butanone (MEK)	VOC	Water	ug/L	3	0	0	3	100.00%
2-Hexanone	VOC	Water	ug/L	3	0	0	3	100.00%
4-Methyl-2-pentanone (MIBK)	VOC	Water	ug/L	3	0	0	3	100.00%
Acetone	VOC	Water	ug/L	3	1	0	3	100.00%
Benzene	VOC	Water	ug/L	3	0	0	3	100.00%
Bromodichloromethane	VOC	Water	ug/L	3	0	0	3	100.00%
Bromoform	VOC	Water	ug/L	3	0	0	3	100.00%
Bromomethane	VOC	Water	ug/L	3	0	0	3	100.00%
Carbon disulfide	VOC	Water	ug/L	3	0	0	3	100.00%
Carbon tetrachloride	VOC	Water	ug/L	3	0	0	3	100.00%
Chlorobenzene	VOC	Water	ug/L	3	0	0	3	100.00%
Chloroethane	VOC	Water	ug/L	3	0	0	3	100.00%
Chloroform	VOC	Water	ug/L	3	0	0	3	100.00%
Chloromethane	VOC	Water	ug/L	3	0	0	3	100.00%
cis-1,2-Dichloroethene	VOC	Water	ug/L	3	0	0	3	100.00%
cis-1,3-Dichloropropene	VOC	Water	ug/L	3	0	0	3	100.00%
Cyclohexane	VOC	Water	ug/L	3	0	0	3	100.00%
Dibromochloromethane	VOC	Water	ug/L	3	0	0	3	100.00%
Dichlorodifluoromethane	VOC	Water	ug/L	3	0	0	3	100.00%
Ethylbenzene	VOC	Water	ug/L	3	0	0	3	100.00%
Isopropylbenzene	VOC	Water	ug/L	3	0	0	3	100.00%
Methyl Acetate	VOC	Water	ug/L	3	0	0	3	100.00%
Methyl tert-butyl ether (MTBE)	VOC	Water	ug/L	3	0	0	3	100.00%
Methylene Chloride	VOC	Water	ug/L	3	0	0	3	100.00%
Styrene	VOC	Water	ug/L	3	0	0	3	100.00%
Tetrachloroethene	VOC	Water	ug/L	3	0	0	3	100.00%
Toluene	VOC	Water	ug/L	3	0	0	3	100.00%
trans-1,2-Dichloroethene	VOC	Water	ug/L	3	0	0	3	100.00%
trans-1,3-Dichloropropene	VOC	Water	ug/L	3	0	0	3	100.00%
Trichloroethene	VOC	Water	ug/L	3	0	0	3	100.00%
Trichlorofluoromethane	VOC	Water	ug/L	3	0	0	3	100.00%
Vinyl chloride	VOC	Water	ug/L	3	0	0	3	100.00%
Xylenes	VOC	Water	ug/L	3	0	0	3	100.00%
1,4-Dioxane	VOC/SVOC	Water	ug/L	3	2	0	3	100.00%

Data validation has been completed for a representative 30% of all samples