Phase II Investigation
Work Plan

Area A: Parcel A2
Sparrows Point Terminal, LLC
Sparrows Point, Maryland

Prepared for:
EnviroAnalytics Group
1650 Des Peres Road, Suite 230
Saint Louis, Missouri 63131

Prepared by:
ARM Group Inc.
9175 Guilford Road
Suite 310
Columbia, MD 21046

September 15, 2015

ARM Project 150298M

Respectfully submitted,

Eric S. Magdar
Senior Geologist

T. Neil Peters, P.E.
Vice President

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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 Sparrows Point Terminal, LLC property that has been designated as Area A, Parcel A2 (the Site). Parcel A2 is comprised of 41 acres of the approximately 3,100-acre former plant property located as shown on **Figure 1**.

Site characterization of Parcel A2 will be performed in compliance with requirements pursuant to the following:

- Administrative Consent Order (ACO) between Sparrows Point Terminal, LLC (SPT) and the Maryland Department of the Environment (effective September 12, 2014); and
- Settlement Agreement and Covenant Not to Sue (SA) between 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 A2 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.

The Site is partially occupied by the Reservoir Warehouse and DACS Building. SPT is seeking to put these buildings back into commercial use as soon as feasibly possible. SPT is proposing a focused Building Occupancy Assessment (BOA) of the Reservoir Warehouse and DACS Building as part of this Work Plan to verify that the current conditions within, below and around the buildings would not pose a potentially unacceptable risk to commercial workers occupying the buildings.

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 steelmaking operations at the Facility ceased in fall 2012.

Groundcover at the Site is comprised of entirely natural soils based on the approximate shoreline of the Sparrows Point Peninsula in 1916, as shown on Figure 2 (Adapted from Figure 3 on the Description of Current Conditions Report (DCC) report prepared by Rust Environmental and Infrastructure, dated January 1998).

Parcel A2 is partially occupied by the Reservoir Warehouse and DACS Building. The Reservoir Warehouse was formerly used for material storage of refractory supplies, electrical, and other parts. The DACS building, also called the In Process Storage Building, was also used for storage of materials, most notable several drums containing lubricants.

Historically, the portion of Parcel A2 not occupied by the Reservoir Warehouse and DACS Building was occupied by roads and open or wooded areas.

1.3 Sampling Design and Rationale

1.3.1 Reservoir Warehouse and DACS BOA

According to the Phase I Environmental Site Assessment (ESA) prepared by Weaver Boos Consultants, dated May 19, 2014, "suspect asbestos containing materials such as transite panels" were observed in the Reservoir Warehouse and DACS Building. As part of the Work Plan development process, ARM and EAG conducted a walkthrough inspection of the Reservoir Warehouse and DACS Building. During the walk through inspection ARM observed both buildings to be empty and inactive, with no evidence of asbestos-containing materials or releases of any kind.

Exposure Pathway Analysis

The building is served by public water and there is no groundwater use on site. Therefore, exposure to groundwater is not a potential concern.

The exterior of the building would be used only for worker parking and truck traffic. While the majority of the exterior of the building is not entirely paved, there is only a minimal potential for commercial workers to come into contact with or ingest soil while they walked into the building

from their vehicle. Given the historic use of this building, and the very short duration of any potential exposure outside of the building, the potential risk associated with exposure to the soils surrounding the building would be expected to be minimal.

Any required construction or subsurface utility work would be performed by SPT's contractors, and the lease would include a restriction to prevent the tenant from disturbing any pavement or doing any excavation on the property without measures protective of workers' health and approved protocols. Therefore direct contact with the soil outside of the building, and potential exposure by dermal contact or incidental ingestion or by inhalation of vapors in an excavation, are not pathways of concern.

If the subsurface has been impacted by releases of Volatile Organic Compounds (VOCs) from the materials stored in the buildings, or from operations on the adjoining areas of the property, there is a potential for volatilization from the subsurface. In this case, workers in the building could be exposed to VOC constituents accumulating in the indoor air. This pathway will be evaluated in the BOA through the collection of sub-slab soil gas samples.

Based on the potential exposures described above, an evaluation of the potential for impacts to indoor air will be sufficient to assess the risk to a commercial worker presented by the proposed use of the existing building.

The proposed sub-slab soil gas sample locations are provided on **Figures 3 through 7** (attached).

1.3.2 Parcel-wide Investigation

Across the whole Sparrows Point 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, a boring was placed at or next to 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. Additional Findings (non-RECs) from the Phase I ESA which were identified as Potential Environmental Concerns were also reviewed and targeted as applicable. There were no findings or RECs identified at the Site.

Following the identification and evaluation of all RECs at the Site, SWMUs and Areas of Concern (AOCs) were identified from the DCC report. There were no additional Findings, SWMUs, or AOCs identified at the Site outside of the Reservoir Warehouse or DACS Building.

Following the identification of all SWMUs and AOCs, three (3) 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), and the 5500 Set (Plant Sewer Lines). A summary of the specific drawings covering the Site is presented in the table below:

Parcel A2 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.)	5057	4/27/1959	3/11/1982
		5062	2/8/1962	3/11/1982
Plant Index	Roads, water bodies, demolished buildings/structures, electric lines, above-ground pipelines	5157	*Unknown*	11/10/2008
		5162	*Unknown*	3/6/2008
Plant Sewer Lines	Same as above plus trenches, sumps, underground piping (includes pipe materials)	5557	*Unknown*	2/2/1976
		5562	3/15/1976	3/15/1976

These drawings only partially cover the Site boundary. 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, additional sampling target that were identified at the Site include: a dredge disposal dike/area, an electric substation, and several truck loading bays.

Additional sample locations were added to fill in areas with insufficient coverage (large spatial gaps between proposed borings) within the Site. The density of soil gas sampling points and soil borings was maintained above the requirements set forth in **Worksheet 17 – Sampling Design and Rationale**. Parcel A2 contained a total of 29.2 acres without engineered barriers, and 11.4 acres with engineered barriers (buildings/parking). Of the 11.4 acres containing engineered barriers, 8.0 acres contained building footprints (sampling covered by sub-slab soil gas), and 3.4 acres contained parking. In accordance with the relevant sampling density requirements, a minimum of 20 soil bores were required in the area without engineered barriers, and a minimum of 2 soil bores were required in the parking sections. 18 soil gas locations were required within the buildings themselves, with 15 samples found in the Reservoir Warehouse and 3 samples found in the DACS building. **Figures 3 through 7** show the proposed borings and the Site boundary overlain on the relevant figures and drawings from the historical documents.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

2.1 Project Personnel

The site characterization of Area A Parcel A2 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. Rachel Christner 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 to protect investigation workers from possible exposure to contaminated soil and groundwater.

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.

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 A.**

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 Quality Assurance Project Plan (QAPP) that has been developed to support the investigation and remediation of the Sparrows Point Terminal Site (Sparrows Point Terminal Quality Assurance Project Plan, ARM Group Inc. April 2015).

The proposed schedule of this investigation is contained in this work plan. All site characterization activities will be conducted under the site-specific health and safety plan (HASP); which is provided as **Appendix B**.

3.3 Soil Investigation

Soil samples will be collected according to procedures referenced in the **Quality Assurance Plan** (QAPP) **Worksheet 21—Field SOPs** (Standard Operating Procedures) and **Appendix A** of the QAPP**.**

Regarding soil sampling depth, a shallow sample will be collected from the 0 to 1 foot depth interval, and a deeper sample 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 5 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** 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 Groundwater Sampling Pumps** (Section 3.6), **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, Oil & Grease, 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 Soil Gas Investigation

To determine if historical on-site activities have negatively impacted the soil beneath the Reservoir Road Warehouse and DACS Building and to determine if there is a potentially unacceptable risk associated with the vapor intrusion to indoor air risk pathway, sub-slab soil gas samples will be collected from temporary monitoring probes installed at each of the locations provided on **Figures 3 through 7**. The final locations for all sub-slab soil gas sampling points will be verified in the field by the MDE project manager. Additional soil gas sampling locations may be required to ensure adequate coverage of the Reservoir Warehouse and DACS Building. Soil gas samples will be collected according to procedures outlined in QAPP **Worksheet 21—Field SOPs** and **Appendix A** of the QAPP**.**

3.5 Groundwater Investigation

Groundwater samples will be collected according to procedures referenced in the QAPP **Worksheet 21—Field SOPs** and **Appendix A** of the QAPP**.** There are no existing monitoring wells located within the Parcel A2 boundaries; therefore, groundwater samples will be collected from temporary piezometers. Sample locations where piezometers will be installed include: A2-013-PZ, A2-022-PZ, A2-025-PZ, and A2-31-PZ.

All groundwater samples will be analyzed for TCL-VOCs, TCL-SVOCs, TAL-Dissolved Metals, Oil & Grease, hexavalent chromium, and cyanide. 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**.

ARM will check each piezometer for the presence of LPH using an oil-water interface probe, in accordance with methods referenced in the QAPP **Worksheet 21—Field SOPs** and **Appendix A** of the QAPP. All piezometers will also be surveyed to obtain groundwater elevation data. The elevation data from these piezometers will be used to create a groundwater contour map indicating groundwater flow direction.

Once each PVC piezometer has been sampled, surveyed and/or checked for LPH, it will be emptied, removed and discarded. The boreholes will then be abandoned in accordance with Maryland abandonment standards as stated in COMAR 26.04.04.34 through 36.

3.6 Sample Documentation

3.6.1 Sample Numbering

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

3.6.2 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**.

3.7 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 A**. The samples will be submitted for analysis with a standard turnaround time (approximately 10 work days). The specific list of compounds and analytes that the soil gas, soil and groundwater samples will be analyzed for, as well as the quantitation limits and project action limits, is provided in **Worksheet 15 – Project Action Limits and Laboratory-Specific Detection/Quantitation Limits**.

4.0 QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

All soil and groundwater 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
  - Water - VOCs only
- Blind Field Duplicate – at a rate of one duplicate per twenty samples
  - Water - VOC, SVOC, Metals
  - Soil - VOC, SVOC, Metals
- Matrix Spike/Matrix Spike Duplicate – at a rate of one per twenty samples
  - Water - VOC, SVOC, Metals
  - Soil - VOC, SVOC, Metals

The QC samples will be collected and analyzed in accordance with the QAPP **Worksheet 12—Measurement Performance Criteria, Worksheet 20—Field Quality Control** and **Worksheet 28—Analytical Quality Control and Corrective Action.**

Since all samples will be collected using dedicated disposable sampling equipment, no equipment blanks will be required.

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** and **Appendix A** of the QAPP**.**

6.0 DATA VALIDATION

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

7.0 REPORTING

Following the receipt of all sampling results from "Area A Parcel A2", 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 activities below are planned so that they may be completed within six months of agency approval of this Work Plan. In addition, the investigation report will be submitted to the regulatory authorities within two months of completion of the field investigation in accordance with these approximate timeframes:

- the sample collection activities will take approximately four (4) weeks to complete (including mobilization activities) once approval of the work plan is received with the BOA being performed first;
- the soil and groundwater sample analysis, data validation and review is expected to require an additional six (6) weeks to complete; and

the preparation of the investigation report, including an internal Quality Assurance Review cycle, will require another four (4) weeks.

FIGURES

ARM Group Inc.
Earth Resource Engineers and Consultants

0 375 750 1,500 Feet

Parcel Boundary
Site Boundary
Private Property

Sparrows Point
Area A and Area B Parcels

September 3, 2015

EnviroAnalytics Group	Sparrows Point Terminal
Area A: Project 150298M Area B: Project 150300M	Baltimore County, MD

Figure 1

ARM Group Inc.
Earth Resource Engineers and Consultants

0 500 1,000 2,000 Feet

Land
Marsh
Water
Parcel Boundary
Site Boundary

Approximate Shoreline in 1916

September 3, 2015

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

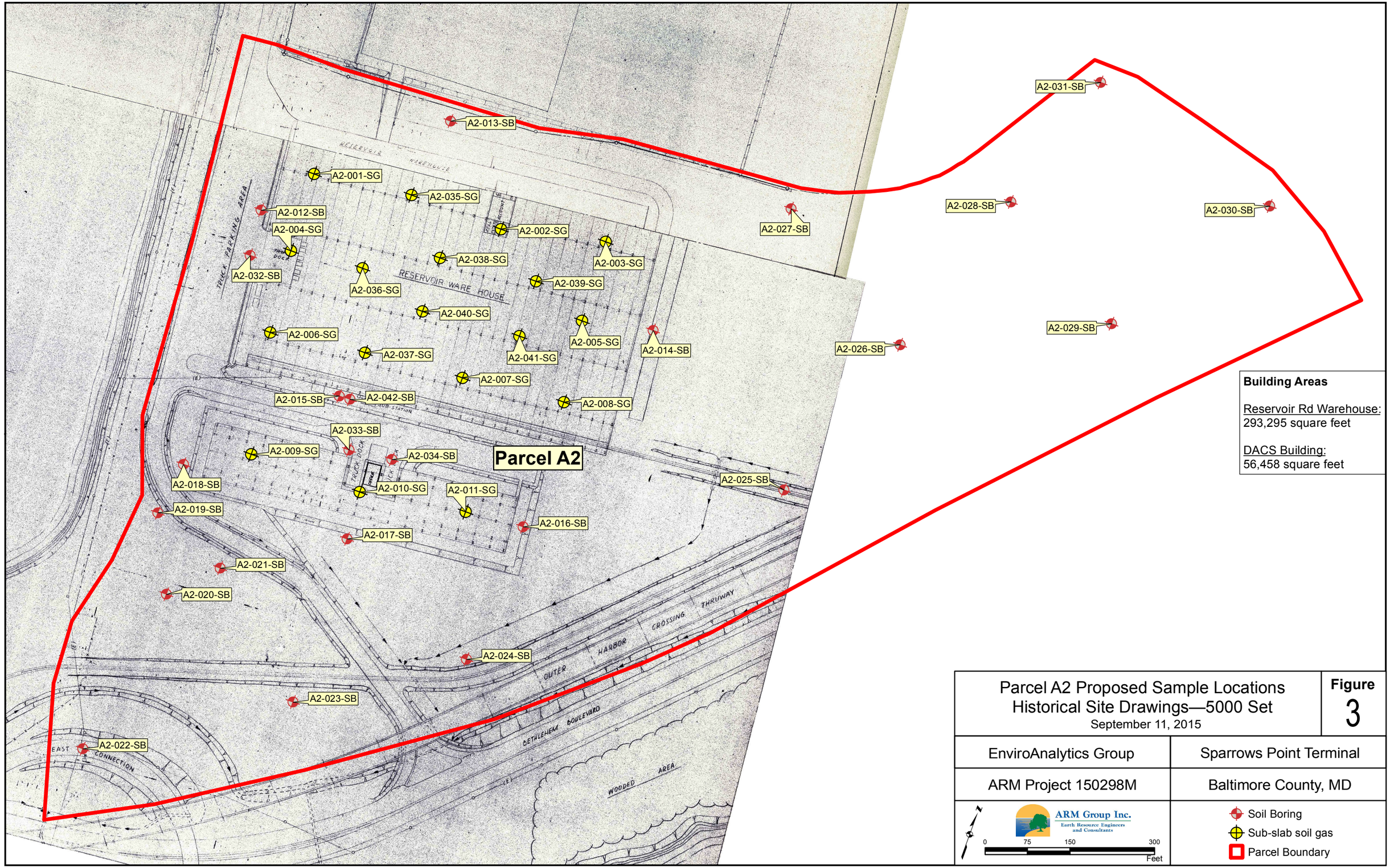
EnviroAnalytics Group

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

Sparrows Point Terminal

Baltimore County, MD

Figure 2



Building Areas

Reservoir Rd Warehouse:
293,295 square feet

DACS Building:
56,458 square feet

Parcel A2 Proposed Sample Locations
Historical Site Drawings—5000 Set

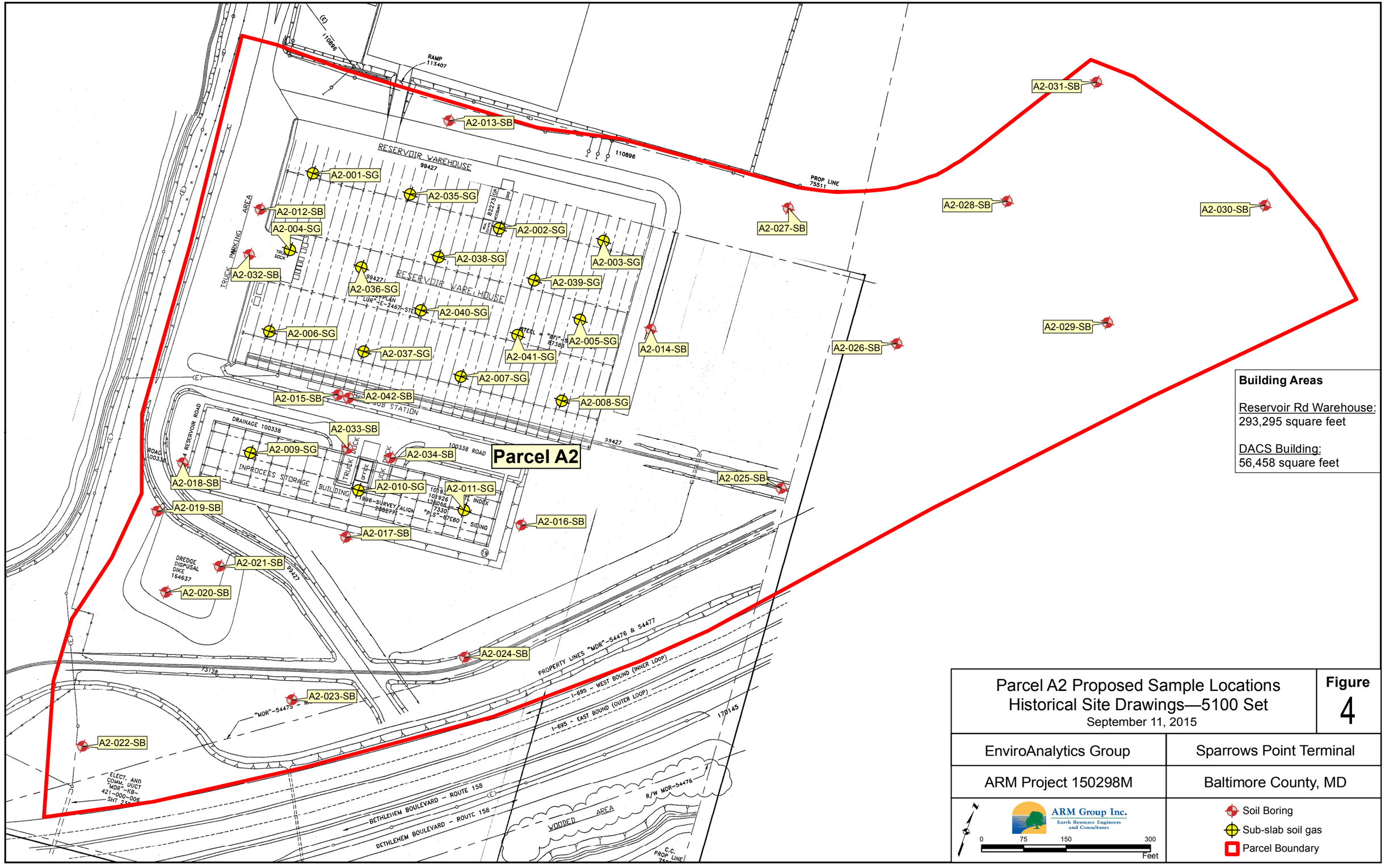
September 11, 2015

Figure 3

EnviroAnalytics Group	Sparrows Point Terminal
ARM Project 150298M	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

- Soil Boring
- Sub-slab soil gas
- Parcel Boundary



Building Areas

Reservoir Rd Warehouse:
293,295 square feet

DACS Building:
56,458 square feet

Parcel A2 Proposed Sample Locations Historical Site Drawings—5100 Set September 11, 2015	Figure 4
EnviroAnalytics Group	Sparrows Point Terminal
ARM Project 150298M	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 75 150 300
Feet

- Soil Boring
- Sub-slab soil gas
- Parcel Boundary

A2-001-SG
A2-002-SG
A2-003-SG
A2-004-SG
A2-005-SG
A2-006-SG
A2-007-SG
A2-008-SG
A2-009-SG
A2-010-SG
A2-011-SG
A2-012-SB
A2-013-SB
A2-014-SB
A2-015-SB
A2-016-SB
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A2-025-SB
A2-026-SB
A2-027-SB
A2-028-SB
A2-029-SB
A2-030-SB
A2-031-SB
A2-032-SB
A2-033-SB
A2-034-SB
A2-035-SG
A2-036-SG
A2-037-SG
A2-038-SG
A2-039-SG
A2-040-SG
A2-041-SG
A2-042-SB

Parcel A2

RESERVOIR WAREHOUSE
TRUCK PARKING AREA
TRUCK DOCK
RESERVOIR WARE HOUSE
OUTER HARBOR CROSSING THRUWAY
WOODED AREA
EAST CONNECTION

Building Areas

Reservoir Rd Warehouse:
293,295 square feet

DACS Building:
56,458 square feet

Parcel A2 Proposed Sample Locations Historical Site Drawings—5500 Set

September 11, 2015

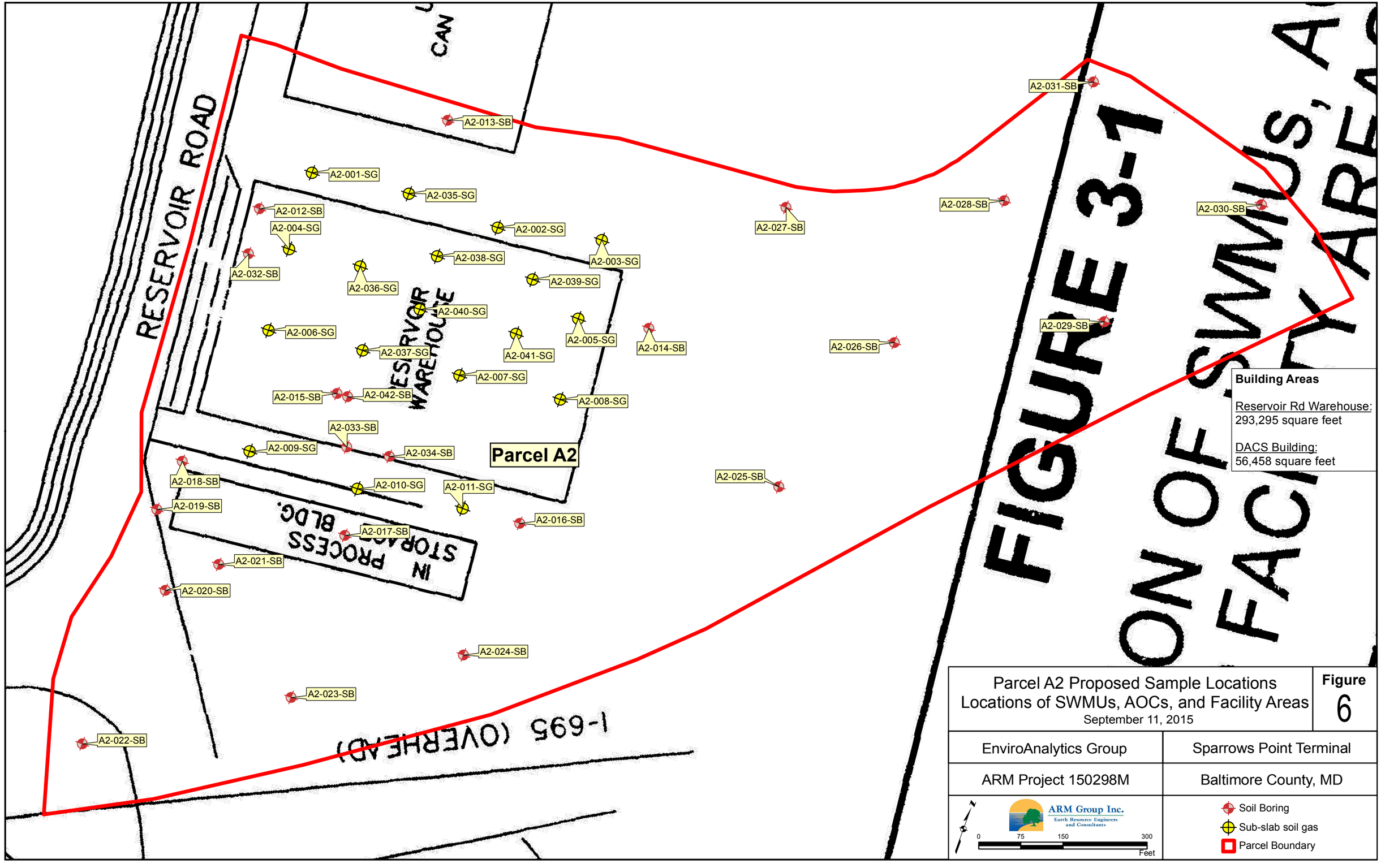
Figure 5

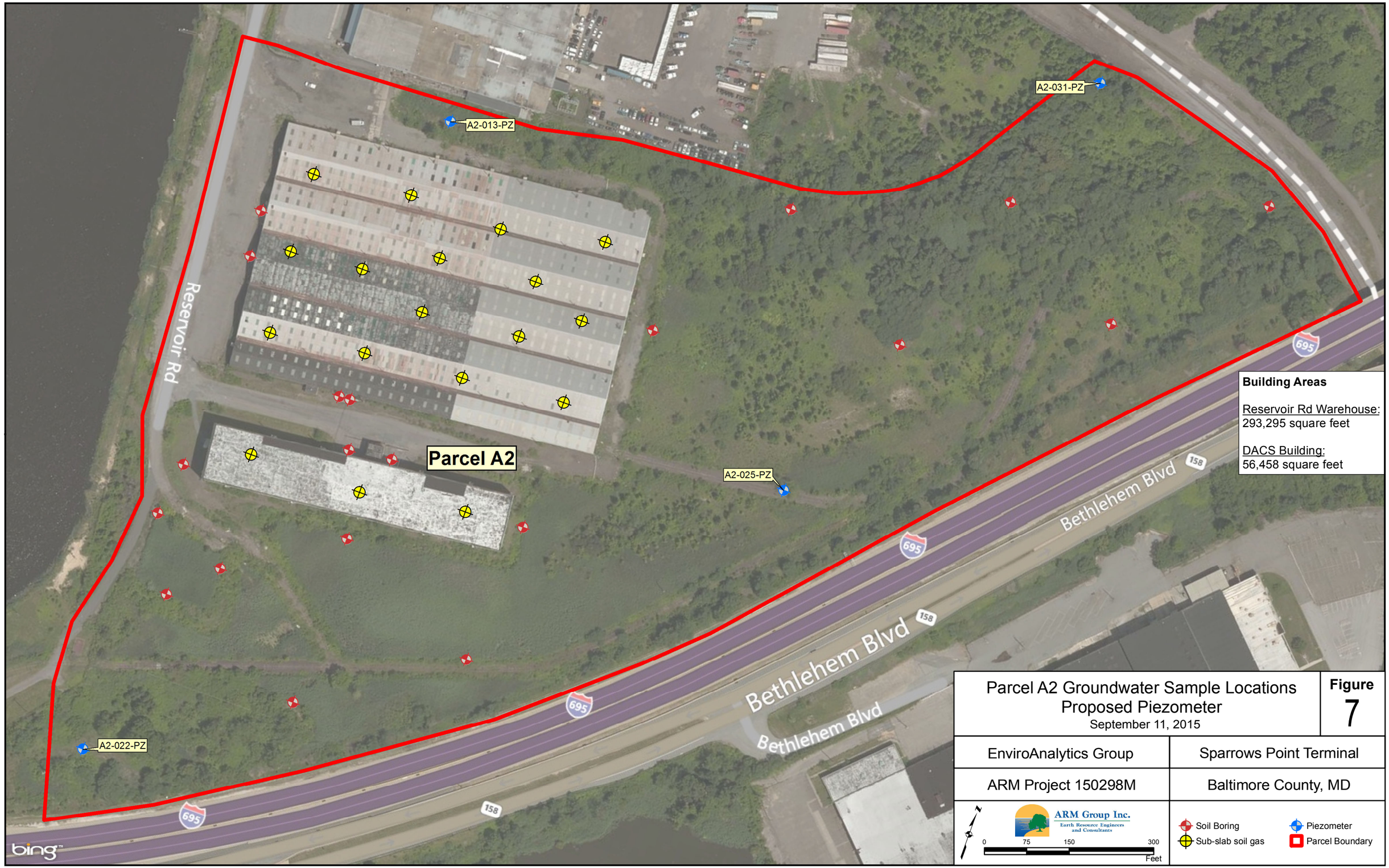
EnviroAnalytics Group	Sparrows Point Terminal
ARM Project 150298M	Baltimore County, MD

ARM Group Inc.
Earth Resource Engineers and Consultants

0 75 150 300
Feet

- Soil Boring
- Sub-slab soil gas
- Parcel Boundary


RESERVOIR ROAD
A2-001-SG
A2-035-SG
A2-012-SB
A2-004-SG
A2-002-SG
A2-038-SG
A2-003-SG
A2-032-SB
A2-036-SG
A2-039-SG
A2-040-SG
A2-006-SG
A2-037-SG
A2-041-SG
A2-005-SG
A2-014-SB
A2-007-SG
A2-015-SB
A2-042-SB
A2-008-SG
A2-033-SB
A2-009-SG
A2-034-SB
Parcel A2
A2-018-SB
A2-010-SG
A2-011-SG
A2-019-SB
A2-016-SB
A2-017-SB
A2-021-SB
A2-020-SB
A2-024-SB
A2-023-SB
A2-022-SB
I-695 (OVERHEAD)
A2-013-SB
A2-027-SB
A2-031-SB
A2-028-SB
A2-030-SB
A2-029-SB
A2-026-SB
A2-025-SB
FIGURE 3-1
Building Areas
Reservoir Rd Warehouse:
293,295 square feet
DACS Building:
56,458 square feet
Parcel A2 Proposed Sample Locations
Locations of SWMUs, AOCs, and Facility Areas
September 11, 2015
Figure
6
EnviroAnalytics Group
Sparrows Point Terminal
ARM Project 150298M
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
75
150
300
Feet
Soil Boring
Sub-slab soil gas
Parcel Boundary


A2-013-PZ
A2-031-PZ
A2-025-PZ
A2-022-PZ
Parcel A2
Reservoir Rd
Bethlehem Blvd
Bethlehem Blvd
Bethlehem Blvd
695
695
695
158
158
158
bing
Building Areas
Reservoir Rd Warehouse:
293,295 square feet
DACS Building:
56,458 square feet
Parcel A2 Groundwater Sample Locations
Proposed Piezometer
September 11, 2015
Figure
7
EnviroAnalytics Group
Sparrows Point Terminal
ARM Project 150298M
Baltimore County, MD
ARM Group Inc.
Earth Resource Engineers and Consultants
0
75
150
300
Feet
Soil Boring
Piezometer
Sub-slab soil gas
Parcel Boundary

Appendix A

Parcel A2 Sampling Plan Summary
Former Sparrows Point Steel Mill
Sparrows Point, Maryland

Table 1 - Soil Gas Samples

Sample Location(s)	Source Area/ Description	Number of Borings	REC & Finding/ SWMU/AOC	Boring Depth	Sample Depth	Analytical Parameters	RATIONALE
						Soil Gas Samples	
A2-001, A2-003 through A2-008, A2-035 through A2-041	Reservoir Warehouse	14		6 inches below bottom of concrete slab	6 inches below bottom of concrete slab	VOCs	Investigate potential impacts related to historical activities or materials stored in Reservoir Warehouse.
A2-002	Reservoir Warehouse "Fuel Room"	1		6 inches below bottom of concrete slab	6 inches below bottom of concrete slab	VOCs	Investigate potential impacts from releases from Fuel Room.
A2-009 through A2-011	DACS Building	3		6 inches below bottom of concrete slab	6 inches below bottom of concrete slab	VOCs	Investigate potential impacts related to historical activities or materials stored in DACS Building.
Total:		18					

Soil Gas Sampling Density Requirements (from **Worksheet 17 - Sampling Design and Rationale**)
Sub-Slab: 1 sample collected per 20,000 ft^2, with a minimum of 3 per building
Reservoir Warehouse (293,295 ft^2) = **15 Samples**
DACS Building (56,458 ft^2) = **3 Samples**

VOCs - Volatile Organic Compounds (Target Compound List)

Table 2 - Soil Borings

Sample Location(s)	Source Area/ Description	Number of Borings	REC & Finding/ SWMU/AOC	Boring Depth	Sample Depth	Analytical Parameters		RATIONALE
						Soil Samples	Groundwater Samples†	
A2-019 through A2-021	Dredge Disposal Dike	3		Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. Last interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, O&G, PCBs		Investigate potential impacts related to dredging/dredged material.
A2-012, A2-032 through A2-034	Truck Loading Bay	4		Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. Last interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, O&G, PCBs		Investigate potential impacts related to loading/unloading of materials in truck bays.
A2-015, A2-042	Electric Substation	2		Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. Last interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, O&G, PCBs		Investigate potential impacts related to presence of electric substation.
A2-013, A2-014, A2-016 through A2-018, A2-022 through A2-031	Parcel A2 coverage	15		Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. Last interval may be adjusted in the field based on observations or field screening.	VOC, SVOC, Metals, O&G, PCBs	VOC, SVOC, O&G, Dissolved Metals	Investigate potential impacts related to historical activities, and characterize soil and groundwater in areas not previously sampled.
Total:		24						

Soil Borings Sampling Density Requirements (from **Worksheet 17 - Sampling Design and Rationale**)
No Engineered Barrier (16-40 acres): 1 boring per 1.5 acres with no less than 15 borings
Engineered Barrier (1-15 acres): 1 boring per 2 acres with no less than 2
No Engineered Barrier (29.2 acres) = **20 Samples**
Engineered Barrier - Parking/Buildings (11.4 acres)
Parking (3.4 acres) = **2 Samples**
Building Footprints (8.0 acres) = **N/A** (Covered by Soil Gas, see Table 1)

VOCs - Volatile Organic Compounds (Target Compound List)
SVOCs - Semivolatile Organic Compounds (Target Compound List)
Metals - (Target Analyte List plus Hexavalent Chromium and Cyanide)
O&G - Oil and Grease
PCBs - Polychlorinated Biphenyls
bgs - Below Ground Surface
†Field measurements include pH, DO, ORP, conductivity, temperature.

APPENDIX B

Health and Safety Plan

Area A: Parcel A2
Sparrows Point Terminal, LLC
Sparrows Point, Maryland

Prepared for:
EnviroAnalytics Group
1650 Des Peres Road
Suite 230
Saint Louis, Missouri 63131

Prepared by:
ARM Group Inc.
9175 Guilford Road
Suite 310
Columbia, MD 21046

August 2015

ARM Project 150298M

Respectfully submitted,

Eric S. Magdar
Senior Geologist

T. Neil Peters
Vice President

TABLE OF CONTENTS

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 Sparrows Point Terminal, LLC property that has been designated as Parcel A2. The on-site activities shall include the following: collection of soil samples, installation and purging of temporary piezometers, and the collection of groundwater 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 and groundwater.

2.0 GENERAL INFORMATION

2.1 Site Description

Parcel A2, which is comprised of 41 acres of the approximately 3,100-acre former plant property, is located off of Sparrows Point Boulevard in Sparrows Point, Maryland. Parcel A2 is one of nine parcels that make up a larger area, known as Area A, of the Sparrows Point facility. Area A and its parcels are shown on **Figure 1.**

From the late 1800s until 2012, the Sparrows Point Terminal, LLC 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 and petroleum hydrocarbons potentially present in soil and groundwater.

Explosive Hazards:

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

Physical Hazards:

- Slipping/tripping in work area
- Stress/fatigue from heat or cold temperatures
- Traffic
- Driving on steep slopes in 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 material will be generated as a result of the planned site work. These wastes will include decontamination water and soil cuttings. All soil cuttings will be returned to their respective borehole. Decon water will be containerized in steel 55-gallon drums for on-site treatment, off-site disposal or discharge to ground surface, pending the receipt of analytical results. Waste will also include used personnel protective equipment (PPE) and disposable sampling equipment that may contain some chemical residue. These materials will be collected and disposed of in a municipal waste dumpster, unless visibly affected. Based on information of the site subsurface conditions, no grossly contaminated material is expected to be generated. Should such waste be generated, the materials will be stored in a steel 55-gallon drum for subsequent off-site disposal.

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,
STEL = Short Term 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, groundwater, or 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 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 and Piezometers, Installation of Soil Gas Points, 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

3.3.2 Groundwater Sampling

All personnel should wear the following:

- Long pants and sleeved shirt/vest (high visibility)
- Steel toe safety boots
- Safety glasses with side shields
- 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 will 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 and bagged 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. Bag or drum all visibly impacted disposable clothing.

3. Field wash of hands and face.

4.2 Equipment Decontamination

All equipment such as drilling and excavation equipment, tools, and pumps should be cleaned with potable water and a non-phosphate detergent (Liquinox), to prevent cross-contamination during the field effort and prior to equipment being taken from the site. Specific procedures for decontamination of field equipment would be established by the ARM Project Manager in order to prevent cross contamination by the drilling or sampling equipment.

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

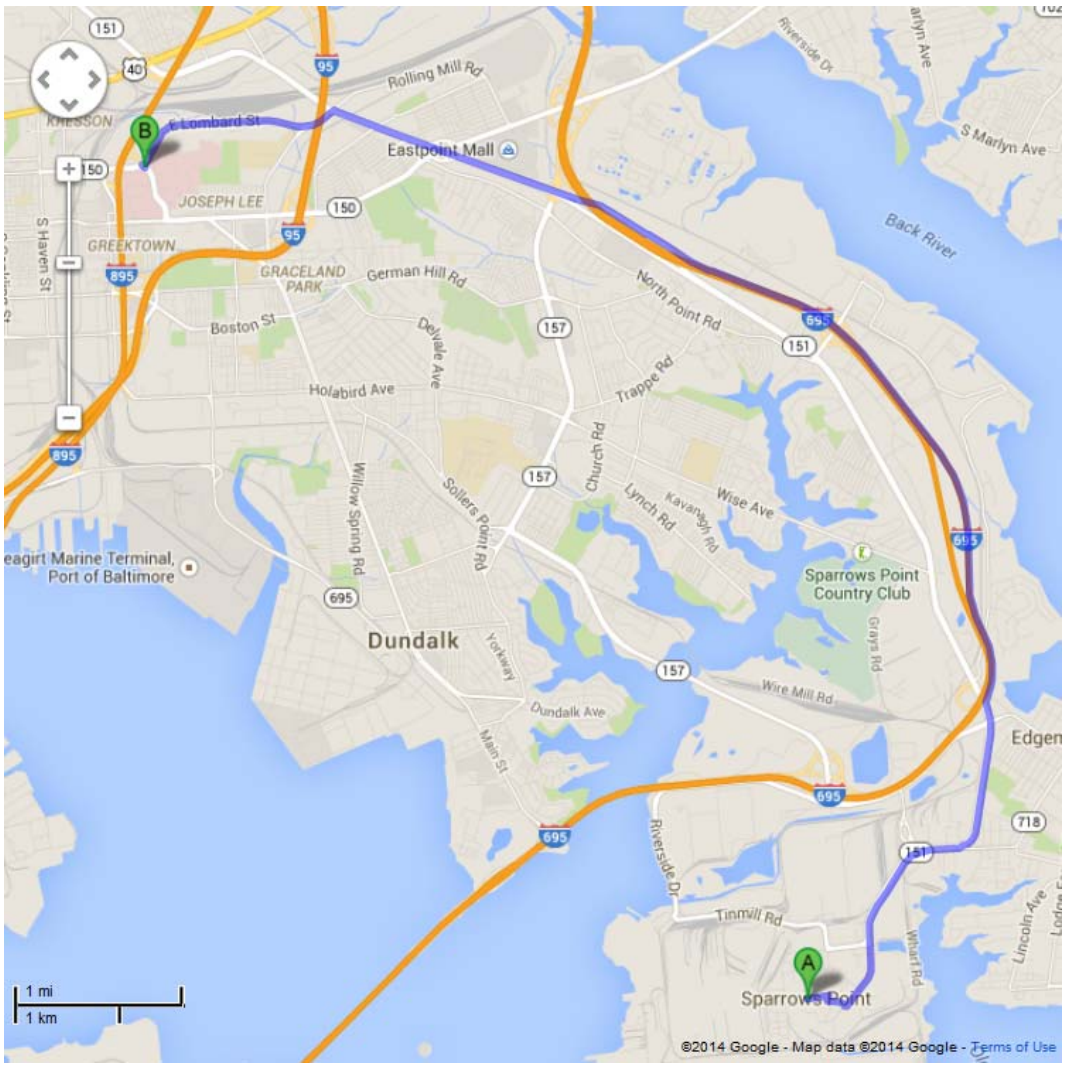
In the event of a fire or explosion, the site will be evacuated immediately and the appropriate emergency response groups notified. In the event of an environmental incident caused by spill or spread of contamination, personnel will attempt to contain the spread of contamination, if possible.

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 Sparrows Point Terminal

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

FIGURE

ARM Group Inc.
Earth Resource Engineers and Consultants

0 375 750 1,500 Feet

Parcel Boundary
Site Boundary
Private Property

Sparrows Point
Area A and Area B Parcels

September 3, 2015

EnviroAnalytics Group	Sparrows Point Terminal
Area A: Project 150298M Area B: Project 150300M	Baltimore County, MD

Figure 1