Phase II Investigation
Work Plan

Area B: Parcel B1
Tradepoint Atlantic
Sparrows Point, Maryland

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ARM Project 150300M

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1.0 INTRODUCTION

1.1 Introduction

ARM Group Inc. (ARM), on behalf of EnviroAnalytics Group (EAG), has prepared the following Work Plan to complete a Phase II site investigation on a portion of the Tradepoint Atlantic property that has been designated as Area B, Parcel B1 (the Site). Parcel B1 is comprised of approximately 217 acres of the approximately 3,100-acre former plant property located as shown on **Figure 1**.

Site characterization of Parcel B1 will be performed in compliance with requirements pursuant to the following:

- Administrative Consent Order (ACO) between Tradepoint Atlantic (formerly Sparrows Point Terminal, LLC) and the Maryland Department of the Environment (effective September 12, 2014); and
- Settlement Agreement and Covenant Not to Sue (SA) between Tradepoint Atlantic (formerly Sparrows Point Terminal, LLC) and the United States Environmental Protection Agency (effective November 25, 2014).

An application to enter the Site into the Maryland Department of the Environment Voluntary Cleanup Program (MDE-VCP) was submitted to MDE on September 10, 2014. The Site's current and anticipated future use is Tier 3 (Industrial), and plans for the Site include demolition and redevelopment over the next several years.

Parcel B1 is part of the acreage that was removed (Carveout Area) from inclusion in the Multimedia Consent Decree between Bethlehem Steel Corporation, the United States Environmental Protection Agency (EPA), and the Maryland Department of the Environment (MDE) (effective October 8, 1997) as documented in correspondence received from EPA on September 12, 2014. Based on this agreement, EPA has 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 EPA's RCRA Corrective Action authorities.

1.2 Site Background

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 the Facility ceased in fall 2012.

Groundcover at the Site is comprised of approximately 52% natural soils and 48% slag based on the approximate shoreline of the Sparrows Point Peninsula in 1916, as shown on **Figure 2** (Adapted from Figure 2-20 on the Description of Current Conditions Report (DCC) report prepared by Rust Environmental and Infrastructure, dated January 1998). Parcel B1 was formerly occupied by the following buildings or facilities: 160" Plate Mill, 60" Plate Mill, East Processing Building, Roll Shop, 45" x 90" Slabbing Mill, Slab Yard, Soaking Pits #1 to #5, Blooming Mill, Skelp Mill, and Flange Mill. Most of these buildings and facilities make up the area formerly known as the Primary Rolling Mills Area. To the south, the Site was formerly partially occupied by the Basic Oxygen Furnaces (BOFs) and Mould Yards. These buildings make up the former Open Hearth Furnace Area and Former Steel Making Area. The facility areas are shown on **Figure 3**.

In 2013, all buildings, with the exception of a few small shops, were demolished, and several pits across the Site were filled in. The concrete slabs remain on grade. Although several smaller buildings still appear on recent aerial images, some of these features (lube shop, mechanical testing lab, and oil house) have recently been demolished. According to MCM Management Corporation (MCM), all of the remaining buildings are scheduled for demolition. Therefore, no borings are proposed in the interior of buildings at the Site. MCM also provided ARM with files indicating the presence of several subgrade structures (pits, tunnels, etc.) within Parcel B1. These structures were primarily concentrated around the 45" x 90" Slabbing Mill and Southern edge of the parcel. The pit locations are highlighted on all relevant figures, and the IDs of the structures (assigned by MCM) are displayed. **Appendix A** includes a table of the ID numbers, estimated dimensions, former functions, and field-verified status of each structure. Open pits which could restrict drilling access were observed in the vicinity of the former 45" x 90" Slabbing Mill, during a past ARM site visit to mark boring locations (since voided) on August 25, 2015. These pits had an estimated depth of 15 to 20 feet, and were partially filled with water and demolition rubble. A photograph log of these pits is included as **Appendix A**. A former scale pit was also observed on historical drawings, and the location of this feature was confirmed by ARM near the western boundary of the parcel. No photographs are available from this pit location, but it is visible on recent aerial imagery. The MCM numbering system was not applied to the scale pit. Several iron and steel work processes were completed within the boundary of Parcel B1. Descriptions of the facilities and processes are provided below:

Primary Rolling Mill:
Slabs were moved from the Slab Conditioning Buildings to roll tables and transported to either of the two reheat furnaces. Slabs were heated and soaked until achieving a rolling temperature of approximately 2,200 degrees F. Heated slabs left the furnace and were descaled with high pressure water to remove iron oxides, then rolled into hot bands of the proper gauge and length. The bands were then water cooled and coiled for sale or further processing.
The two reheat furnaces could use a combination of natural gas, No. 6 fuel oil, and/or on-specification used oil.

Basic Oxygen Furnace (BOF):
Basic oxygen steel making is a method of primary steel making in which carbon-rich molten pig iron is made into steel. Blowing oxygen through molten pig iron lowers the carbon content of the alloy and changes it into low-carbon steel. The process is known as basic because fluxes of burnt lime or dolomite, which are chemical bases, are added to promote the removal of impurities and protect the lining of the converter. The BOF received hot metal from the blast furnaces, scrap steel, and additional recyclable additives. After it was removed from the blast furnaces, the hot metal was passed through a desulfurization process or sent directly to the BOF. Pure oxygen was blown through a water-cooled lance to produce carbon monoxide, which accelerates the metallurgical reactions in the iron. After completion, the molten steel was poured into a ladle, where other alloying agents could be added.

Mould Yard:
When the BOF facilities were unable to receive the hot metals produced from the blast furnaces, the iron could be temporarily stored in the Mould Yard. The hot metal was poured on the ground and allowed to cool. Once it was cooled it could be broken into smaller pieces and then transferred to the BOF.

There are six (6) existing groundwater wells located within the Site boundaries: SW07-PZM004, SW11-PZM005, and SW12-PZP001 (shallow zone); SW07-PZM108, SW11-PZM092, and SW12-PZM100 (lower zone). There are no existing groundwater wells in the intermediate zone. Groundwater samples have been collected from these wells in the past (December 2000 to January 2001) and analyzed for a limited set of general water quality parameters. Available analytical data from these samples were presented in the Site Wide Investigation Groundwater Study Report prepared by the Bethlehem Steel Corporation Sparrows Point Division dated December 20, 2001. The data are included as **Appendix B**, and indicate that historical concentrations of both iron and manganese have exceeded the Project Action Limits (PALs) in all of the deep wells: SW07-PZM108, SW11-PZM092, and SW12-PZM100. Historical concentrations of iron exceeded the PAL in shallow well SW12-PZP001, while historical concentrations of manganese exceeded the PAL in SW11-PZM005. There is no historical soil or soil gas sampling data from this parcel.

1.3 Sampling Design and Rationale

Across the whole Tradepoint Atlantic property, several buildings and facilities may have been historical sources of environmental contamination. These areas were identified as targets for sampling through a careful review of historical documents. When a sampling target was identified, at least two borings were placed at or around its location using GIS software (ArcMap Version 10.2.2). The first sampling targets to be identified were Recognized Environmental Conditions (RECs) located within the Site boundaries, as shown on the REC Location Map provided in the Phase I Environmental Site Assessment (ESA) prepared by Weaver Boos Consultants dated May 19, 2014. All RECs were targeted with at least three (3) borings. The following RECs were identified within the Site boundaries: the Waste Oil Stabilization/Packing Area (REC 9A, Finding 233, also listed as SWMU 194) and Rolling Mills Impoundment (REC 9B, Finding 238). REC 9A consisted of a concrete pad, a soil/gravel area, and 28 dumpsters. The unit received drums of waste oil from around the site. The waste oil was typically contaminated with soil, speedy dry, and grease. Upon arrival, the drums were transported to the dumpsters and emptied. The oil within the dumpsters was then mixed with lime and/or soil to stabilize it. The concrete pad was described as severely cracked and stained during a previous site visit. The area of REC 9A was redrawn from the REC Location Map, based on information given in and preceding Figure IV-9 of the DCC Report. REC 9B included the Rolling Mills Impoundment which was recognized in the DCC report from 1952 aerial photographs. Weaver Boos observed this area to be vacant during the site visit, but speculated that hazardous substances and/or petroleum products may have been present based on experience and historical source information. A secondary spray pond located adjacent to the larger impoundment was also targeted for sampling.

Following the identification and evaluation of all RECs at the Site, SWMUs and Areas of Concern (AOCs) were identified from the DCC Report Figure 3-1. SWMUs and AOCs that were identified as boring targets include a Former Diesel Fuel Spill Area (AOC G), Former Slab Cut-off Spill Area (AOC F), RCRA Regulated Storage Area (SWMU 193), Rolling Mill Scale Pit (SWMU 92), and Waste Oil Stabilization/Packing Area (SWMU 194, discussed with RECs). At the location of AOC G, waste oil was applied to the road surface for dust control on the west side of Slab Haul Road. Approximately 50 tons of soils were removed during remediation efforts, and several thin layers of asphalt were observed during the removal. This suggested that the waste oil application was actually several asphalt paving events. At AOC F, approximately 30 gallons of hydraulic oil were spilled on February 5, 1990. The oil discharged to the ground within the Slabbing Mill, between the Slab Yard and the Soaking Pits. The surface soil remained oil-stained during a visual site inspection in 1991. SWMU 193 identifies the regulated storage area where drums containing chromic acid, mercury, and antimony trichloride were observed during the 1991 visual site inspection. The storage area was located inside the Former Skelp Mill Building, toward the northern end. This area may have been the only RCRA-permitted unit

at Bethlehem Steel Corporation. The Permitted PCB Storage Facility Closure Report prepared by Bethlehem Steel Corporation revised November 2003 also identified a PCB storage facility in the northern section of the building. SWMU 92 recognizes the Rolling Mill Scale Pit located on the southwest side of the Plate Mill. It contains a concrete pit which managed mill scale. The pit was designated as a unit managing non-hazardous waste, and no known releases were recorded.

Additional Findings (Non-RECs) from the Phase I ESA which were identified as Potential Environmental Concerns were also reviewed and targeted as applicable. Weaver Boos' distinction of a REC or Non-REC was based upon the findings of the DCC Report (which was prepared when the features remained on-site in 1998) or on observations of the general area during the site visit. In Non-REC areas, Weaver Boos observed no indications of an existing release, or localized oily staining of surfaces or oily water in de minimis quantities. The DCC Report stated no indications of a release and/or recommended no further action in connection with each of the Non-RECs. Some Non-REC findings are not included on the DCC figure, and therefore were not initially targeted for sampling. However, it is likely that many of these features were targeted for sampling if they were visible on other sets of drawings.

Following the identification of all RECs, SWMUs, and AOCs, four (4) sets of historical site drawings were reviewed to identify additional sampling targets. These site 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. A summary of the specific drawings covering the Site is presented in the table below:

Parcel B1 Historical Site Drawings Details				
Set Name	Typical Features Shown	Drawing Number	Original Date Drawn	Latest Revision Date
Plant Arrangement	Roads, water bodies, building/structure footprints, electric lines, above-ground pipelines (e.g.: steam, nitrogen, etc.)	5026	6/24/1958	3/11/1982
		5027	6/24/1959	3/11/1982
		5032	9/1/1958	3/11/1982
		5033	6/23/1958	3/11/1982
		5038	9/1/1958	3/11/1982
		5039	9/1/1958	3/11/1982
Plant Index	Roads, water bodies, demolished buildings/ structures, electric lines, above-ground pipelines	5126	*Unknown*	9/27/2010
		5127	*Unknown*	8/14/2008
		5132	*Unknown*	8/15/2008
		5133	*Unknown*	7/9/2008
		5138	*Unknown*	1/10/2008
		5139	*Unknown*	1/16/2008
		5120D	*Unknown*	8/13/2008
		5120E	*Unknown*	8/11/2008
Plant Sewer Lines	Same as above plus trenches, sumps, underground piping (includes pipe materials)	5526	8/24/1959	3/19/1992
		5527	*Unknown*	9/10/2008
		5532	*Unknown*	6/1/1976
		5533	8/25/1959	6/8/1976
		5538	*Unknown*	2/10/1975
		5539	8/28/1959	2/21/1975
Drip Legs	Coke Oven Gas Drip Legs Locations	5885B	*Unknown*	Sept. 1988
		5886B	*Unknown*	Sept. 1988
		5887	*Unknown*	Sept. 1988
		5888	*Unknown*	Sept. 1988

Sampling target locations were identified if the historical site drawings depicted industrial activities or a specific feature at a location that may have been a source of environmental contamination that impacted the Site. Based on this criterion, the following sampling targets were identified at the Site: Coal Bins, an Electric Substation, Fuel/Oil/Lube Shops, Oil/Storage Tanks, a Glycol Tank, the Roll Shop, Scale Pits, Settle Basins, Soaking Pits, Spray Ponds, a Spray Water Strainer Room, and a Transformer Storage Area. ARM received a list of former PCB-containing transformer equipment from Tradepoint Atlantic personnel. These possible PCB-containing equipment areas (in addition to the PCB Storage Facility in the Skelp Mill) are indicated on all of the figures. The full list of parcel sampling targets, along with the specific rationale for sampling each, is provided as **Appendix C.**

Additional sample locations were added to fill in areas with insufficient coverage (large spatial gaps between proposed borings) within the Site and to meet the sample density requirements set forth in the Quality Assurance Project Plan (QAPP) Worksheet 17 – Sampling Design and Rationale. Parcel B1 contains a total of approximately 217 acres: 111.0 acres without engineered barriers and 106.4 acres with engineered barriers (parking/roads or building slabs). In accordance with the relevant sampling density requirements, a minimum of 40 soil boring locations are required in the area without engineered barriers, and a minimum of 20 soil boring locations are required in the area with engineered barriers. A total of 94 borings have been proposed in areas without engineered barriers and a total of 82 borings have been proposed in areas with engineered barriers. **Figures 3 through 7** show the proposed borings and the Site boundary overlain on the relevant figures and drawings from the historical documents. **Figure 8** shows the proposed borings on an aerial image to indicate boring locations with regard to engineered barriers. The aerial images were used for some boring adjustments based on physical obstructions (pits), particularly along the eastern parcel boundary near the former 45" x 90" Slabbing Mill. The observed pit locations are highlighted on each of the site-specific figures contained in this Work Plan.

Tradepoint Atlantic has developed an initial master plan for the entire site that shows potential future development areas across the entire Tradepoint Atlantic property. This master plan is a working document and it is expected to undergo subsequent revisions in the future. In its current iteration, the plan shows that roughly 52% of the total area within Parcel B1 is proposed for paving. **Figure 9** shows the current and future (proposed) engineered barriers within Parcel B1.

Groundwater at the Site will be investigated as described in the Area B Groundwater Investigation Work Plan. The groundwater sample locations proposed in this plan are shown on **Figure 10**.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

2.1 Project Personnel

The site characterization of Area B Parcel B1 will be conducted by ARM under a contract with EAG. ARM will provide project planning, field sampling and reporting support. The required drilling, Geoprobe® and laboratory services will be contracted directly by EAG. The management, field, and laboratory responsibilities of key project personnel are defined in this section.

The ARM Project Manager, Mr. Eric Magdar is responsible for ensuring that all activities are conducted in accordance with this Work Plan and the contract requirements. Mr. Magdar will provide technical coordination with the MDE, EPA and EAG. The ARM Project Manager is responsible for managing all operations conducted for this project including:

- Ensure all personnel assigned to this project review the technical project plans before initiation of all tasks associated with the project.
- Review of project plans in a timely manner.
- Ensure proper methods and procedures are implemented to collect representative samples.
- Monitor the project budget and schedule and ensure the availability of necessary personnel, equipment, subcontractors, and other necessary services.

The lead ARM Geologist, Mr. Stewart Kabis, will be responsible for coordinating field activities including the collection, preservation, documentation and shipment of samples. Mr. Kabis will directly communicate with the ARM Project Manager and Laboratory Project Manager on issues pertaining to sample shipments, schedules, container requirements, and other necessary issues. Mr. Kabis is also responsible for ensuring the accuracy of sample documentation including the completion of the chain-of-custody (CoC) forms.

Pace Analytical Services, Inc. (PACE) of Greensburg, Pennsylvania will provide the analytical services for this project. The address for the laboratory is as follows:

Pace Analytical
1638 Roseytown Road
Greensburg, PA 15601

During the field activities, the Laboratory Project Manager will coordinate directly with the ARM Project Manager on issues regarding sample shipments, schedules, container requirements, and other field-laboratory logistics. The Laboratory Project Manager will monitor the daily

activities of the laboratory, coordinate all production activities, and ensure that work is being conducted as specified in this document. Ms. Samantha Bayura will be the Laboratory Project Manager for PACE on this project.

2.2 Health and Safety Issues

Because of the potential presence of metals, petroleum hydrocarbons and chlorinated hydrocarbons in the soil and groundwater at the Site, the investigation will be conducted under a site-specific Health and Safety Plan (HASP) to protect investigation workers from possible exposure to contaminated soil and groundwater. The site-specific HASP for Parcel B1 is provided as **Appendix D**.

Based on information provided to ARM, the planned site activities will be conducted under modified Level D personal protection. The requirements of the modified Level D protection are defined in ARM's site specific Health and Safety Plan. All field personnel assigned for work at the Site have been trained in accordance with the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response standard (29 CFR 1910.120) and other applicable OSHA training standards. All field staff will be experienced in hazardous waste site work, use of personal protective equipment (PPE), and emergency response procedures.

3.0 FIELD ACTIVITIES AND PROCEDURES

3.1 Utility Clearance

ARM will take appropriate precautions to avoid subsurface utilities and structures during the site investigation. Prior to initiating any subsurface investigations, ARM will attempt to determine the location of utilities in the project area using the Miss Utility system. Additionally, any required state or local permits will be acquired prior to the commencement of site activities.

In addition to the Miss Utility system, EAG will clear each proposed boring with utility personnel currently working on the property. To facilitate this, ARM will locate with a GPS and mark all proposed boring locations in the field. ARM will coordinate the staking of borings in the field with Tradepoint Atlantic utility personnel to avoid conflicts. Historical utility drawings which may be relevant include the 5600 Set (Plant Water Lines) and 5800 Set (Plant Gas Lines).

3.2 Sampling Plan

The purpose of this site characterization is to identify any existing hazardous conditions across the entire Site. A summary of the RECs and other areas of concern that will be investigated, along with the proposed boring identification number and the analyses being performed, has been provided as **Appendix C**.

This Work Plan presents the methods and protocols to be used to complete the site characterization. These methods and procedures follow the MDE-VCP and EPA guidelines. Information regarding the project organization, field activities and sampling methods, sampling equipment, sample handling and management procedures, the laboratory analytical methods and selected laboratory, quality control and quality assurance procedures, investigation-derived waste (IDW) management methods, reporting requirements are described in detail in the QAPP that has been developed to support the investigation and remediation of the Tradepoint Atlantic Site (Quality Assurance Project Plan, ARM Group Inc., October 2, 2015).

The proposed schedule of this investigation is contained in this Work Plan (Section 8.0). All site characterization activities will be conducted under the site-specific HASP (**Appendix D**).

3.3 Soil Investigation

Soil samples will be collected from the locations identified on **Figures 3 through 8**, and in accordance with procedures referenced in the QAPP Worksheet 21 – Field SOPs (Standard Operating Procedures), SOP No. 009 – Sub-Surface Soil Sampling.

Regarding soil sampling depth, a shallow sample will be collected from the 0 to 1 foot depth interval, and a deeper sample will be collected from the 4 to 5 foot depth interval. One additional set of samples will also be collected from the 9 to 10 foot depth interval if groundwater has not been encountered; however, these samples will be held by the laboratory pending the analysis of the 0 to 1 and 4 to 5 foot depth interval samples. If the PID or other field observations indicate contamination to exist at a depth greater than 3 feet bgs but less than 9 feet bgs, and is above the water table, the sample from the deeper 4-5 foot interval may be shifted to the depth interval indicated by the PID response. It should be noted that no soil samples will be collected from a depth that is below the water table.

After soil sampling has been concluded at a location, all down-hole soil sampling equipment will be decontaminated according to procedures referenced in the QAPP Worksheet 21 – Field SOPs, SOP No. 016 – Equipment Decontamination. The decontamination procedures that will be used during the course of this investigation include Decontamination Area (Section 3.1 of the SOP), Decontamination of Sampling Equipment (Section 3.5), Decontamination of Measurement Devices & Monitoring Equipment (Section 3.7), Decontamination of Subsurface Drilling Equipment (Section 3.8), and Document and Record Keeping (Section 5).

All soil samples will be analyzed for TCL-VOCs, TCL-SVOCs, TAL-Metals, TPH-DRO, TPH-GRO, hexavalent chromium, and cyanide. Additionally, the shallow soil samples collected across the Site from the 0-1 foot bgs interval will also be analyzed for PCBs. Analytical methods, sample containers, preservatives, and holding times for the sample analyses are listed in the QAPP Worksheet 19 & 30 – Sample Containers, Preservation, and Holding Times.

3.4 NAPL Delineation

In the event that NAPL bearing soils are identified in a soil boring, a temporary piezometer will be installed according to the specifications identified in SOP No. 28 – Direct Push Installation and Construction of Temporary Groundwater Sample Collection Points. ARM will immediately check the piezometer for the presence of NAPL using an oil-water interface probe in accordance with methods referenced in the SOP No. 19 – Depth to Groundwater and NAPL Measurements. If NAPL is not detected, the piezometer will be allowed to equilibrate for at least 48 hours prior to a second measurement. If no product is detected after 48 hours, the piezometer will be emptied, removed and discarded, and the borehole will be abandoned in accordance with Maryland abandonment standards as stated in COMAR 26.04.04.34 through 36. If measurable NAPL is detected during either check, another measurement will be made after a 30 day (minimum) equilibration period to determine NAPL thickness.

If NAPL is detected in the initial piezometer, ARM will remobilize (following utility clearance) to install and inspect additional soil borings and shallow, temporary piezometers to the north, south, east, and west of the detection point at distances of 25 feet. Delineation piezometers will

extend into adjacent parcels (if applicable) but will not be installed off of Tradepoint Atlantic property and will only be installed up to the edge of existing buildings. At each location, continuous core soil samples will be screened with a hand-held PID and inspected for evidence of NAPL, and the additional temporary piezometers will be installed to a final depth determined by ARM personnel.

Each additional piezometer installed to delineate the NAPL will be checked for the presence of product with an oil-water interface probe immediately after installation, 48 hours after installation, and again after a 30 day equilibration period. If measureable NAPL is identified within any of the piezometers, additional borings/piezometers will be added as necessary to complete the delineation. The MDE will be notified within 48 hours if NAPL is detected within the temporary piezometers. Once the MDE has given approval to abandon the additional piezometers, each piezometer will be emptied, removed and discarded. All boreholes will be abandoned in accordance with Maryland abandonment standards as stated in COMAR 26.04.04.34 through 36. A full report documenting the results of the delineation, including NAPL thickness, will be submitted to the MDE within 30 days of completing the field activities.

3.5 Sample Documentation

3.5.1 Sample Numbering

Samples will be numbered in accordance with the QAPP Appendix C – Data Management Plan.

3.5.2 Sample Labels & Chain-of-Custody Forms

Samples will be labeled and recorded on the Chain-of-Custody form in accordance with methods referenced in the QAPP Worksheet 26 & 27 – Sample Handling, Custody and Disposal.

3.6 Laboratory Analysis

EAG has contracted PACE of Greensburg, Pennsylvania to perform the laboratory analysis for this project. All sample analyses to be performed are listed in **Appendix C**. The samples will be submitted for analysis with a standard turnaround time (approximately 5 work days). The specific list of compounds and analytes that the soil samples will be analyzed for, as well as the quantitation limits and project action limits, is provided in QAPP Worksheet 15 – Project Action Limits and Laboratory-Specific Detection/Quantitation Limits.

4.0 QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

All soil samples will be collected using dedicated equipment including new soil core liners and polyethylene tubing. Each cooler temperature will be measured and documented by the laboratory upon receipt.

Quality control (QC) samples are collected during field studies for various purposes, among which are to isolate site effects (control samples), to define background conditions (background sample), and to evaluate field/laboratory variability (spikes and blanks, trip blanks, duplicates, etc.).

The following QC samples will be submitted for analysis to support the data validation:

- Trip Blank – at a rate of one per day
  - Soil – VOCs only
- Blind Field Duplicate – at a rate of one duplicate per twenty samples
  - Soil - VOCs, SVOCs, Metals, TPH-DRO, TPH-GRO, PCBs, 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, PCBs, and Hexavalent Chromium
- Field Blank and Equipment Blank
  - Soil - VOCs, SVOCs, Metals, TPH-DRO, TPH-GRO, Hexavalent Chromium, and Cyanide

The QC samples will be 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.

5.0 MANAGEMENT OF INVESTIGATION-DERIVED WASTE

All investigation derived waste (IDW) procedures will be carried out in accordance with methods referenced in the QAPP Worksheet 21 – Field SOPs, SOP No. 5 – Investigation-Derived Wastes Management.

6.0 DATA VALIDATION

All data validation procedures will be carried out in accordance with the QAPP Worksheet 34 – Data Verification and Validation Inputs, QAPP Worksheet 35 – Data Verification Procedures, and QAPP Worksheet 36 – Data Validation Procedures.

7.0 REPORTING

Following the receipt of all sampling results from "Area B Parcel B1", ARM will prepare a Phase II Site Investigation Report that will document the sample collection procedures and supporting rationale, and present and interpret the analytical results. All results will be presented in tabular and graphical formats as appropriate to best summarize the data for future use. The sample results will be compared against relevant criteria such as the MDE Generic Numeric Cleanup Standards and the EPA Regional Screening Levels, considering appropriate land use factors and institutional controls, to identify contaminants and exposure pathways of potential concern. ARM will also present recommendations for any additional site investigation activities if warranted.

8.0 SCHEDULE

The field activities below (including sample analysis and data validation) are planned so that they may be completed within six (6) months of agency approval of this Work Plan. In addition, the investigation report will be submitted to the regulatory authorities within two (2) months of completion of the field investigation in accordance with these approximate timeframes:

- the sample collection activities will take approximately six (6) weeks to complete (including mobilization activities) once approval of the work plan is received; and
- the soil analysis, data validation and review is expected to require an additional eight (8) weeks to complete; and
- the preparation of the investigation report, including an internal Quality Assurance Review cycle, will require another eight (8) weeks.

FIGURES

ARM Group Inc.
Earth Resource Engineers and Consultants

0 375 750 1,500 Feet

- Site Boundary
- Private Property
- Area A Boundaries
- Area B Boundaries

Tradepoint Atlantic
Area A and Area B Parcels

March 2, 2016

EnviroAnalytics Group	Tradepoint Atlantic
Area A: Project 150298M Area B: Project 150300M	Baltimore County, MD

Figure 1

ARM Group Inc.
Earth Resource Engineers and Consultants

0 375 750 1,500 Feet

Site Boundary
Area A Boundaries
Area B Boundaries
Land
Marsh
Water

Approximate Shoreline in 1916

March 2, 2016

Adapted from Figure 2-5 of the Description of Current Conditions Report prepared by Rust Environmental and Infrastructure, dated January 1998

EnviroAnalytics Group

Area A: Project 150298M
Area B: Project 150300M

Tradepoint Atlantic

Baltimore County, MD

Figure 2

Parcel B1: Proposed Sample Locations
Locations of SWMUs, AOCs, and Facility Areas

March 3, 2016

Figure 3

EnviroAnalytics Group	Tradepoint Atlantic
ARM Project 150300M	Baltimore County, MD

Parcel B15

Parcel B1

Parcel B2

Parcel B17

Parcel B4

Parcel B5

Clock House

North Yard Office

Oil House

Car Checker's Office

Lube Shop

160" Plate Mill

60" Plate Mill

East Process Building

Slab Yard

40" x 80" Slab Mill

#10 Mechanical Testing Lab

Plate Mill Office

Slab Yard Office

No. 2 & 4 Soaking Pits

Maintenance Office

REC 9A, Finding 233

REC 9B, Finding 238

12" Skelp Mill

No. 1 & 3 Soaking Pits

54" & 40" Blooming Mills

Oil House

Office

Oxygen Station

Service Building

Roll Shop

45 x 90 Slabbing Mill

No. 5 Soaking Pit

Slab Yard

Pattern Storage Building

Locomotive Repair Building

Service Building

No. 4 Open Hearth

No. 4 Open Hearth

No. 4 Mould Yard & Stripper

No. 2 BOF & Continuous Caster

No. 3 Open Hearth

General Mech Office

No. 1 Steel Side Supply Whse

Car Repair Shop

Training (Welding) School

Brick Layer School

Slab Group Office

No Engineered Barrier:
51% of Parcel Coverage
4,833,700 square feet (111.0 acres)

Parking/Roads:
27% of Parcel Coverage
56% of Engineered Barriers
2,577,500 square feet (59.2 acres)

Buildings:
22% of Parcel Coverage
44% of Engineered Barriers
2,055,400 square feet (47.2 acres)

Parcel B1: Proposed Sample Locations Historical Site Drawings - 5000 Set

March 3, 2016

Figure 4

EnviroAnalytics Group	Tradepoint Atlantic
ARM Project 150300M	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

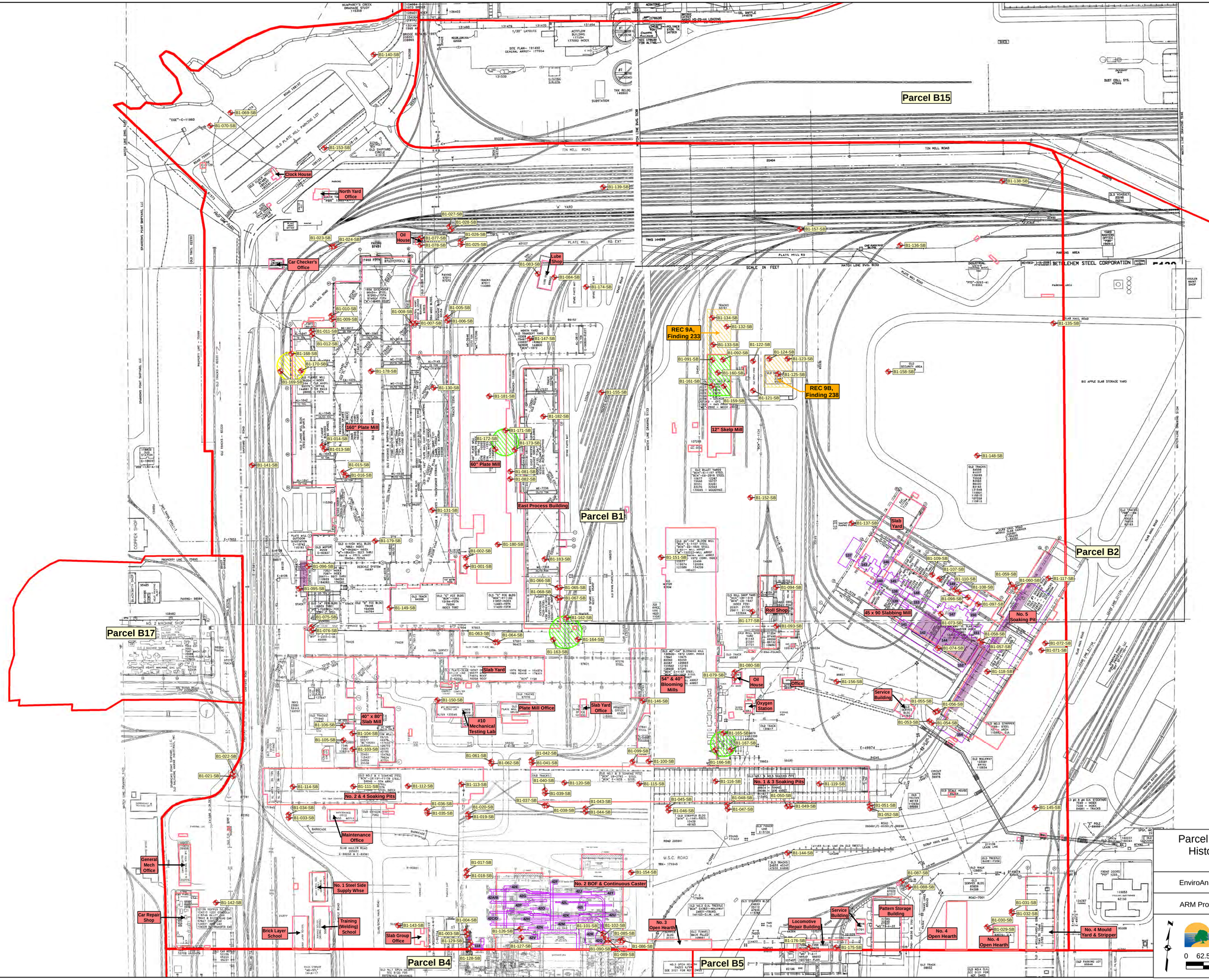
0 62.5 125 250 Feet

- Soil Boring
- Former Building Footprints
- Pit Locations Observed (ARM)
- Pit Locations from MCM
- REC Area
- Parcel Boundary

Possible PCB-Containing Area

Concentration

- Over 50 ppm
- Over 500 ppm



No Engineered Barrier:
51% of Parcel Coverage
4,833,700 square feet (111.0 acres)

Parking/Roads:
27% of Parcel Coverage
56% of Engineered Barriers
2,577,500 square feet (59.2 acres)

Buildings:
22% of Parcel Coverage
44% of Engineered Barriers
2,055,400 square feet (47.2 acres)

Parcel B1: Proposed Sample Locations Historical Site Drawings - 5100 Set

March 3, 2016

Figure 5

EnviroAnalytics Group	Tradepoint Atlantic
ARM Project 150300M	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 62.5 125 250 Feet

- Soil Boring
- Former Building Footprints
- Pit Locations Observed (ARM)
- Pit Locations from MCM
- REC Area
- Parcel Boundary

Possible PCB-Containing Area
Concentration
- Over 50 ppm
- Over 500 ppm

No Engineered Barrier:
51% of Parcel Coverage
4,833,700 square feet (111.0 acres)

Parking/Roads:
27% of Parcel Coverage
56% of Engineered Barriers
2,577,500 square feet (59.2 acres)

Buildings:
22% of Parcel Coverage
44% of Engineered Barriers
2,055,400 square feet (47.2 acres)

Parcel B1: Proposed Sample Locations Historical Site Drawings - 5500 Set

March 3, 2016

Figure 6

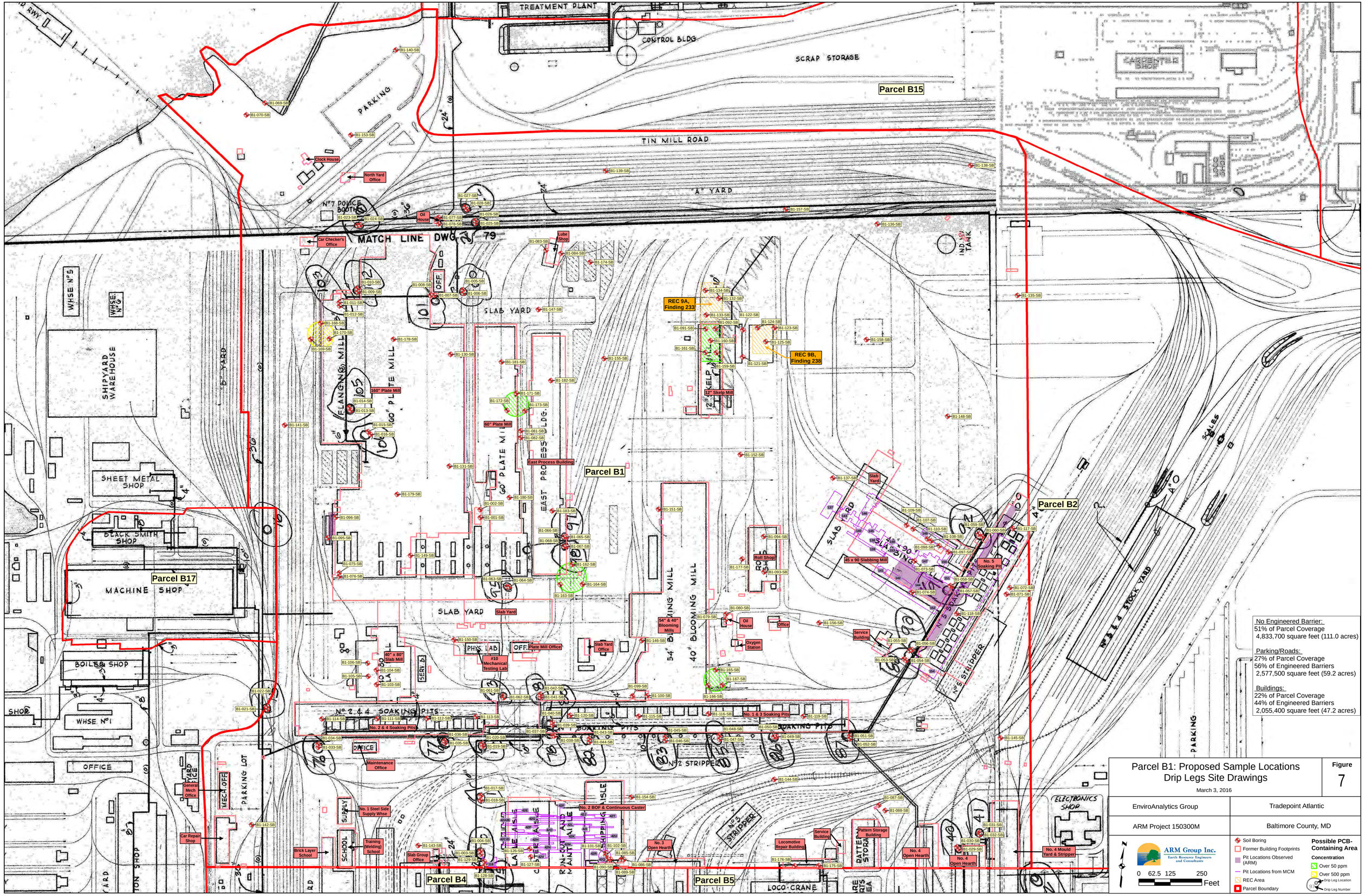
EnviroAnalytics Group	Tradepoint Atlantic
ARM Project 150300M	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 62.5 125 250 Feet

- Soil Boring
- Former Building Footprints
- Pit Locations Observed (ARM)
- Pit Locations from MCM
- REC Area
- Parcel Boundary

Possible PCB-Containing Area
Concentration
- Over 50 ppm
- Over 500 ppm


Parcel B15
Parcel B1
Parcel B2
Parcel B17
Parcel B4
Parcel B5
TREATMENT PLANT
CONTROL BLDG.
SCRAP STORAGE
CARPENTER SHOP
LOCO SHOP
TIN MILL ROAD
"A" YARD
PARKING
Clock House
North Yard Office
No 7 POLICE BOOTH
Oil House
Car Checker's Office
MATCH LINE DWG. 79
Lube Shop
IND. 50' TANK
WHSE. N° 5
WHSE. N° 6
SHIPYARD WAREHOUSE
SLAB YARD
OFF.
REC 9A, Finding 233
REC 9B, Finding 238
160" Plate Mill
12" Skelp Mill
60" Plate Mill
East Process Building
54" & 40" Blooming Mills
Roll Shop
Slab Yard
45 x 90 Slabbing Mill
No. 5 Soaking Pit
N°5 STRIPPER
N°5 STOCK YARD
SALES
SHEET METAL SHOP
BLACK SMITH SHOP
MACHINE SHOP
BOILER SHOP
SHOP
WHSE. N°1
OFFICE
PARKING LOT
50" x 80" Slab Mill
PHYS. LAB.
#10 Mechanical Testing Lab
OFF.
Plate Mill Office
Slab Yard Office
Oil House
Oxygen Station
Office
Service Building
No. 1 & 3 Soaking Pits
No. 2 & 4 Soaking Pits
Nº 2 & 4 SOAKING PITS
SOAKING PITS
Nº2 STRIPPER
Maintenance Office
General Mech Office
MECH. OFF.
No. 1 Steel Side Supply Whse
SUPPLY
Car Repair Shop
Brick Layer School
Training (Welding) School
SCHOOL
Slab Group Office
No. 2 BOF & Continuous Caster
No. 3 Open Hearth
No. 3 STRIPPER
Locomotive Repair Building
Service Building
Pattern Storage Building
No. 4 Open Hearth
No. 4 Open Hearth
No. 4 Mould Yard & Stripper
ELECTRONICS SHOP
LOCO-CRANE
No Engineered Barrier:
51% of Parcel Coverage
4,833,700 square feet (111.0 acres)
Parking/Roads:
27% of Parcel Coverage
56% of Engineered Barriers
2,577,500 square feet (59.2 acres)
Buildings:
22% of Parcel Coverage
44% of Engineered Barriers
2,055,400 square feet (47.2 acres)
Parcel B1: Proposed Sample Locations
Drip Legs Site Drawings
March 3, 2016
Figure
7
EnviroAnalytics Group
Tradepoint Atlantic
ARM Project 150300M
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0 62.5 125 250
Feet
Soil Boring
Former Building Footprints
Pit Locations Observed (ARM)
Pit Locations from MCM
REC Area
Parcel Boundary
Possible PCB-Containing Area
Concentration
Over 50 ppm
Over 500 ppm
Drip Leg Location
Drip Leg Number

No Engineered Barrier:
51% of Parcel Coverage
4,833,700 square feet (111.0 acres)

Parking/Roads:
27% of Parcel Coverage
56% of Engineered Barriers
2,577,500 square feet (59.2 acres)

Buildings:
22% of Parcel Coverage
44% of Engineered Barriers
2,055,400 square feet (47.2 acres)

Parcel B1: Proposed Sample Locations Aerial View

March 3, 2016

Figure 8

EnviroAnalytics Group	Tradepoint Atlantic
ARM Project 150300M	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

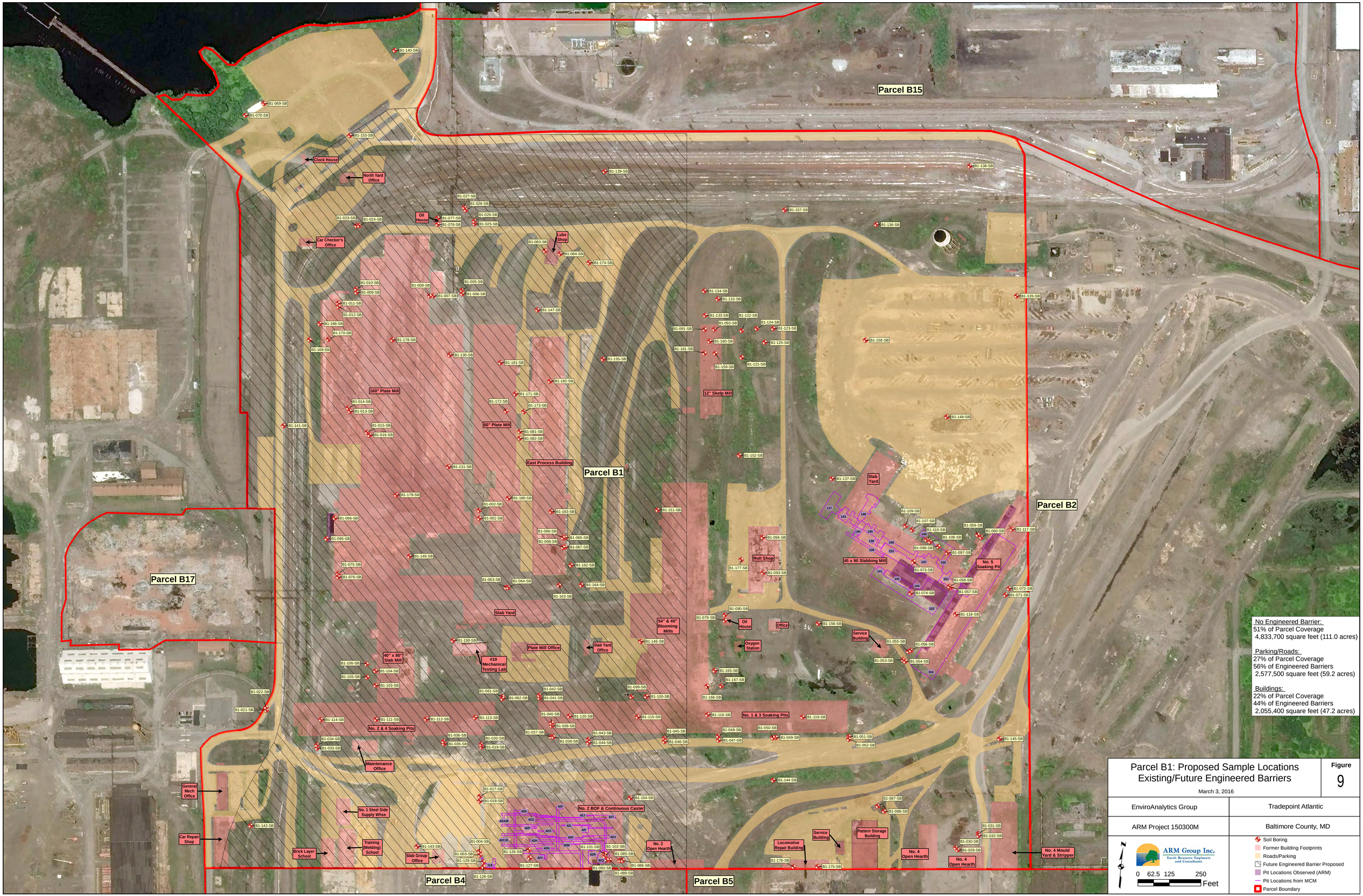
0 62.5 125 250 Feet

- Soil Boring
- Former Building Footprints
- Pit Locations Observed (ARM)
- Pit Locations from MCM
- REC Area
- Parcel Boundary

Possible PCB-Containing Area

Concentration

- Over 50 ppm
- Over 500 ppm


Parcel B15
Parcel B1
Parcel B2
Parcel B17
Parcel B4
Parcel B5
B1-140-SB
B1-069-SB
B1-070-SB
B1-153-SB
Clock House
North Yard Office
B1-139-SB
B1-138-SB
B1-027-SB
B1-028-SB
B1-026-SB
B1-025-SB
B1-023-SB
B1-024-SB
Oil House
B1-077-SB
B1-078-SB
B1-157-SB
B1-136-SB
Car Checker's Office
B1-083-SB
Lube Shop
B1-084-SB
B1-174-SB
B1-010-SB
B1-009-SB
B1-008-SB
B1-007-SB
B1-005-SB
B1-006-SB
B1-134-SB
B1-132-SB
B1-135-SB
B1-011-SB
B1-012-SB
B1-147-SB
B1-133-SB
B1-122-SB
B1-092-SB
B1-124-SB
B1-123-SB
B1-091-SB
B1-168-SB
B1-170-SB
B1-160-SB
B1-125-SB
B1-158-SB
B1-169-SB
B1-178-SB
B1-130-SB
B1-161-SB
B1-155-SB
B1-159-SB
B1-121-SB
B1-181-SB
B1-182-SB
160" Plate Mill
12" Skelp Mill
B1-014-SB
B1-013-SB
B1-171-SB
B1-172-SB
B1-173-SB
B1-148-SB
B1-141-SB
B1-015-SB
B1-016-SB
60" Plate Mill
B1-081-SB
B1-082-SB
B1-152-SB
East Process Building
B1-131-SB
B1-137-SB
Slab Yard
B1-179-SB
B1-180-SB
B1-002-SB
B1-001-SB
B1-183-SB
B1-151-SB
B1-096-SB
B1-095-SB
B1-066-SB
B1-068-SB
B1-065-SB
B1-067-SB
B1-149-SB
B1-162-SB
B1-075-SB
B1-076-SB
B1-063-SB
B1-064-SB
B1-164-SB
B1-163-SB
Roll Shop
B1-177-SB
B1-093-SB
45 x 90 Slabbing Mill
No. 5 Soaking Pit
B1-109-SB
B1-107-SB
B1-110-SB
B1-059-SB
B1-060-SB
B1-117-SB
B1-094-SB
B1-108-SB
B1-098-SB
B1-097-SB
B1-073-SB
B1-058-SB
B1-057-SB
B1-072-SB
B1-071-SB
B1-074-SB
B1-080-SB
B1-079-SB
Oil House
Office
B1-156-SB
B1-118-SB
54" & 40" Blooming Mills
B1-150-SB
Plate Mill Office
Slab Yard Office
B1-146-SB
Service Building
B1-055-SB
B1-056-SB
40" x 80" Slab Mill
#10 Mechanical Testing Lab
B1-106-SB
B1-104-SB
B1-105-SB
B1-103-SB
B1-053-SB
B1-054-SB
Oxygen Station
B1-165-SB
B1-167-SB
B1-166-SB
B1-022-SB
B1-021-SB
B1-061-SB
B1-062-SB
B1-042-SB
B1-041-SB
B1-099-SB
B1-100-SB
B1-116-SB
No. 1 & 3 Soaking Pits
B1-119-SB
B1-114-SB
B1-111-SB
B1-112-SB
B1-113-SB
B1-040-SB
B1-120-SB
B1-115-SB
B1-039-SB
No. 2 & 4 Soaking Pits
B1-048-SB
B1-050-SB
B1-051-SB
B1-145-SB
B1-034-SB
B1-033-SB
B1-036-SB
B1-035-SB
B1-020-SB
B1-019-SB
B1-037-SB
B1-043-SB
B1-038-SB
B1-044-SB
B1-045-SB
B1-046-SB
B1-047-SB
B1-049-SB
B1-052-SB
Maintenance Office
B1-144-SB
B1-087-SB
B1-088-SB
General Mech Office
B1-017-SB
B1-018-SB
B1-154-SB
No. 1 Steel Side Supply Whse
No. 2 BOF & Continuous Caster
B1-142-SB
Car Repair Shop
Training (Welding) School
Brick Layer School
B1-143-SB
Slab Group Office
B1-004-SB
B1-003-SB
B1-129-SB
B1-126-SB
B1-127-SB
B1-128-SB
B1-101-SB
B1-102-SB
B1-085-SB
B1-086-SB
B1-090-SB
B1-089-SB
No. 3 Open Hearth
Locomotive Repair Building
Service Building
Pattern Storage Building
No. 4 Open Hearth
No. 4 Open Hearth
No. 4 Mould Yard & Stripper
B1-176-SB
B1-175-SB
B1-031-SB
B1-032-SB
B1-030-SB
B1-029-SB
No Engineered Barrier:
51% of Parcel Coverage
4,833,700 square feet (111.0 acres)
Parking/Roads:
27% of Parcel Coverage
56% of Engineered Barriers
2,577,500 square feet (59.2 acres)
Buildings:
22% of Parcel Coverage
44% of Engineered Barriers
2,055,400 square feet (47.2 acres)
Parcel B1: Proposed Sample Locations
Existing/Future Engineered Barriers
March 3, 2016
Figure
9
EnviroAnalytics Group
Tradepoint Atlantic
ARM Project 150300M
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0 62.5 125 250
Feet
Soil Boring
Former Building Footprints
Roads/Parking
Future Engineered Barrier Proposed
Pit Locations Observed (ARM)
Pit Locations from MCM
Parcel Boundary

Parcel B15
Parcel B1
Parcel B2
Parcel B17
Parcel B4
Parcel B5
TM03-PZM004
TM03-PZM037
TM05-PZM005
TM05-PZM040
SW-021-MWS
SW-022-MWS
SW-023-MWS
SW-024-MWS
SW-025-MWS
SW-026-MWS
SW-058-MWS
SW-059-MWS
SW-060-MWS
SW-061-MWS
SW-062-MWS
SW-068-MWS
SW-069-MWS
SW07-PZM108
SW07-PZM004
SW08-PZM003
SW08-PZM053
FM01-PZM041
FM01-PZM003
SW09-PZM028
SW09-PZM004
SW09-PZM068
SW11-PZM005
SW12-PZP001
Clock House
North Yard Office
Oil House
Car Checker's Office
Lube Shop
160" Plate Mill
60" Plate Mill
East Process Building
12" Skelp Mill
REC 9A, Finding 233
REC 9B, Finding 238
Slab Yard
Roll Shop
45 x 90 Slabbing Mill
No. 5 Soaking Pit
54" & 40" Blooming Mills
Office
Oxygen Station
Service Building
Plate Mill Office
Slab Yard Office
40" x 80" Slab Mill
#10 Mechanical Testing Lab
No. 1 & 3 Soaking Pits
No. 2 & 4 Soaking Pits
Maintenance Office
General Mech Office
No. 1 Steel Side Supply Whse
Car Repair Shop
Brick Layer School
Training (Welding) School
Slab Group Office
No. 2 BOF & Continuous Caster
No. 3 Open Hearth
Locomotive Repair Building
Service Building
Pattern Storage Building
No. 4 Open Hearth
No. 4 Open Hearth
No. 4 Mould Yard & Stripper

No Engineered Barrier:
51% of Parcel Coverage
4,833,700 square feet (111.0 acres)

Parking/Roads:
27% of Parcel Coverage
56% of Engineered Barriers
2,577,500 square feet (59.2 acres)

Buildings:
22% of Parcel Coverage
44% of Engineered Barriers
2,055,400 square feet (47.2 acres)

Parcel B1: Proposed Groundwater Samples Aerial View (From Groundwater Work Plan)

March 3, 2016

Figure 10

EnviroAnalytics Group

Tradepoint Atlantic

ARM Project 150300M

Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 62.5 125 250 Feet

Final Location, Near-field Well
Final Location, Perimeter Well
Existing Well
Former Building Footprints
Pit Locations Observed (ARM)
Pit Locations from MCM
REC Area
Parcel Boundary
Possible PCB-Containing Area Concentration
Over 50 ppm
Over 500 ppm

Appendix A

Parcel B1 Pit Information from MCM
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

Structure ID Number*	Function	MCM Field Verified?	Approx. Length (ft)	Approx. Width (ft)	Approx. Depth (ft)
CEI-118	Mould Treating Pit	No	152	1	10.5
CEI-137	Slab Piling Car Pit	No	87	28	5.5
CEI-138	Vert. Roll Tilter	No	16	5	8.0
CEI-139	Air & Cable Tunnel	No	139	4	9.3
CEI-140	Shear	No	47	44	5.6
CEI-141	Slab Shear	No	16	14	15.0
CEI-142	Maint. M.G. Set Foundation	No	91	7	10.0
CEI-143	Shear Runout Table	No	60	40	8.5
CEI-144	Main Drive & Edger Motor Foundation	No	76	32	8.0
CEI-145	Shear Approach Table	No	64	32	10.0
CEI-146	Crop Conveyor	No	113	44	12.0
CEI-147	Slabbing Mill	No	100	73	10.0
CEI-148	Mill Run Out Table	No	125	16	13.0
CEI-149	Scale Pit	No	118	23	43.0
CEI-150	Tunnel Between Mill & Scale Pit	No	55	14	29.5
CEI-151	Turn Around Scale Receiving & Mill Approach Table	No	118	23	15.0
CEI-152	Motor Room Floor Pit	No	236	83	15.6
CEI-153	Oil Cellar	No	110	30	15.6
CEI-154	Soaking Pits	No	625	103	14.5
CEI-42A/B	Steam Exhaust Tunnel	No	465	7	4.3
CEI-42C/D	Steam Exhaust Tunnel	No	465	7	4.3
CEI-42E	Mechanical Tunnel	No	588	11	8.8
CEI-42F	Electrical Tunnel	No	186	9	17.3
CEI-42G	Caster Flumes	Yes	355	8	8.8
CEI-42H	Caster Flumes	Yes	355	8	8.8
CEI-42I	Cable Spreading Vault	No	28	27	3.2
CEI-42J	Hydraulic Trench	No	162	3	2.0
CEI-42K	Hydraulic Trench	No	162	3	2.0
CEI-42L	Electrical Trench	No	218	5	5.3
CEI-42M	Electrical Trench	No	136	5	5.3
CEI-42N	Electrical Trench	No	72	4	5.9
CEI-42O	Electrical Trench	No	90	5	5.8
CEI-42P	Hydraulic Trench	No	46	5	2.0
CEI-42Q	Scale Pit	Yes	27	(circular)	63.3
CEI-42R	Scale Pit Pump Room	Yes	55	40	47.8
CEI-42T	Piler Pit	No	71	6	13.5
CEI-42U	Piler Pit	No	71	6	13.5
CEI-42V	Elevator	No	17	14	6.8

*Abbreviated IDs are given on the figures (only the unique identifiers after "CEI-")

March 3, 2016

Parcel B1 Foundation Pits Photographic Log
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

082515-1: Pits observed a the location of the former 45” x 90” Slabbing Mill, facing northeast. Pits were observed to be filled with standing water and rubble.

082515-2: Pits observed a the location of the former No. 5 Soaking Pits, facing east. Pits were observed to be filled with standing water and rubble.

Appendix B

Parcel B1 Historical Well Data
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

	Well	Chemical Analyte	CAS #	Sampling Date	Detection Limit	Units	Project Action Limit (PAL)	Result
Shallow Zone	SW07-PZM004	Bicarbonate	71-52-3	12/27/2000	1	mg/L	No PAL	120
	SW07-PZM004	Calcium	7440-70-2	12/27/2000	0.5	mg/L	No PAL	100
	SW07-PZM004	Chloride	16887-00-6	12/27/2000	10	mg/L	No PAL	430
	SW07-PZM004	Iron	7439-89-6	12/27/2000	0.1	mg/L	14	3.2
	SW07-PZM004	Magnesium	7439-95-4	12/27/2000	0.1	mg/L	No PAL	20
	SW07-PZM004	Manganese	7439-96-5	12/27/2000	0.01	mg/L	0.43	0.28
	SW07-PZM004	Potassium	7440-09-7	12/27/2000	0.1	mg/L	No PAL	24
	SW07-PZM004	Sodium	7440-23-5	12/27/2000	0.5	mg/L	No PAL	250
	SW07-PZM004	Sulfate	14808-79-8	12/27/2000	10	mg/L	No PAL	230
	SW07-PZM004	Total dissolved solids (TDS)	TDS	12/27/2000	10	mg/L	No PAL	1100
Lower Zone	SW07-PZM108	Bicarbonate	71-52-3	12/27/2000	1	mg/L	No PAL	38
	SW07-PZM108	Calcium	7440-70-2	12/27/2000	0.5	mg/L	No PAL	76
	SW07-PZM108	Chloride	16887-00-6	12/27/2000	50	mg/L	No PAL	1100
	SW07-PZM108	Iron	7439-89-6	12/27/2000	0.1	mg/L	14	**100**
	SW07-PZM108	Magnesium	7439-95-4	12/27/2000	0.1	mg/L	No PAL	52
	SW07-PZM108	Manganese	7439-96-5	12/27/2000	0.01	mg/L	0.43	**2.2**
	SW07-PZM108	Potassium	7440-09-7	12/27/2000	0.1	mg/L	No PAL	7.2
	SW07-PZM108	Sodium	7440-23-5	12/27/2000	0.5	mg/L	No PAL	500
	SW07-PZM108	Sulfate	14808-79-8	12/27/2000	5	mg/L	No PAL	140
	SW07-PZM108	Total dissolved solids (TDS)	TDS	12/27/2000	200	mg/L	No PAL	2700
Shallow Zone	SW11-PZM005	Bicarbonate	71-52-3	12/28/2000	2	mg/L	No PAL	140
	SW11-PZM005	Calcium	7440-70-2	12/28/2000	0.5	mg/L	No PAL	65
	SW11-PZM005	Chloride	16887-00-6	12/28/2000	10	mg/L	No PAL	260
	SW11-PZM005	Iron	7439-89-6	12/28/2000	0.1	mg/L	14	1
	SW11-PZM005	Magnesium	7439-95-4	12/28/2000	0.1	mg/L	No PAL	24
	SW11-PZM005	Manganese	7439-96-5	12/28/2000	0.01	mg/L	0.43	**0.57**
	SW11-PZM005	Potassium	7440-09-7	12/28/2000	0.1	mg/L	No PAL	6.8
	SW11-PZM005	Sodium	7440-23-5	12/28/2000	0.5	mg/L	No PAL	180
	SW11-PZM005	Sulfate	14808-79-8	12/28/2000	5	mg/L	No PAL	170
	SW11-PZM005	Total dissolved solids (TDS)	TDS	12/28/2000	100	mg/L	No PAL	1100
Lower Zone	SW11-PZM092	Bicarbonate	71-52-3	1/16/2001	1	mg/L	No PAL	100
	SW11-PZM092	Calcium	7440-70-2	1/16/2001	0.5	mg/L	No PAL	78
	SW11-PZM092	Chloride	16887-00-6	1/16/2001	2	mg/L	No PAL	110
	SW11-PZM092	Iron	7439-89-6	1/16/2001	0.1	mg/L	14	**20**
	SW11-PZM092	Magnesium	7439-95-4	1/16/2001	0.1	mg/L	No PAL	18
	SW11-PZM092	Manganese	7439-96-5	1/16/2001	0.01	mg/L	0.43	**1**
	SW11-PZM092	Potassium	7440-09-7	1/16/2001	0.1	mg/L	No PAL	9
	SW11-PZM092	Sodium	7440-23-5	1/16/2001	0.5	mg/L	No PAL	60
	SW11-PZM092	Sulfate	14808-79-8	1/16/2001	5	mg/L	No PAL	96
	SW11-PZM092	Total dissolved solids (TDS)	TDS	1/16/2001	10	mg/L	No PAL	440

Parcel B1 Historical Well Data
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

	Well	Chemical Analyte	CAS #	Sampling Date	Detection Limit	Units	Project Action Limit (PAL)	Result
Shallow Zone	SW12-PZP001	Bicarbonate	71-52-3	12/28/2000	2	mg/L	No PAL	140
	SW12-PZP001	Calcium	7440-70-2	12/28/2000	0.5	mg/L	No PAL	110
	SW12-PZP001	Chloride	16887-00-6	12/28/2000	1	mg/L	No PAL	70
	SW12-PZP001	Iron	7439-89-6	12/28/2000	0.1	mg/L	14	0.8
	SW12-PZP001	Magnesium	7439-95-4	12/28/2000	0.1	mg/L	No PAL	39
	SW12-PZP001	Manganese	7439-96-5	12/28/2000	0.01	mg/L	0.43	0.36
	SW12-PZP001	Potassium	7440-09-7	12/28/2000	0.1	mg/L	No PAL	17
	SW12-PZP001	Sodium	7440-23-5	12/28/2000	0.5	mg/L	No PAL	140
	SW12-PZP001	Sulfate	14808-79-8	12/28/2000	25	mg/L	No PAL	550
	SW12-PZP001	Total dissolved solids (TDS)	TDS	12/28/2000	10	mg/L	No PAL	1000
Lower Zone	SW12-PZM100	Bicarbonate	71-52-3	12/28/2000	1	mg/L	No PAL	76
	SW12-PZM100	Calcium	7440-70-2	12/28/2000	0.5	mg/L	No PAL	60
	SW12-PZM100	Chloride	16887-00-6	12/28/2000	10	mg/L	No PAL	520
	SW12-PZM100	Iron	7439-89-6	12/28/2000	0.1	mg/L	14	**38**
	SW12-PZM100	Magnesium	7439-95-4	12/28/2000	0.1	mg/L	No PAL	38
	SW12-PZM100	Manganese	7439-96-5	12/28/2000	0.01	mg/L	0.43	**1.3**
	SW12-PZM100	Potassium	7440-09-7	12/28/2000	0.1	mg/L	No PAL	8.3
	SW12-PZM100	Sodium	7440-23-5	12/28/2000	0.5	mg/L	No PAL	210
	SW12-PZM100	Sulfate	14808-79-8	12/28/2000	1	mg/L	No PAL	30
	SW12-PZM100	Total dissolved solids (TDS)	TDS	12/28/2000	10	mg/L	No PAL	990

Appendix C

Parcel B1 Sampling Plan Summary
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

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
Coal Bins		Drawing 5032	Investigate potential impacts related to coal bins (potential leaks or releases).	2	B1-001 and B1-002	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, PCBs (0-1')
Drip Legs (33)		Drip Legs Drawings 5885B, 5886B, and 5887	Coke oven gas condensate was removed from the gas pipelines at drip legs located throughout the distribution system. The condensate was typically discharged to drums, although it is possible some spilled out of the drums and on to the ground.	66	B1-003 through B1-068	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, PCBs (0-1')
Electric Substation		Drawing 5138	Investigate potential impacts related to the electric substation (potential leaks or releases).	2	B1-069 and B1-070	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, PCBs (0-1')
Former Diesel Fuel Spill Area	AOC G	DCC Figure 3-1	Waste oil was applied to the road surface for dust control. The application area was on the west side of Slab Haul Road. Approximately 50 tons of soil were removed during remediation efforts. Several thin layers of asphalt were observed during the soil removal, suggesting that the waste oil application actually represented several asphalt paving events.	2	B1-071 and B1-072	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, PCBs (0-1')
Former Slab Cut-off Spill Area	AOC F	DCC Figure 3-1	Approximately 30 gallons of hydraulic oil were spilled on February 5, 1990. The oil discharged to the ground within the Slabbing Mill, between the Slab Yard and the Soaking Pits. The surface soil was observed to be oil-stained during the site inspection of 1991, but not during the 1997 visual site inspection.	2	B1-073 and B1-074	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, PCBs (0-1')
Oil (Fuel/Lube) House or Shop (5)		Drawings 5026, 5027, 5032, and 5038	Investigate potential impacts related to the fuel/lube oil houses and shops (potential leaks or releases).	10	B1-075 through B1-084	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, PCBs (0-1')
Glycol Tank		Drawing 5120-D	Investigate potential impacts related to the glycol tank (potential leaks or releases).	2	B1-085 and B1-086	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, PCBs (0-1')
Oil Storage Tank		Drawings 5027	Investigate potential impacts related to the oil storage tank (potential leaks or releases).	2	B1-087 and B1-088	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, PCBs (0-1')
Oily Waste Storage Tank		Drawing 5120-D	Investigate potential impacts related to the oily waste storage tank (potential leaks or releases).	2	B1-089 and B1-090	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, PCBs (0-1')
RCRA Regulated Storage Area	SWMU 193	DCC Figure IV-9	The regulated storage area contained drums of chromic acid, mercury, and antimony trichloride during the visual site inspection. The area was located inside the Former Skelp Mill Building. The area may have been the only RCRA permitted unit at Bethlehem Steel Corporation.	2	B1-091 and B1-092	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, PCBs (0-1')
Roll Shop (containing oil vats)		Drawing 5033	Investigate potential impacts related to the roll shop, which contained oil vats (potential leaks or releases).	2	B1-093 and B1-094	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, PCBs (0-1')

Parcel B1 Sampling Plan Summary
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

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
Scale Pit (Rolling Mill)	SWMU 92	DCC Figure 3-1	The Rolling Mill Scale Pit is located outdoors and on the southwest side of the Plate Mill. It contains a concrete pit which managed mill scale. The pit was designated as a unit managing non-hazardous waste, and no known releases were recorded.	2	B1-095 and B1-096	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, PCBs (0-1')
Scale Pit - Other (5)		Drawings 5026, 5033, 5120-D, and 5526	Investigate potential impacts related to the scale pits (potential leaks or releases), other than the Rolling Mill Scale Pit, discussed above.	10	B1-097 through B1-106	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, PCBs (0-1')
Settle Basin (2)		Drawing 5033	Investigate potential impacts related to the settle basins (potential leaks or releases).	4	B1-107 through B1-110	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, PCBs (0-1')
Soaking Pits (5)		DCC Figure 3-1	Investigate potential impacts related to the No. 1 through No. 5 soaking pits (potential leaks or releases).	10	B1-111 through B1-120	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, PCBs (0-1')
Spray Pond		Drawing 5033	Investigate potential impacts related to the smaller spray pond (potential leaks or releases), located adjacent to the Rolling Mills Impoundment (REC 9B), discussed below.	2	B1-121 and B1-122	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, PCBs (0-1')
Rolling Mills Impoundment	REC 9B, Finding 238	REC Location Map/ Drawing 5033	The Rolling Mills Impoundment was recognized in the DCC report from a 1952 aerial photograph. Weaver Boos observed this area to be vacant during the site visit, but speculated that hazardous substances and/or petroleum products may have been present based on experience and historical source information.	3	B1-123 through B1-125	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, PCBs (0-1')
Spray Water Strainer Room		Drawing 5126	Investigate potential impacts related to the spray water strainer room (potential leaks or releases).	2	B1-126 and B1-127	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, PCBs (0-1')
Storage Tank - Unknown Contents		Drawing 5026	Investigate potential impacts related to the storage tank with unknown contents (potential leaks or releases).	2	B1-128 and B1-129	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, PCBs (0-1')
Transformer Storage Area		Drawing 5132	Investigate potential impacts related to the transformer storage area (potential leaks or releases). The area may have held PCB-containing equipment.	2	B1-130 and B1-131	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, PCBs (0-1')
Waste Oil Stabilization/ Packing Area	REC 9A, Finding 233/ SWMU 194	REC Location Map/ DCC Figures 3-1 and IV-9	This unit consisted of a concrete pad, a soil/gravel area, and 28 dumpsters. The unit received drums of waste oil from around the site. The waste oil was typically contaminated with soil, speedy dry, and grease. Upon arrival, the drums were transported to the dumpsters and emptied. The oil within the dumpsters was then mixed with lime and/or soil to stabilize it. The concrete pad was described as severely cracked and stained in the RFA Report.	3	B1-132 through B1-134	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, PCBs (0-1')

Parcel B1 Sampling Plan Summary
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

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
Parcel B1 Coverage			Investigate potential impacts related to unknown historical activities, and characterize soil in areas not previously sampled.	24	B1-135 through B1-158	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, PCBs (0-1')
Possible PCB-Containing Area		PCB Inventory Map	Investigate potential impacts related to former possible PCB-containing transformer areas.	15	B1-159 through B1-173	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, PCBs (0-1')
Spare Parts Mat		Drawing 5132	MDE Request. Investigate potential impacts related to the spare parts mat (potential leaks or releases).	1	B1-174	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, PCBs (0-1')
Locomotive Repair Building		Drawing 5127	MDE Request. Investigate potential impacts related to the locomotive repair building (potential leaks or releases).	2	B1-175 and B1-176	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, PCBs (0-1')
Roll Shop Storage Yard		Drawing 5133	MDE Request. Investigate potential impacts related to the roll shop storage yard (potential leaks or releases).	1	B1-177	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, PCBs (0-1')
160" Plate Mill		DCC Figure	MDE Request. Investigate potential impacts related to the 160" Plate Mill (potential leaks or releases), and provide additional site coverage.	2	B1-178 and B1-179	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, PCBs (0-1')
60" Plate Mill		DCC Figure	MDE Request. Investigate potential impacts related to the 60" Plate Mill (potential leaks or releases), and provide additional site coverage.	2	B1-180 and B1-181	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, PCBs (0-1')
East Procesing Building		DCC Figure	MDE Request. Investigate potential impacts related to the East Processing Building (potential leaks or releases), and provide additional site coverage.	2	B1-182 and B1-183	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, PCBs (0-1')
			Total:	183				

Soil Borings Sampling Density Requirements (from **Worksheet 17 - Sampling Design and Rationale**)
No Engineered Barrier (>100 acres): 1 boring per 3 acres with no less than 40.
Engineered Barrier (>100 acres): 1 boring per 6 acres with no less than 20.
No Engineered Barrier (111.0 acres) = **40 borings required, 101 proposed**
Engineered Barrier (106.4 acres) = **20 borings required, 82 proposed**
Parking/Roads (59.2 acres)
Buildings (47.2 acres)

VOCs - Volatile Organic Compounds (Target Compound List)
SVOCs - Semivolatile Organic Compounds (Target Compound List)
Metals - (Target Analyte List plus Hexavalent Chromium and Cyanide)
DRO/GRO - Diesel Range Organics/Gasoline Range Organics
PCBs - Polychlorinated Biphenyls
bgs - Below Ground Surface
† Groundwater Samples are addressed by the Area B Groundwater Work Plan

APPENDIX D

Health and Safety Plan

Area B: Parcel B1
Tradepoint Atlantic
Sparrows Point, Maryland

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January 2016

ARM Project 150300M

Respectfully submitted,

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1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been prepared for employees of ARM Group Inc. (ARM) to address personnel health and safety requirements for employees of ARM and its subcontractors to complete a Phase II investigation on a portion of the Tradepoint Atlantic property that has been designated as Parcel B1. The on-site activities shall mostly consist of collection of soil samples. ARM will comply with industry-standard health and safety protocol and Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120 to prevent human exposure to volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), petroleum hydrocarbons, polychlorinated biphenyls (PCB) and metals present in site soil.

2.0 GENERAL INFORMATION

2.1 Site Description

Parcel B1, which is comprised of 217 acres of the approximately 3,100-acre former plant property, is located off of Sparrows Point Boulevard in Sparrows Point, Maryland. Parcel B1 is one of several parcels that make up a larger area, known as Area B, of the Tradepoint Atlantic facility. Area B and its parcels are shown on **Figure 1.**

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

2.2 Site Hazards

The following is a general description of the potential site hazards.

Chemical Hazards:

- VOCs, SVOCs, PCBs, petroleum hydrocarbons, and metals potentially present in soil.

Explosive Hazards:

- VOC and petroleum hydrocarbon vapors in boreholes and collection containers.

Physical Hazards:

- Slipping/tripping in work area
- Stress/fatigue from heat or cold temperatures
- Traffic
- Driving on steep slopes and/or off-road conditions
- Insect and animal bites
- Hand tools

Mechanical/Electrical Hazards:

- Underground utilities
- Heavy equipment (Geoprobe)
- Noise from heavy equipment operations
- Power tools

2.3 Utilities

Prior to initiating any subsurface investigations, all underground utilities will be cleared using the Miss Utility system. Additionally, EnviroAnalytics Group (EAG) will clear each proposed boring with utility personnel currently working on the property. The ARM staff will be responsible for avoiding any above ground utilities while operating vehicles on the site.

2.4 Waste Management

A small quantity of investigation derived waste (IDW) material will be generated as a result of the planned site work. These wastes could include decontamination fluids, soil cuttings, personal protective equipment (PPE) and disposable sampling equipment. All IDW will be containerized in steel 55-gallon drums for on-site treatment or off-site disposal, pending the receipt of analytical results. Specific procedures associated with the management of the IDW have been established in SOP 005, attached in Appendix A of the EPA approved Quality Assurance Project Plan (QAPP).

2.5 Site Controls and Security

It is the responsibility of ARM staff to keep unauthorized personnel away from the work areas during site work. All equipment used at the site must be secured or taken off-site. Subsurface intrusions should be covered to reduce any hazard that may be posed. Traffic cones, caution tape, physical barriers, or other such means as necessary shall be used to ensure that no unauthorized work area entry occurs.

3.0 OPERATING PROCEDURES

3.1 Air Monitoring

Due to the nature of the site activities and materials potentially present at the site, no vapor hazards are expected. If discernable odors are noted, then work will be temporarily suspended and air monitoring will be initiated using a PID or explosive gas indicator. If sustained vapor concentrations are measured at or above action levels in the breathing zone, work will immediately cease until such time as appropriate action is established. This action may require the upgrade of PPE or reevaluation of the need to proceed.

3.2 Personnel Protection

Personnel health and safety protection shall follow the guidelines provided by this HASP. Modifications to the HASP may be made by the field supervisor with the approval of the ARM Project Manager on a day-to-day basis as conditions change, based on existing conditions. Any necessary revisions must be fully documented by the field supervisor to include the specifics and rationalizations for the change.

It is anticipated that a modified Level D will be appropriate for the anticipated site activities. PPE associated with this designated level of protection (Level D), as established by the USEPA, is listed in a later section. Equipment listed for this level should be available to all personnel.

PPE will be stored in a clean, dry environment prior to it usage. Disposable equipment shall remain, in as much as possible, its original manufacturer's packaging to ensure its integrity. PPE that is assigned to a specific end user is subject to inspection by the supervisor at any time.

3.2.1 Determination of Level of Protection Requirements

The appropriate level of personnel protection must be established on the basis of ambient air monitoring responses. Air monitoring action levels should be consistent with the primary compounds of concern as listed in Table 3-1 (below). Appropriate action should be taken if total organic vapor air concentrations are sustained at a concentration equal to or greater than the PEL listed on Table 3-1.

Substance	CAS #	OSHA PEL (ppm)	IDLH (ppm)
Benzene	71-43-2	10	500
Toluene	108-88-3	200	500
Ethyl benzene	100-41-4	100	800
Xylenes	1330-20-7	100	900
Naphthalene	91-20-3	10	250
Tetrachloroethylene	127-18-4	100	150
Trichloroethylene	79-01-6	100	1,000

Notes: ppm = parts per million, PEL = Permissible Exposure Limit,
IDLH = Immediately Dangerous to Life or Health

This criterion will be applicable to all activities unless specific protection requirement for a certain task are addressed separately. As previously stated, it is anticipated that a modified Level D will be appropriate for the anticipated site activities; which requires a regular worker uniform, steel-toed safety shoes, hardhat, safety glasses and long paints. Level D will be considered the minimum protection level for all work on-site.

Respiratory protection against dust must also be considered during site work, particularly on windy days. The usage of dust respirators (high efficiency particulate air [HEPA] filters) will be determined by site conditions and judgment of the field supervisor. Sprinklers may be used to control dust during work activities.

3.2.2 Dermal Protection

In general, dermal protection levels will correspond with the respiratory protection level in use during an activity as described in other sections. For most activities on the site, Level D dermal protection will be adequate. When work tasks are such that a higher level of personal protection is required, dermal protection may be upgraded to coated Tyvek (Saranex) or chemical-resistant rain suit or Tyvek. This determination will be made by the ARM Field Supervisor as required.

Chemical and abrasion-resistant outer gloves and inner chemical-resistant disposable gloves would be required in the work zone to provide adequate protection of hands and assist in preventing transfer of contaminants. As much of the investigation may require handling of possibly contaminated equipment and soil, chemical-resistant gloves should be required for all on-site work with these materials. Various operations, which require dexterity and do not necessitate the abrasion-resistant feature of outer gloves, could be performed with the inner gloves only, at the direction of the ARM Field Supervisor.

3.2.3 Eye Protection

Since many volatile contaminants are capable of penetrating skin tissues, the eyes provide a potential route of entry into the body. Typically, volatile organic vapors will be detected in the air-monitoring program. Dust and air-borne particulates will be monitored visually and nuisance dust standards will be applied. If exceeded, dust masks will be donned. Eye protection requirements, beyond the use of safety glasses, must correspond to the respiratory protection level.

3.3 Task-Related Personnel Protection

At a minimum, all workers are required to wear long pants, steel toed shoes and a sleeved shirt at all times. Additional PPE will be required on a task-specific basis.

3.3.1 Installation of Geoprobe Soil Borings, Soil Logging and Soil Sampling Activities

All personnel should wear the following:

- Long pants and sleeved shirt/vest (high visibility)
- Steel toe safety boots
- Safety glasses with side shields
- Hearing protection
- Chemical resistant gloves

3.4 Explosion Prevention

Due to the potential presence of flammable materials at the site, the following safety guidelines must be followed to prevent the possibility of explosion:

a. All monitoring equipment will be intrinsically safe or explosion-proof, if used in areas of possible explosive atmospheres.

b. A fire extinguisher, first-aid kit, and an eye wash station will be located at the site within a short distance of site work.

c. Any compressed gas cylinders or bottles will be stored safely as required by the OSHA regulations. In addition, metal barriers must be provided and installed between oxygen and acetylene bottles, extending above the height of the regulators. At the end of each work shift, regulators shall be removed and replaced with protective caps.

d. No explosives, whatsoever, shall be used or stored on the premises.

e. All cleaning fluids or solvents must be stored and transported in OSHA-approved safety containers.

f. Propane, butane, or other heavier-than-air gases shall not be transported onto or used on-site unless prior approval is obtained in writing from the Project Manager and the Facility Operator.

4.0 DECONTAMINATION PROCEDURES

Decontamination procedures will be used on some field tasks, but not all, completed at the site. All decontamination operations may be performed at the sampling location unless the level of PPE is upgraded. If the level of PPE is upgraded, all decontamination operations will be performed in a central decontamination area and supervised by the ARM Field Supervisor. If necessary, a decontamination corridor will be set up adjacent to the area and equipped with brushes, plastic bags, and drum storage. Disposable outerwear and contaminated disposable equipment will be collected for future disposal. The ARM Field Supervisor would be required to inspect PPE and clothing to determine if decontamination procedures were sufficient to allow passage into the staging area.

The following decontamination facilities, as a minimum, will be provided in the staging area:

a. Hand washing facilities

b. First-aid kit

c. Eye wash station

d. Fire extinguisher

Proper on-site decontamination procedures, the use of disposable outer clothing, and field wash of hands and face as soon as possible after leaving the decontamination corridor could effectively minimize the opportunity for skin contact with contaminants.

4.1 Personnel Decontamination Procedures

Decontamination procedures should be as follows:

Level D decontamination will consist of:

1. Potable water wash and potable water rinse of boots and outer gloves (if worn).
2. Drum all visibly impacted disposable clothing.
3. Field wash of hands and face.

4.2 Equipment Decontamination

All equipment decontamination will be completed in accordance with the procedures referenced in Worksheet 21—Field SOPs, and Appendix A of the QAPP (SOP No. 016 Equipment Decontamination). The decontamination procedures that will be used during the course of this investigation include Decontamination Area (Section 3.1 of the SOP), Decontamination of Sampling Equipment (Section 3.5), Decontamination of Measurement Devices & Monitoring Equipment (Section 3.7), Decontamination of Subsurface Drilling Equipment (Section 3.8), and Document and Record Keeping (Section 5).

Level D personnel protection is required during equipment decontamination.

5.0 EMERGENCY CONTINGENCY INFORMATION

Pertinent emergency telephone numbers are listed in Table 5-1. This information must be reviewed by and provided to all personnel prior to site entry.

Table 5-1
Emergency Telephone Numbers

Facility/Title	Telephone Number
Fire and Police	911
Ambulance	911
James Calenda, EnviroAnalytics Group	(314) 620-3056
Eric Magdar, ARM Manager	Office: (410) 290-7775 Cell: (301) 529-7140
Hospital – Johns Hopkins Bayview	(410) 550-0350

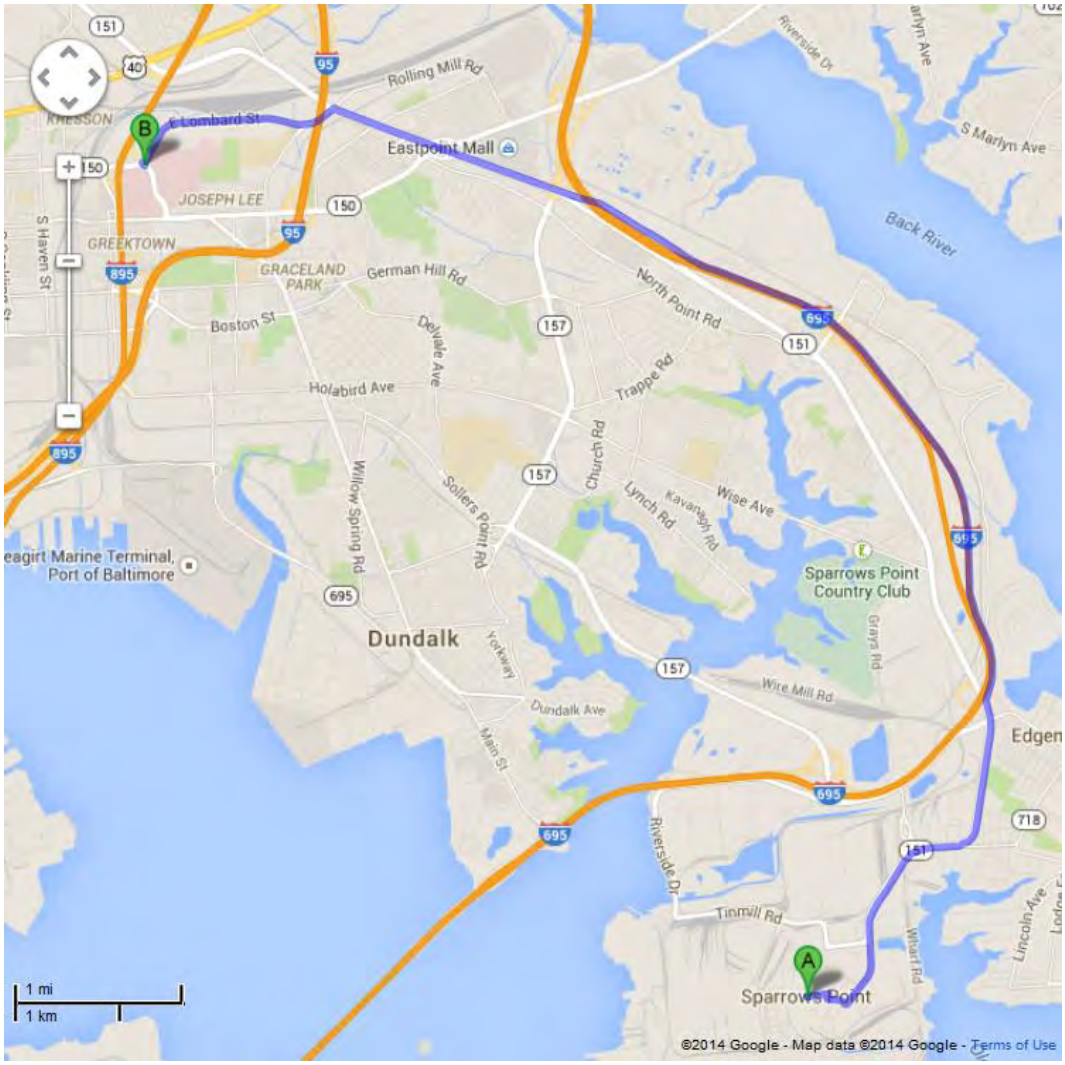
In the event of a fire or explosion, the site will be evacuated immediately and the appropriate emergency response groups notified. In the event of an environmental incident caused by spill or spread of contamination, personnel will attempt to contain the spread of contamination, if possible.

In the event of a personnel injury, emergency first aid would be applied on site by ARM as deemed necessary. The victim should be transported to the local medical facility if needed. The map to the hospital is provided below.

Hospital Route From Tradepoint Atlantic

Johns Hopkins Bayview
4940 Eastern Avenue
Baltimore, MD
(410) 550-0350

1. Start out going East on 7th Street.
2. Turn LEFT onto Sparrow Point Road.
3. Travel 1.4 miles and continue onto North Point Boulevard.
4. Travel 0.9 miles and turn slight right to merge onto I-695 North/Baltimore Beltway toward Essex.
5. Travel 3.4 miles and take EXIT 40 for MD-151/N. Pt. Blvd. N toward MD-150/East. Blvd W/Baltimore.
6. Travel 0.5 miles and merge onto MD-151 N/North Point Blvd.
7. Travel 2.0 miles and turn LEFT onto Kane Street.
8. Travel 0.2 miles and turn slight right onto E. Lombard Street.
9. Travel 1.2 miles and turn left onto Bayview Blvd.
10. Make a left at the emergency room of the hospital



6.0 ACKNOWLEDGEMENT OF PLAN

All site personnel are required to read and comply with the HASP. The following safety compliance affidavit should be signed and dated by each person directed to work on-site.

I have read this HASP and agree to conduct all on-site work in conformity with the requirements of the HASP. I acknowledge that failure to comply with the designated procedures in the HASP may lead to my removal from the site, and appropriate disciplinary actions by my employer.

Title and Company	Name	Signature	Date